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Author(s): Richard A. Hudson

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CONJUNCTION REDUCTION, GAPPING, AND RIGHT-NODE RAISING

RICHARD A. HUDSON

University College London

It is argued that Conjunction Reduction, Gapping, and Right-node Raising are three separate phenomena in English, each having its own set of constraints and therefore needing a separate rule. Contrary to earlier analyses, these rules do not delete, but just raise. This is true even of Gapping, which is shown to be a special case of a more general rule of Conjunct Postposing, which is also responsible for 'split coördinations' like *John came, and Bill (too)*. All three rules appear to apply at the level of surface structure, and can be formulated in such a way that they leave that structure perhaps surprisingly unaffected.*

1. INTRODUCTION. The main topic of this paper is the way in which sentences such as the following should be handled in a grammar:

- (1) a. Mary opened the window at 8:00 and looked out.
- b. Mary cooked the first course and Jane the second.
- c. Mary likes, and Jane would go anywhere to find, antique horse-brasses from the workshop of that genius in metalwork, Sam Small.

Each of these sentences consists of two conjoined clauses in surface structure, and in each case it appears that one clause has something missing from its structure—e.g., in 1a the second clause lacks a subject. In order to make the defective clause complete, it would be sufficient to add to it one or more elements which are overt in the other clause: in the case of 1a, we can add *Mary* to the second clause; in 1b we can add *cooked* to the second clause; and in 1c, in which the first clause is incomplete, we can add to it *antique horse-brasses from the workshop of that genius in metalwork, Sam Small*. The standard transformational treatment is to say that the material which could be added to the incomplete clause was in fact part of the latter's structure at some stage in the derivation, until it got deleted by a transformation; and the name of this transformation, in at least some analyses, is Conjunction Reduction (hereafter CR) for 1a, Gapping for 1b, and Right-node Raising for 1c.¹

The reason for bringing together these three rules into a single paper, with the phenomena they cover, is that they share two properties which distinguish them from all other rules that I know of: they reduce the length of a coördinate structure by reducing all but one of the conjuncts, and they apply only to coördinate structures (with certain important exceptions for Right-node Raising, discussed

* My main debt is to Geoff Pullum, who spent a lot of time going through an earlier version of this paper (distributed by the Indiana University Linguistics Club under the title 'Conjunction Reduction, Gapping, Hacking and the preservation of surface structure'), pointing out all the mistakes and telling me about work I should have taken account of. If it weren't for the fact that he disagrees with a lot of what remains, his name should have appeared as co-author. I also benefited from comments from Neil Smith and from Arnold Zwicky.

¹ In the earlier paper I used the term 'Hacking' instead of Right-node Raising, not having realized that the latter term is already rather well established (cf. Postal 1974 : 125). 'Hacking' seemed to be an appropriate word, since the effect of the transformation is usually pretty unstylish.

below). It is most important to highlight the second of these characteristics, in order to avoid confusion later, since it means that we shall NOT be concerned here with any kind of reduction process that isn't restricted to coördinate structures. In particular, our rules are not intended to cover either NP's whose head is missing as a result of identity-of-sense anaphora (e.g. *John's* as in *John's is bigger than mine*), or clauses whose time or place adverbial is missing but understood from the context (e.g. *because it was too warm [in his study]* in *He turned the fire off in his study because it was too warm*). Not surprisingly, both of these types of reduction are possible in coördinate structures, since they are possible virtually anywhere; but since they aren't restricted to coördinate structures, it would be both unnecessary and misleading to demand that the rules of CR etc. should cover them.²

We shall need to be able to refer to the elements in sentences like 1a-c throughout this paper, so I propose to use the following terms. A COÖRDINATION is a string of two or more coördinated items (clauses, phrases, or words), and each of the items is a CONJUNCT. All the sentences in 1a-c are REDUCED COÖRDINATIONS, since in each case one of the conjuncts is incomplete, and some part of the other conjunct is the 'missing' bit; we can think of both conjuncts as 'sharing' this material (as *Mary* is 'shared' by both clauses in 1a), so we can refer to the overt material which is shared in this way as the SHARED ITEMS. The remainder of the conjuncts, excluding the shared items, can be called the NON-SHARED ITEMS. Thus the shared item in 1a is *Mary*, the non-shared items in the first conjunct are *opened the window at 8:00*, and the non-shared items in the second conjunct are *looked out*.

One advantage of this terminology is that it is neutral as to whether the surface structure is generated directly, or by deleting material from an underlying structure, as in most transformational analyses. I shall argue below that deletion transformations are unnecessary in generating reduced coördinations, so it is very helpful to have a neutral terminology on that score. Instead of deletion transformations, I

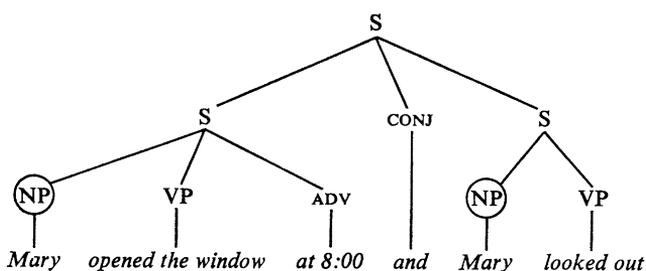


FIGURE 1

² Failing to distinguish between reduction rules that are restricted to coördinations and those that aren't can have serious consequences. Thus Harries (1973:149) uses the possibility of *my sister's garden and my friend's* as evidence that coördination reduction can delete material from the right-hand end of the right conjunct; but of course the lack of a head (*garden*) in the second conjunct is just an ordinary case of identity-of-sense anaphora. Jackendoff uses similar examples to prove that Gapping is possible in NP's (1971:29). Similarly, Harries (155) uses examples like *John left yesterday and Mary arrived* to show that time-adverbials can be deleted from the right-hand end of the right conjunct; but again, a time-adverbial in one clause can be understood to apply to another clause whether the two are coördinated or not, as in *John left yesterday whereas Mary arrived* (*whereas* isn't a conjunction that allows CR).

shall propose raising transformations, though these transformations will have rather unconventional formal properties. For sentences like 1a, we start with a non-reduced structure like Figure 1. (The items in the underlying structures which are due to be raised are circled.) We then raise both the *Mary*'s into the same position to the left of the first conjunct, giving Figure 2.

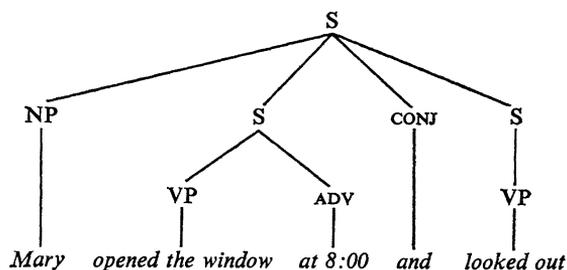


FIGURE 2

For sentence 1b, we start with an unreduced structure like Figure 3.

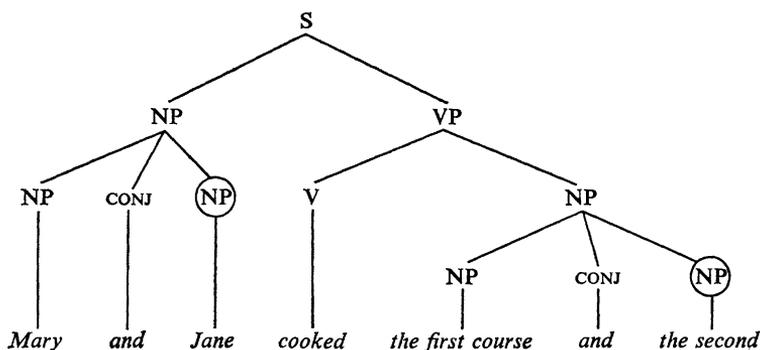


FIGURE 3

Then we convert it into Figure 4 by raising two embedded conjuncts to act as right sisters of the original sentence, each conjunct having started out in a separate coördination within the sentence.

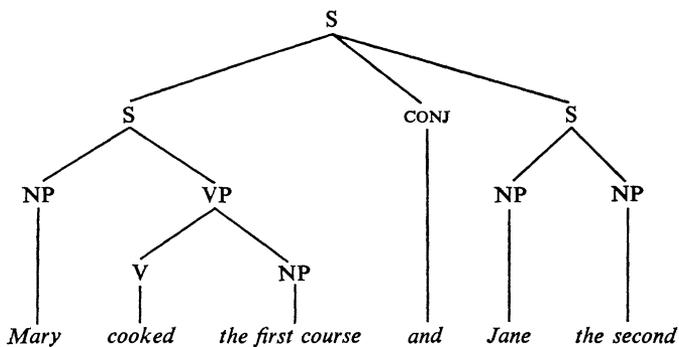


FIGURE 4

For 1c, we again start with an unreduced coördination, as in Figure 5.

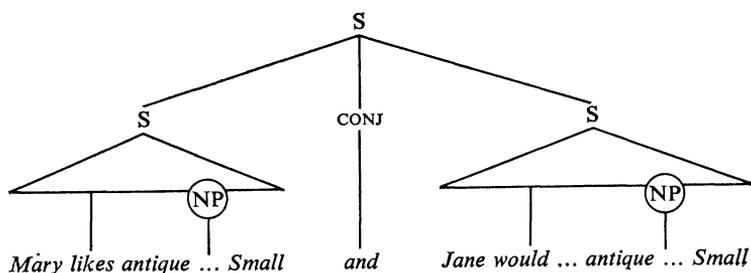


FIGURE 5

Here we raise both the occurrences of *antique horse-brasses ... Sam Small* into the same position to the right of the second conjunct, giving Figure 6.

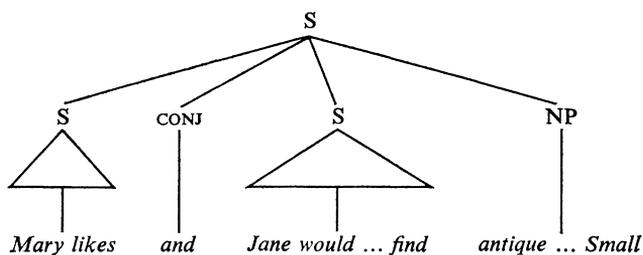


FIGURE 6

Having said this, I have to admit that I don't really believe that transformations are necessary at all, either for reduced coördinations or for any other construction. As I have argued elsewhere (Hudson 1971, 1974, 1976), if you replace phrase-structure rules by rules which variously classify constituents, introduce them (as dependent daughters or sisters), and order them from left to right, then you can do without rules that convert one structure into another. Clearly, to explain and justify such a claim for those readers who aren't immediately convinced by the previous sentence would take a very long article indeed, so it seems best to assume the transformational framework for the sake of the present paper. This allows me to concentrate on the descriptive questions connected with reduced coördinations, and in so doing to point out a number of implications of these constructions for conventional transformational theory—such as the fact that at least some rules appear to refer to functional similarities between constituents, while others refer to dependency relations between constituents. Also, as I have already noted, the rules I propose are formally unconventional, so their presence in a transformational grammar would somewhat enlarge the standard range of four or so types of transformation (Bach 1974:84). These relatively minor modifications apart, transformational theory allows reduced coördinations to be handled quite satisfactorily, so there would have been little point in using this paper to argue against transformational grammar as a whole.

One question which deserves a brief airing in this introduction is whether the phenomena that we shall be discussing really do need to be treated transformationally, in a transformational grammar—or whether they might be handled in some way in the BASE of such a grammar, without recourse to transformations. The question is worth asking, since at least one transformational treatment of CR (Dougherty 1970, 1971) considerably reduces the role of transformations in the generation of constructions which contain coördinations of phrases; and so it is at least worth considering the possibility that the trend might be pushed further, entirely eliminating transformations for CR. Dougherty proposes that the base rules should be allowed to generate coördinate structures consisting not only of sentences as conjuncts, but also of NP's or VP's (1970:864);³ and I for one find his arguments impressive. Thus, in sentences like *John and Harry are similar* (857) or *John, Bill, and Tom are a motley crew* (858), one can show the implausibility of a deep structure with sentences, rather than phrases, as conjuncts: **John is similar and Harry is similar, *John is a motley crew and ...* (Similar arguments for allowing coördinated phrases to be generated directly are given in McCawley 1968:148, Lakoff & Peters 1966, Hudson 1970.) Given the possibility of generating sentences like *John and Harry are similar* without recourse to a CR transformation, why should such a transformation be needed in ANY sentence? And then why should Gapping and Right-node Raising be needed?

Taking Gapping and Right-node Raising first, the answer is easy: they are needed because some of the conjuncts are incomplete, and there is no reasonable way to generate them directly. Thus Gapping is needed for the generation of *Mary cooked the first course and Jane the second* because the second conjunct consists of just a subject and an object, with nothing in between—and the only circumstances under which we want to generate such clauses are when they are second conjuncts, as in this example. Similarly, in a sentence like *Most of our students enjoy, but don't completely understand, our lectures on the philosophy of language*, the first conjunct is incomplete, and won't be generated except under these particular circumstances. It seems clear that, given the transformational framework, some kind of transformational mechanism is needed for coping with sentences of these two kinds, and so far it has been widely assumed that the transformations needed are Gapping and Right-node Raising.

For CR it is less easy to use this kind of argument, since it isn't self-evident that any of the conjuncts in question are incomplete. Whether or not they are incomplete depends on how you analyse surface structure; and the more structure you think there is, the fewer incomplete conjuncts you will find. Thus in *He goes to bed at ten and gets up at eight*, the second conjunct is *gets up at eight*. Now if time-adverbials like *at eight* are seen as daughters of sentences (along with subjects, VP's, and the rest), this conjunct must be considered an incomplete sentence: it is too big to be a VP, since time-adverbials are sisters, not daughters, of VP's; but it is too small to be a complete sentence, since it lacks a subject (and auxiliary). On the one hand, there are linguists who believe that surface structure has much more

³ It may be that a much wider range of constituent types must be allowed to coördinate in the base—other kinds of phrases, and words. However, this is such a big question that I leave it untouched in this paper.

bracketing than this; and they would probably be happy with an analysis in which the traditional VP and a time-adverbial formed a single constituent; for them, *gets up at eight* would be a complete constituent, and there would be no need to invoke CR in sentences like the above. On the other hand, I think most linguists would reject an analysis in which an object and a time-adverbial formed a single constituent, to the exclusion of the verb; so sentences like *He drinks coffee at breakfast-time and tea at other times* would presumably be accepted by all linguists as evidence that conjuncts can be incomplete (the relevant conjunct in this case being *tea at other times*). Unfortunately, it isn't so clear that this can be used as specific evidence that a rule of CR is needed, since sentences like the last one can perhaps be generated by means of Gapping. My own view is that surface structure is relatively 'flat' (has little bracketing, and many daughters for each mother—cf. Hudson 1967), so *gets up at eight* would be a genuine example of an incomplete sentence; but I recognize that this is a controversial matter, so I shall try not to beg the question in the following. (For further examples and discussion, cf. Dik 1968:134.)

The clearest evidence for CR is to be found in sentences like Dougherty's *Mary was fun to tease, easy to please, and known to have fleas* (1970:853), where none of the conjuncts exist as constituents in deep structure (according to most transformational analyses); *easy to please*, with *Mary* as surface subject, comes into being only as the result of Tough Movement; and *known to have fleas*, again with *Mary* as subject of *known*, is the result of Subject Raising and Passive. Consequently, the coördination consisting of *fun to tease* followed by *easy to please* followed by *known to have fleas* cannot be generated directly in the base; therefore the underlying coördination must be a coördination of sentences (rather than adjective phrases or whatever), and the necessary reductions must be effected by means of transformations.

One argument which SHOULDN'T be used for the necessity of CR is the semantic one: that it allows sentences like *John and Mary went to London* to have two sources, one where the coördination is sentential (*John went to London and Mary went to London*), and another where it is phrasal, as in the surface structure. It is claimed that sentences like this are ambiguous, according to whether John and Mary went together or separately (McCawley, 152), and that the distinction between sentential and phrasal conjunction in deep structure reflects this ambiguity satisfactorily (Lakoff & Peters). On the other hand, it has also been pointed out (McCawley *ibid.*, Dougherty 1970:855, Hudson 1970) that this analysis isn't necessary, since whatever ambiguities are found with conjoined NP's (in surface structure) are also found with non-conjoined plural and collective NP's like *the boys* and *the couple*. Some kind of semantic rule will be needed to interpret the non-conjoined cases, and it could presumably be extended very easily to the conjoined cases as well; so there is no need to postulate two different deep structures for the conjoined cases. (One assumes, of course, that no comparable deep-structure distinction could reasonably be made for the non-conjoined cases.)

In the last few paragraphs I have argued on the one hand that CR is necessary, and on the other that we must allow coördinations of phrases to be generated in the base. Each of these conclusions is no doubt fairly uncontroversial in itself; but

when you put them together, taking account of the point about semantics, a rather controversial possibility arises: that the scope of CR might be much more restricted than has been thought in the past (except by Dougherty). It has been widely assumed that CR should have the power to reduce a structure like *John saw Harry and John saw Bill* to *John saw Harry and Bill*, by changing a coördination of sentences into a coördination of phrases; but I can see no reason to allow a change as drastic as this, which I shall call ‘wholesale reduction’. Indeed, I can see good reasons why it should NOT be allowed:

(i) Wholesale reduction provides too many sources for sentences with surface coördinations of phrases: one with an underlying coördination of phrases, plus (at least) one with an underlying coördination of sentences. As we have seen, this structural ambiguity doesn’t match the semantic ambiguity (if it is indeed ambiguity, rather than vagueness) which one finds in some sentences; and in any case there are sentences with no ambiguity which will still be given two sources, e.g. *John and Mary are erudite*.

(ii) In particular, if a sentence contains embedded clauses, and there is a coördination involving the latter, then the number of possible sources rises rapidly. Thus *John said that he was right and that I was wrong* has two sources, both of which contain coördinations of sentences: one is like the surface structure, and the other is *John said that he was right and John said that I was wrong*. Now if each of the embedded clauses itself contains a coördination of embedded clauses, there are five possible sources, and so on (as the reader can work out for himself). Moreover, the same is true even if the embedded coördination is phrasal: if CR is unlimited in its scope, it can convert *John said that he liked Mary and John said that he liked Jane* into *John said that he liked Mary and Jane*, but it can also arrive at the same surface structure starting from *John said that he liked Mary and that he liked Jane*. And of course the deep structure could start off more or less the same as the surface structure, with *Mary and Jane* as a deep-structure phrasal coördination. This gives three possible sources for *John said that he liked Mary and Jane*. I realize that there are cases of syntactic ambiguity with no corresponding semantic ambiguity, but this case seems to be an artifact of the analysis rather than a fact of language.⁴

(iii) Wholesale reduction makes no distinction in surface structure between genuine cases of reduced coördination and cases where a coördination could have been present in deep structure, since any sentence containing a surface coördination of NP’s could be derived in either way. However, if one DOES make such a distinction, then it is possible to impose a very simple but far-reaching constraint on CR, to the effect that it must always be possible for the shared items and the unshared items in each conjunct to be put together again, to get a complete constituent which is acceptable on the phonological as well as on the syntactic level (Pullum 1974). This explains, for instance, why in German it is possible for a verb to be shared by two clauses only if it is in the right form to go with the subjects of both of them—e.g., *trinkst* ‘drink’ is compatible with *du* ‘you’ but not *ich* ‘I’, so one can’t say **weil ich Bier und du Milch trinkst* ‘because I (drink) beer and you milk drink’

⁴ Geoff Pullum drew my attention to the significance of this problem.

(Eisenberg 1973). The problem with this simple generalization is that *John and Bill live here* is an exception to it, if it is treated as a case of CR: either of the conjuncts on its own is NOT compatible with the verb *live*, and yet the sentence is well-formed. If, on the other hand, sentences like this are generated without recourse to CR, as I am advocating, there is no problem; and as far as I know, Pullum's constraint holds true.

The conclusion to which we are led, then, is that CR is necessary, but that it needs to be invoked in far fewer sentences than has been generally thought. In particular, it is needed in only two kinds of sentence: (a) those with one or more incomplete conjuncts in surface structure (if such cases exist); and (b) those where the shared item is something like a subject which need not have been in a suitable position for sharing in the deep structure (as in *He likes his students and is liked by them*, or in the *Mary was fun to tease ...* example); or, to put it another way, where the surface conjuncts need not correspond to constituents in the deep structure. This conclusion allows us to restrict the CR rule considerably more than would be possible if we allowed it to perform wholesale reduction, as we shall see in §4 below.

2. GAPPING is a rule that has been discussed frequently in the literature (Ross 1970, Jackendoff 1971, Hankamer 1973); it is supposed to derive sentences like *John invited Mary and Bill, Jane* from full structures like *John invited Mary and Bill invited Jane*. Some writers have denied that this kind of reduction is different from CR, and have claimed that a single rule can cover both sets of phenomena (Tai 1969, Eckman 1970, Koutsoudas 1971); so my first task is to explain why I think that Gapping and CR are different.

2.1. GAPPING AND CONJUNCTION REDUCTION. What I must show is that the restrictions on Gapping are different from those on CR, to an extent that makes it impossible to cover both by a single rule. For the time being, I shall pretend that both rules involve deletion, as in previous analyses, although I shall show below that NEITHER rule does. The following is a list of differences between Gapping and CR, showing that each rule covers a type of reduction which is characterized by a BUNDLE of characteristics: had there been only one difference between them, the distinction would simply have been a matter of terminology. The following differences should, of course, be seen against the background of important similarities between the two types of rule: they are both restricted to coördinations, both lead to reductions in the length of the coördination, and both apply late in the derivation (as we shall see in §4).

(i) CR applies only to the PERIPHERY of the (non-initial) conjunct, whereas Gapping applies to its MIDDLE. (So far, this is just repeating the definitions of the terms.) In other words, an item can be deleted by CR only if it is on the edge (especially on the left-hand edge) of its conjunct, whereas this is not so for Gapping.

(ii) CR deletes only DAUGHTERS of the conjunct concerned, whereas Gapping deletes VARIABLES—i.e. virtually anything, whether it is a constituent or not, subject to the constraints which we shall come to below. That is, if the deletion is on the periphery, it can't involve anything smaller than a daughter of the conjunct; but if it is in the middle, it can—and can involve any number of bits and pieces. To see the restriction on CR (the Immediate Dominance Principle of Koutsoudas,

344), take a sentence like *In London it was hot and in Paris it was cold*. If there were no such restriction on CR, it ought to be possible to reduce the *in*'s, giving **In London it was hot and Paris it was cold*—but of course you can't. Nor can you reduce *Which boy is John and which girl is Mary?* to **Which boy is John and girl is Mary?* (Note that *in London and Paris* and *which boy and girl* are possible, so there can't be a restriction on the deletion of *in* or *which*.) In contrast with these restrictions on CR, consider the freedom with which Gapping operates, as noted by Jackendoff (25) and by Hankamer (18); e.g., it can delete any number of constituents in the second conjunct, and these needn't even be contiguous, as shown in *John has tried to persuade Mary to accept his hand in marriage and Bill, Jane*, where the 'gap' is *has tried to persuade ... to accept his hand in marriage*.

(iii) The only restriction that CR places on the constituent to be deleted is that it should be identical to a constituent in a corresponding position in the first conjunct; but Gapping requires that the 'gap' should include the first verb of the conjunct concerned, as well as requiring identity to material in the first conjunct.⁵ Thus in the last example, the gap included *has*, the first verb (albeit an auxiliary) in its clause; and an auxiliary is all that need be in the gap. Witness the possibility of *John will sing and Mary dance* (gap = *will*), and the impossibility of **John will buy the apples and Mary will the potatoes* (gap = *buy*, not the first verb), or of **John told Mary that he loved her and Bill told that he would die for her* (gap = *Mary*).

(iv) CR is indifferent to the number of constituents that are left after the deletion, but Gapping requires that there be two of them (and marginally allows three).⁶ For example, Jackendoff (25) gives as an ungrammatical sentence **Arizona elected Goldwater Senator, and Massachusetts McCormack Congressman*; and he is uncertain about *Willy put the flowers in a vase, and Charlie the book on the table*. Moreover, in Gapping the two constituents that are left over must each balance, contrastively, one in the first conjunct; thus in *John invited Mary and Bill, Sue*, we find that *Bill* balances *John* and *Sue* balances *Mary*. To see how free CR is in this respect, consider *John worked hard and was awarded the first prize at the end of the year*, where there is no parallelism at all between the non-shared items in the two conjuncts. By contrast, note the bad effect of gapping the verb in the following: *John sings in the bath and Mary (sings) arias at the top of her voice*; here, there is no direct contrast between *in the bath* and *arias at the top of her voice*. Moreover, the parallel items must be in the same order in each clause: **John left on foot in the morning and in the evening, Bill (left on foot)*.

(v) CR is possible with any of the conjunctions *and*, *or*, *but*, and *nor*. But Gapping is possible only with *and*, *or*, and *nor*—with *but* it is at best marginal: ?*John invited Mary but Bill, Jane*.

I hope this list will have made it clear that CR and Gapping really are different phenomena, and not just different names for instances of the same phenomenon. The alternative to distinguishing them is to have a very general Identity Deletion

⁵ As noted in fn. 2, Jackendoff allows Gapping in NP's, and therefore cannot stipulate that the 'gap' must include a verb.

⁶ It is interesting to compare this characterization of the restrictions on Gapping with those given by Jackendoff. The difference is caused by the fact that Jackendoff attempts to specify the constraints on the GAP alone, whereas in my analysis one of the two main restrictions on Gapping applies to the REMAINDER.

rule (Tai, 41) to cover both. I give below Tai's formulation of the rule, which incorporates Ross's Directionality Constraint (1970:251).

- (2) **IDENTITY DELETION.** Delete one of the two highest identical constituents in the pair of conjuncts under consideration according to the following principle: If these two identical constituents are left branches, deletion operates forward; if they are right branches, it operates backward.

This analysis works well when applied to very simple examples. Thus in *John invited Mary*, we can assume that *John* and *invited* are both on left branches (coming down from S and VP respectively), while *Mary* is on a right branch. As the rule predicts, *John* and *invited* delete under identity with a preceding element, while *Mary* deletes under identity with a following one: *John held a party and (John) invited Mary; John invited Mary and Bill (invited) Elizabeth; John invited (Mary) and Bill entertained Mary*. But what the analysis fails to explain is why a constituent on the left of the conjunct can be deleted only if it is a daughter of the conjunct—cf. point (ii) above—or why one which is not on the periphery of its conjunct can be deleted only if it is, or contains, the first verb of the conjunct—cf. (iii)—and also leaves just two balanced constituents behind in its constituent—cf. (iv)—and is not linked by *but* to the earlier constituent. By the time each of these constraints has been added to the grammar, it will be clear that a generalization has been missed, since each constraint refers to the same contrast, which we refer to in terms of CR vs. Gapping.

Another alternative, in which a single rule is intended to cover both phenomena, is that proposed by Harries (152):

- (3) **DELETION RULE (optional).** In a coördinate structure in which each conjunct contains a constituent which is identical to a corresponding constituent in all other conjuncts, delete all but the leftmost of these identical constituents.

What this rule says, in effect, is that ANY constituent of a non-initial conjunct may be deleted under identity with a constituent in the first conjunct. The main advantage of this rule seems to be that, unlike the Identity Deletion rule discussed above, it accounts easily for what Harries calls 'split coördination', where one conjunct of a phrasal coördination appears to have been moved to the end of the sentence, as in *John came, and Bill (too)*, or *I saw John yesterday, and Bill (too)*. According to Harries' analysis, sentences like these are simply reduced coördinations in which everything except one remaining NP has been deleted from the second conjunct. Like Tai's analysis, however, this leaves most of the differences between CR and Gapping unexplained: why a deleted element on the left periphery of its conjunct has to be a daughter of that conjunct, why a medial one has to contain the first verb, and so on. As with Tai's analysis, it would certainly be possible to impose all the relevant restrictions on the grammar, by adding extra conditions either on the application of the Deletion rule or on its counterpart, the Regrouping rule (Harries, 159); but to do so would be to miss the generalization that the restrictions on deletion from the periphery (CR) are different from those on internal deletion (Gapping).

2.2. GAPPING AND 'SPLIT COÖRDINATION'. As I mentioned, Harries offers an analysis for sentences in which just one conjunct of a phrasal coördination appears

to have been moved to the end of the sentence, e.g. *John came, and Bill too*. Her analysis claims to subsume these cases under her general Deletion rule, so that no rule is necessary to move the conjunct out of its original position; i.e. *John came, and Bill too* is the result of deleting *came* from *John came and Bill came too*, rather than the result of moving *Bill* out of *John and Bill came*. I have tried to show why I think this analysis is mistaken, but I think it is important that Harries has focussed attention on sentences containing ‘split coördination’, since they turn out to be highly relevant to the analysis of Gapping. The aim of this subsection is to point out some similarities between split coördination and Gapping.

(i) In both constructions, the conjunction used is restricted to *and*, *or*, and *nor*—apparently excluding *but*: **John came, but Bill (too)*. (As with Gapping, such sentences may be marginally or even fully acceptable for some speakers.) Since *John came but Bill came too* is well-formed, it looks as though the rules which generate both Gapping and split coördinations will have to be restricted so that they don’t apply freely if the conjunction is *but*. It is very tempting to relate this restriction to the fact that coördinations of NP’s don’t allow *but* either: **John but Bill came*. Moreover, there are cases where *but* is in fact allowed in a phrasal coördination, such as *She’s a good cook but a bad linguist*; and in precisely corresponding examples of split coördination, *but* becomes possible: *She’s a good cook if she really tries hard, but a bad linguist*. I shall succumb below to the temptation to relate these facts to each other.

(ii) In both constructions, if the first clause is negative, the second conjunct has to be introduced by *nor* rather than *and*: *John didn’t come, nor (*and) Bill (either)*; *John didn’t invite Mary, nor (*and) Bill Jane*.⁷ (This point is noted with reference to Gapping by Jackendoff, 23.) This distinguishes both constructions from CR, where either *and* or *nor* may be found (though *nor* in this case is normally anticipated by *neither*): *John didn’t come, and missed the bus*; *John neither came nor sent his apologies*.

(iii) In both constructions, if the first clause is positive, the second conjunct may be introduced by *not*: *John came, not Bill*; *John invited Mary, not Bill Jane*. Again it is tempting to relate this to the fact that adjacent NP’s can be coördinated (if that is the right name for their relation) by *not*: *John, not Bill, came to the party*. It is also tempting to bring in the fact that, in Gapping, the first verb has to be deleted: thus, if there is any negation in the second conjunct, it has no finite verb to which it could attach itself in the usual way, and must be realized as *not*. One consequence of this point about *not* is that a DELETION analysis of Gapping would have to apply before the negative formative has been attached to the finite verb—although in other respects Gapping, like CR, seems to be unordered relative to other rules (or appears very late in the order, as we shall see in §5 below).

(iv) Both constructions have a constraint on deletion: everything in the FIRST conjunct must be represented in the second conjunct, either by an overt constituent which contrasts with the one in the first conjunct, or by a constituent which has undergone deletion under identity with an element in the first conjunct. Thus if

⁷ If the negative word in the first conjunct is not a marker of SENTENTIAL negation, *and* is used rather than *nor*: *Not many lecturers read the Daily Mirror, and not many laborers the Times*.

we start with *John took an umbrella because it was raining, and Bill took his briefbag*, it is impossible to delete the second *took* under identity with the first, since *because it was raining* in the first clause isn't matched by anything in the second one. To put it the other way round, it is impossible to interpret the reduced version *John took an umbrella because it was raining, and Bill his briefbag*, except to mean that Bill took his briefbag because it was raining. Similarly, *John came home for his father's sake, and Bill too* has to mean that Bill came home for his father's sake, and not for any other reason. This constraint on both Gapping and split coördination is very strange from the point of view of CR, where no such constraint applies. Thus *John came home for his father's sake, and stayed for three nights* is completely well-formed, although the only similarity between the underlying structures of the two clauses is that both contain *John* as subject. (This constraint clearly has something to do with the need for parallelism in Gapping; cf. §2.1.)

The above four points seem sufficient to establish the claim that Gapping and split coördination are different instances of the same phenomenon—in contrast with CR, which we have already seen to be something different. If this claim is accepted, it is only a short step to accepting the next claim, which is that Gapping, like split coördination, is the result of a RAISING rule, rather than of a deletion rule: after all, the relation between a delayed phrasal conjunct and the first conjunct within the clause looks remarkably like Right Dislocation, both in its effect on the 'moved' constituent (it is moved to the end of the clause, and put in a separate tone group) and in its function (it allows the moved constituent to be specified as an afterthought). In other words, I know many linguists think that a movement rule is responsible for the position of *these potatoes* in *They're pretty lumpy, these potatoes*; I assume they would be happy to treat *John came, and Bill too* in a similar way; so I hope they can be persuaded that the same is also reasonable for *John invited Mary and Bill, Sue*.

2.3. CONJUNCT POSTPOSING. If Gapping and split coördination are instances of a single phenomenon, we need a name for that phenomenon; I propose the term 'Conjunct Postposing'. Gapping is the postposing of two (or possibly three) conjuncts, while split coördination is the postposing of a single one. Indeed, it is time to abandon the term Gapping in any case, since even the phenomenon to which it refers doesn't always involve a GAP, strictly speaking. Consider *On Mondays, John washes up, and on Tuesdays, Mary* (which I find well-formed): here the 'gap' in the second conjunct is all at the end of the conjunct—in terms of a deletion analysis, what has been deleted is *washes up*. In other respects, this sentence satisfies the criteria for 'Gapping' (and certainly can't be an example of CR reduction or Right-node Raising), so we need only revise slightly what was said in §2.1 about CR applying only to the periphery of the conjunct and Gapping applying only to its middle: Gapping can also apply to the periphery of its conjunct (as in the last example), but to the opposite periphery from that to which CR applies.

The following is an attempt to spell out as explicitly as possible the rule for Conjunct Postposing. I will not attempt to formalize the rule, since the standard formalisms would be more of a hindrance than a help; but I will start by defining

some terms. An EMBEDDED COÖRDINATION is one which is embedded at some point within a clause—not necessarily as a daughter of that clause. A NON-INITIAL CONJUNCT is, specifically, a non-initial conjunct in such a coördination. A POSITION is the place in the clause's underlying structure at which a coördination occurs. The rule is then something like this (with special conditions added below):

- (4) CONJUNCT POSTPOSING. Postpose, as right sisters of the clause, any number of non-initial conjuncts, matched pairwise if they come from more than one position; and preserve their original order.

As it stands, this rule allows us to start with any clause, containing any number of coördinations; we then extract the non-initial conjuncts from all these coördinations, and line them up to the right of the clause. Before adding some restrictions, I should explain, first, that it seems most reasonable to treat the postposed conjuncts as sisters of the clause, since this is what I shall do with CR (I have no better argument than that); second, that I don't know whether or how to make the two or more postposed conjuncts into a single constituent, labeled (presumably) 'S'; and third, that I don't know how to get the conjunction moved up from the embedded coördination in front of the postposed conjuncts.

The following constraints seem to apply to Conjunct Postposing in English, though it may be that some of them are relaxed in other languages:

(i) If the conjoined verbs are the first verbs in the underlying sentence, postposition of one of them isn't allowed. E.g., we can't start with *John lives and works in London* and convert it into *John lives in London and works*. Similarly, if two conjuncts are postposed, neither can originate as one of the conjoined first verbs; thus *John and Bill buy and sell antiques* won't convert into **John buys antiques and Bill sells*. It may be that other languages don't have this constraint; e.g., where a language allows SVO + SVO to reduce to SVO + SV (Harries, 148), it may be that this is the result of Conjunct Postposing of the subject and the verb—which, as we have just seen, isn't allowed in English. It is encouraging to note that, according to Harries, the language which allows this reduction (Russian) is also relatively generous in the use of split coördination; but one would clearly need to know more facts about a language before deciding what was the effect of Conjunct Postposing and what was the effect of some other rule. Another language which seems to allow the same pattern is Luo (Omondi 1975).

(ii) The acceptability of the output of Conjunct Postposing decreases if the number of positions involved exceeds two. This seems the best way to account for the borderline status of the examples with three postposed conjuncts, discussed above (*?Arizona elected Goldwater Senator, and Massachusetts McCormack Congressman*).

(iii) If two NP's are postposed, from different positions in the clause, there must be no other NP between them. Thus, as Hankamer (26) points out,⁸ *Max gave*

⁸ Hankamer excludes the Conjunct Postposing interpretation in sentences like this by means of his No-ambiguity Condition (29); but it seems to me better to spell out the individual constraints that lead to the lack of ambiguity in such cases, and leave the 'No-ambiguity condition' as a functional explanation of the contents of the grammar, rather than as part of the grammar itself. One reason for this preference is the difficulty of defining what counts as an ambiguity: as Hankamer himself recognizes (30), his constraint applies even where the sense is

Sally a nickel and Harvey gave Sally a dime doesn't reduce to *Max gave Sally a nickel and Harvey a dime*; in other words, in our terms, this last sentence doesn't derive from *Max and Harvey gave Sally a nickel and a dime*, since there is another NP (*Sally*) between the two that are postposed.

(iv) If a verb is moved—note that point (i) above applies only to the FIRST verb of the matrix clause—then all its dependent complements must move with it.⁹ Thus it is possible to change *John and Mary will sing and dance* into *John will sing and Mary dance*, since *Mary* is the only complement of *dance*, and the two have moved together. (The meaning of the derived form is the same as for the 'respectively' interpretation of the underlying form, as is usual in Conjunct Postposing—see below.)

But if we change the verbs into transitive ones, then we can no longer postpose the subject and the lexical verb, since this means leaving one of the latter's complements (its object) behind: thus, *John and Mary will wash and peel the potatoes* does not go to **John will wash the potatoes and Mary peel*. Now we can also use this constraint to explain some of the examples that Hankamer discusses. One of them is the sentence *Jack wants Mike to wash himself and Arnie to shave himself*; he points out (25), following Jackendoff (24), that this sentence is unambiguous: the only meaning it can have is that Jack wants Arnie to shave himself, rather than that Arnie wants Mike to shave himself. In other words, in our terms the sentence quoted can be derived by CR but not by Conjunct Postposing, alias Gapping—although one might have expected Gapping to apply to *Jack wants Mike to wash himself and Arnie wants Mike to shave himself*, deleting *wants Mike*. In terms of our analysis, the explanation is this: we can try applying Conjunct Postposing to *Jack and Arnie want Mike to wash himself and to shave himself*; but if we postpose *shave*, we have to move with it both its complements, namely *himself* and *Mike*. This gives **Jack wants Mike to wash himself and Arnie Mike to shave himself*, which is bad because *Mike* has undergone raising into the *want* clause,¹⁰ and therefore counts as a separate constituent—which gives on the one hand too many postposed constituents (three instead of two), and on the other a postposed

disambiguated by lexical items or by the form of the reflexive pronoun; and Harries points out (193) that even case-marking, in a language that has it, must be ignored by the condition. Hankamer's condition can be rephrased in terms of our analysis: grammars are formulated in such a way that, wherever a given surface string could otherwise be given two different readings, one associated with CR and the other with Conjunct Postposing (alias Gapping), only the former reading is permitted. Since the relative properties of CR and Conjunct postposing make the former easier to apply than the latter (and, one assumes, more widely distributed among languages), it would have been surprising if the analysis with Conjunct Postposing had been given priority, in cases of potential ambiguity, over the one with CR; but in Hankamer's analysis, it makes no difference which way the ambiguity is resolved, since he rejects the distinction between CR and Gapping. This would seem to be a point in favor of the distinction.

⁹ The notion 'dependent complement' is very hard to capture in transformational grammar, since it is shown only in the strict-subcategorization features of the verb, and not in the phrase marker. In contrast, it is shown explicitly in grammars which show dependency relations, including 'Daughter-dependency grammar' (Hudson, 1976). It should be noted that 'dependent complements' include the subject as well as the direct objects etc., so the scope of the VP can't be used to define 'dependent complement' in terms of phrase markers.

¹⁰ Postal (125) uses sentences like this to show that subjects can be raised to object position.

constituent which didn't start off as a non-initial conjunct (namely *Mike*). A similar explanation applies to all Hankamer's other examples in which the 'gap' includes a verb like *want*, and the subject of the complement clause is raised to object of *want*.

(v) If the clause is negative, the conjunction must be *nor* rather than *and*; thus *John and Bill didn't know the answer* becomes *John didn't know the answer, nor Bill*, and *John and Bill didn't invite Mary and Jane* becomes *John didn't invite Mary, nor Bill Jane*. Whether this fact should be treated as a constraint on Conjunct Postposing, or as an extra transformation, I don't know.

This completes the list of constraints on Conjunct Postposing.¹¹ The only other point I want to make about this rule is that it is semantically quite plausible, if we give a 'respectively' interpretation to the underlying clause. For example, *John and Bill invited Mary and Jane respectively* means the same as *John invited Mary and Bill, Jane*. One would hope, then, that Conjunct Postposing is found only in languages in which 'respectively' interpretations are possible.¹²

3. RIGHT-NODE RAISING (hereafter RNR) is the term used by Postal (125) to refer to sentences like *Jack may be—and Tony certainly is—a werewolf*, where, he claims, some common element has been raised out of two conjuncts and attached to the right of both of them. Dougherty refers to the same phenomenon (1970:891) as simply 'Node-raising', a term which he attributes to Ross. As they both say, one characteristic of the construction is that there is a marked intonation break before the 'raised' item. They agree in distinguishing RNR from CR,¹³ but there are linguists who deny the difference—specifically, the same ones who deny the difference between CR and Gapping (Tai, Koutsoudas, and Harries). So it is worth setting out the reasons, as I see them, for maintaining the distinction. This is what I shall do in this section, since it is important for the discussion of CR which follows to exclude the phenomena covered by RNR. (I shan't try to formulate a rule for RNR, however, since I don't know how.) The following, then, is a list of differences between CR reduction and RNR.¹⁴

¹¹ It will be noted that Conjunct Postposing takes place only when the corresponding non-postposed coördination would have a 'non-joint' interpretation. Thus *John and Mary went to London* may be ambiguous, as to whether they went 'jointly' or not; but *John went to London, and Mary* only allows, or at least encourages, the interpretation that they went separately. Similarly, if a verb requires a subject referring to a set of entities, a coördinate subject can't be split up by Conjunct Postposing: *John and Mary met | are alike*, but not **John met | is alike, and Mary (too)*. Both exclusions (which are presumably special cases of the same phenomenon) seem good candidates for treatment under semantics, rather than syntax; and this can be done easily enough if we adopt the suggestion of Chomsky (1974:31)—with which I agree—that all semantic interpretation rules apply directly to surface structure.

¹² The connection between Conjunct Postposing and the possibility of a 'respectively' interpretation was pointed out to me by Geoff Pullum. It may be that Luo presents a problem: I have already suggested that its pattern SVO + SV might be explained as the result of applying Conjunct Postposing, but it also appears that Luo doesn't allow 'respectively' interpretations (according to Lucia Omondi).

¹³ Arguments for distinguishing RNR from Gapping may be found in Maling 1972.

¹⁴ RNR seems to be subject to a constraint which doesn't appear in our list of differences, since it would be irrelevant to CR as we have formulated it: the shared element must be taken

(i) CR has the shared items on the left of the coördination, RNR has them on the right. (This generalization is true only so long as we exclude wholesale reduction, since this requires *John left and Mary left* to be reduced by CR to *John and Mary left*. In the absence of good reasons for allowing wholesale reduction, this need not worry us.)

(ii) CR has no special intonational break between the shared item and the rest of the sentence, but RNR does have such a break, as already noted. Chomsky (1957:35) noted this intonational break; but he thought it was the result of applying CR across constituent boundaries (his example was *John enjoyed and my friend liked the play*), and reflected a lowering in the acceptability of the sentence. In terms of the distinction between CR and RNR, we can see that his sentence is an ordinary instance of RNR; and we can explain the doubtful acceptability as a general characteristic of this rule—most linguists with whom I have discussed it seem to agree that it's stylistically awkward, although it also seems to be used surprisingly often in both speech and writing. How one assigns different degrees of acceptability to RULES in a generative grammar, I have no idea.

(iii) CR is restricted to coördinations, but RNR isn't. Thus the following sentences all seem well-formed (with the reservations noted above regarding RNR in general):

- (5) a. Of the people questioned, those who liked outnumbered by two to one those who disliked the way in which the devaluation of the pound had been handled.
- b. I'd have said he was sitting on the edge of rather than in the middle of the puddle.
- c. It's interesting to compare the people who like with the people who dislike the power of the big unions.

In contrast, application of CR is severely restricted to coördinate structures whose conjuncts are linked by *and*, *but*, *or*, *nor*, *then*, and (maybe) *so*. This difference between CR and RNR seems, on its own, to clinch the argument as to whether they are the same phenomenon. Of course, one still has to show that the sentences in 5 have undergone RNR, rather than some other process that applies in non-coördinate structures; however, the similarities seem sufficiently obvious not to need spelling out.

(iv) CR can delete any number of constituents (by applying recursively to its own output, and deleting one at a time); but RNR can apply to just one constituent, as

from as high in the tree as possible. This has been called the Highest Identical Constituent Condition by Tai (22), and the Higher Order Constituent Constraint by Eckman; it has been used to explain, e.g., why we can't start with a structure like *The man cooked rice and the woman cooked rice*, and right-node-raise just *rice*, giving **The man cooked and the woman cooked rice*. This is ruled out because it would have been possible to raise *cooked* as well as *rice*: so if there was to be any RNR, it should have applied to the larger stretch. Of course, Tai and Eckman reject the distinction between CR and RNR, so they believe that their constraint applies to both; but in terms of our analysis, it couldn't apply to CR, since there is only one size of elements that this can raise, namely daughters of the conjunct. If anything, it supports the distinction between the two rules; starting with a structure like *John will get up at eight and John will catch the latest possible train*, we can raise either *John* on its own, or *John plus will*. It will be seen, however, that this fact is still compatible with the constraint of Eckman and Tai, since *John* and *will*, in our analysis, are both equally 'high' in the tree.

Postal notes (125). Thus CR can apply to *Who has been eating my porridge, and who has eaten it all up?*, to give *Who has been eating my porridge, and eaten it all up?*, ‘deleting’ both *who* and *has*; or it can apply to *He may well have given Mary a pound and he may well have given Jane two pounds*, giving *He may well have given Mary a pound and Jane two pounds*, after ‘deleting’ *he may well have given*. With RNR, on the other hand, nothing like this is possible. For example, one cannot apply it to *John gave Mary two pounds and Bill lent Mary two pounds*, deleting both *Mary* and *two pounds* to give **John gave, and Bill lent, Mary two pounds*; the best you can do is delete just *two pounds*, giving *John gave Mary, and Bill lent her, two pounds*.

(v) In CR, as already noted, any constituent which is ‘deleted’ must be a daughter—i.e. an immediate constituent—of the conjunct in question. (This claim is clearly controversial, however, since I said in the last paragraph that CR could be responsible for removing *he may well have given*; and only one of its constituents, namely *he*, would be treated as a daughter of the clause in most transformational grammars I know. We shall return to this question in the next section.) There is no such restriction on RNR; so sentences like *John is a wizard at growing, and Mary has perfected the art of preserving, a very delicate kind of quince which is only known in their part of Worcestershire* are as good as any sentences involving RNR.

To end this discussion of RNR, it is worth pointing out that the very first example used to illustrate CR (Ross 1967:97) isn’t an example of CR at all, but a very clear case of RNR! The example is *Sally might be, and everyone believes Sheila definitely is, pregnant*. In view of the important differences just noted between the two constructions, it is most impressive that any progress at all has been made since then in the understanding of reduced coordinations.

4. CONJUNCTION REDUCTION. Having isolated Gapping (or Conjunct Postposing) and RNR, we can now concentrate on CR. This seems to me to be a more important phenomenon than the other two, in that I would give it a better chance of being found in every language. Interestingly, it is also rather more sensitive to syntactic structure than either of the others. The properties of CR, and how it should be formulated, depend on whether we accept wholesale reduction. Since I don’t believe wholesale reduction is necessary, I shall consider CR without it in §4.1; then, in §4.2, I shall show what difference it makes if one does accept wholesale reduction.

4.1. CR WITHOUT WHOLESale REDUCTION. At the end of §1, after the discussion of wholesale reduction, I concluded that CR was needed in only two cases: (a) where surface-structure constituents are incomplete; and (b) where a surface constituent need not have existed as a constituent in deep structure, and therefore couldn’t have been a deep-structure conjunct. An example of the first case is *He gave Mary a pound and Jane two pounds*, where neither *Mary a pound* nor *Jane two pounds* is a complete constituent under any analysis; an example of the second case is *John is liked by his students and seems to like them*, where neither *is liked by his students* nor *seems to like them* is represented in deep structure by a single constituent (to the exclusion of other items, notably *John*).¹⁵ So far as I know, all the constructions

¹⁵ The examples with passive constructions would cease to be a problem if we adopted Freidin’s analysis (1975), in which passives are determined by the base rather than by trans-

which fall under either of these cases involve reduction from the left, as in the examples just given; any constructions in which reduction takes place on the right or in the middle are instances of Conjunct Postposing or RNR. (I am referring here to English; whether the same is true of other languages I don't know.)

The first property of CR, then, is that it removes items from the left of the conjuncts. More precisely, of course, we can say that it removes them from the left-hand EDGE of the conjuncts, since no non-shared items may be to their left in either conjunct. Thus we cannot reduce (*I don't know*) *when he is coming or who he will bring with him* to *(*I don't know*) *when he is coming or who will bring with him*, since *when* and *who* are to the left of the shared item, *he*. Nor can we start with *John gave Mary a pound and Bill gave Jane two pounds* and reduce it to **John gave Mary a pound and Bill Jane two pounds*, since *gave* isn't on the edge of its conjunct (and there are too many parallel items for it to be even permitted as Conjunct Post-posing).

The effect of this restriction, together with the restriction that the OVERT shared item is always on the left of the conjuncts, is that CR never changes the order of elements: the overt shared item can always be stuck back onto the beginning of each of the conjuncts, and the order of elements within the reconstituted conjuncts will be just the same as before CR applied. The same is true of RNR; and something rather similar is true of Conjunct Postposing, in that the rule says the postposed conjuncts must be kept in the same order that they were in originally.

A natural way to capture the fact that CR removes elements only from the left-hand edge of each conjunct is to formulate CR as a RAISING rule rather than as a deletion rule: all it does is change the dominance relations, by raising the shared items to act as sisters rather than as daughters of their conjuncts. Like the other clear raising rule in English, Subject Raising, it takes an item which has to be on the left-hand edge of its present mother, and KEEPS it on the left (i.e. in the same position relative to everything else in the mother), but turns it into a sister of its former mother. But unlike Subject Raising, CR applies across the board, so that whatever is extracted from one conjunct must also be extracted from all the others. If one made no provision for movement in the rule, it would automatically follow that the extracted items had to be on the left-hand edge of the conjuncts; whereas if CR were treated as a deletion rule, one would need to make specific mention of this condition as a rather arbitrary fact about the rule. The effect of CR can be represented diagrammatically as the change from Figure 7a to Figure 7b.

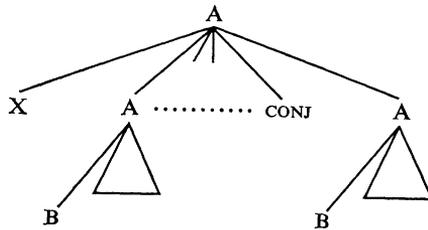


FIGURE 7a

formations. Similarly, if one could show that there was no Subject Raising in the *seems* type of sentence, they would cease to be relevant.

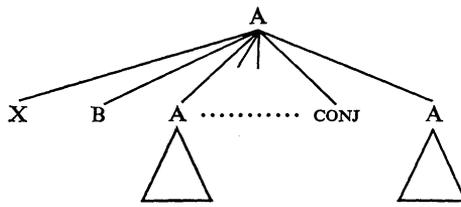


FIGURE 7b

It will be seen that Fig. 7b allows for some element, represented as X, which already occurs as a sister of the first conjunct (the first A). The reason for this is that the diagram only allows for one constituent to be raised at a time—since B is not to be interpreted as a variable, but as a single constituent; however, since there are cases where more than one constituent is included among the shared items, we must allow the rule to apply recursively to its own output. Take the sentence *John has left late and missed the bus*. This is derived from *John has left late and John has missed the bus*, by first raising the first daughters of the two conjuncts (*John*), and then doing the same to the second one (*has*)—which is in fact the new first daughter of each conjunct, once *John* has been raised.

The advantage of this analysis is that it prevents the rule from raising constituents which are smaller than daughters of the conjuncts: each time the rule applies, it raises exactly one daughter. The alternative is to allow the rule to raise more than one daughter at a time, which means that the raised material would have to be represented as a variable—a very strange kind of raising rule, compared even with the relatively free-and-easy RNR rule.¹⁶ Moreover, if the raised material were represented as a variable, it would then be necessary to impose a restriction on the variable to prevent it from containing any INCOMPLETE daughters, such as determiners from daughter NP's. At least, it seems that my proposed analysis has no very strong competitors, and at present I see no great problems with it.

The main problem with the analysis is that it makes assumptions about constituent structure which most transformational grammarians are likely to find unacceptable without a great deal of supporting evidence. The claim is, as I have said at several points, that CR can raise whole daughters of the conjuncts, but nothing smaller. This is the same claim as expressed in the Immediate Dominance Principle of Koutsoudas (344)—although it was intended by him to apply to all kinds of reduced coördination, and we have seen that it does not:

- (6) IMMEDIATE DOMINANCE PRINCIPLE. An identical constituent in a coördination may be deleted only if it is immediately dominated by a conjunct of that coördination.

The possibility of such a constraint on CR is also discussed by Stockwell, Schachter & Partee (1973:351); but they decide against it on the basis of sentences like *Yesterday large and this morning small flags were flying*, which they find acceptable. If such examples are indeed acceptable, then they constitute counter-evidence to the principle that RNR only raises single constituents—since *flags were flying*, in this

¹⁶ Note that we have already disposed of one of Hankamer's main examples of a rule which DELETES variables, namely Gapping; so it is at least conceivable that there are no rules even for deleting variables, let alone for raising them.

case, is not a single constituent; but they have nothing to do with CR as I am now using the term, since the reduction is on the right, not on the left. I believe, then, that the Immediate Dominance Principle is correct, when applied to CR only. Thus it accounts for the facts that the word *giving* can be shared in *Giving small presents to small people and big presents to big people is a good principle* (the first conjunct is *giving small presents to small people*, and *giving* is a daughter of it), but the same word cannot be shared in **Giving small presents to small people is sensible and big presents to big people is prudent*: here the first conjunct is *giving small presents to small people is sensible*, and *giving* is not one of its daughters. We have already seen several other examples of the effect of the Immediate Dominance Principle, so there should be no need for more here.

The trouble with this principle, as noted, is that it doesn't work if you accept the types of constituency analysis that are assumed in most current transformational work. Most obviously, neither auxiliaries nor main verbs are thought to be daughters of the sentences in which they occur: either one may be separated from the conjunct S by one or more of the labels AUX, VP, NP, S. And yet, in a sentence like *John has given his big brother a book and his little brother a toy car*, not only the subject has been shared, but also the auxiliary *has* and the main verb *given*. The fault in this case is, I believe, in the standard constituency analyses rather than in the Immediate Dominance Principle; but in order to prove this I should need to go much further than would be appropriate in this paper. I can only refer the reader to Hudson 1976, in which I do justify a much 'flatter' analysis, with auxiliaries and main verbs as daughters of the clause, and point out that both AUX and the node labeled alternatively VP or S (with or without a dominating NP) are extremely difficult to justify; indeed, so far as AUX is concerned, I don't even know of an ATTEMPT to justify it in print.

Let us consider briefly what the alternative to the Immediate Dominance Principle is. How else could we rule out sentences like **Giving small presents to small people is sensible and big presents to big people is prudent*, without also ruling out good sentences like *John has put the light out and gone to sleep*? We can't use the Immediate Dominance Principle if *has* in the second sentence is not a daughter of *John has put the light out*; so we must find some way of allowing CR to remove either a daughter, or certain kinds of non-daughter, with (presumably) a list of arbitrary restrictions on the kind of non-daughter which can be removed. If there were really strong reasons for preserving the standard transformational constituency analyses, this would be a price worth paying; but I don't think there are.

To summarize, the proposed CR rule will take a coördination and raise the daughters of the conjuncts to act as their sisters, one by one from the left, provided the leftmost daughters of all the conjuncts are the same every time the rule applies. To add one final advantage of the analysis, it guarantees that the raised items will be the same (without actually saying so), simply by raising them all to occupy the same place—in other words, by merging them into a single constituent.

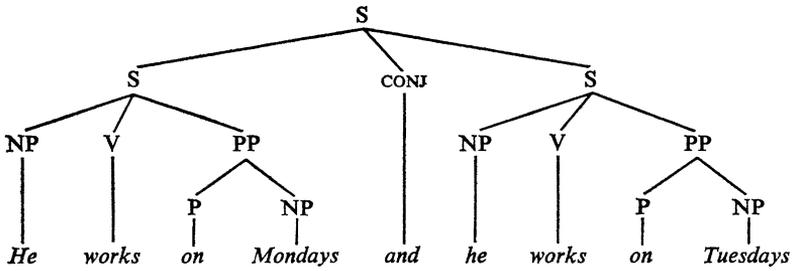
4.2. WHOLESALE REDUCTION. If our analysis were to allow for wholesale reduction, such as the reduction of *John is erudite and Mary is erudite* to *John and Mary are erudite*, a number of changes would be needed in the analysis offered above.

First, and most obviously, we would have to allow CR to reduce from the right as well as from the left. Thus, in the above example, the rule would have to remove *is erudite* from *John is erudite*. This would have the effect of making CR into a mirror-image rule, though it is doubtful whether such rules otherwise exist (cf. Hankamer). It would also apparently have the effect of making some sentences derivable either by RNR or by CR; but the presence or absence of the intonational dislocation associated with RNR should serve to show which rule was involved; clearly, there is no such dislocation in examples like *John and Mary came*.

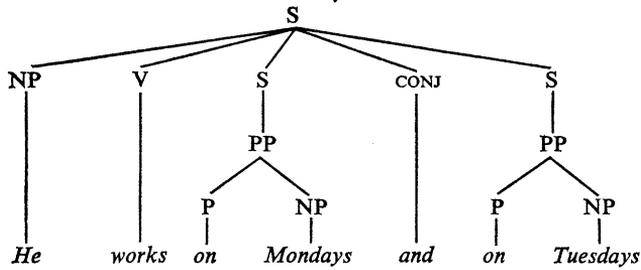
In such an analysis, it is suspicious that there seem to be no sentences in which CR, rather than RNR, must have removed some item from the right. For example, if it were possible to pronounce *John lent Mary, and Bill gave Jane, a fountain pen* either with or without the intonational break represented by the comma after *Jane*, this would suggest that such a sentence could be derived either by RNR (with the break) or by CR (without it); but in fact I think the intonation break is necessary.

The second change that would be necessary in order to allow for wholesale reduction is that we would have to find some way to lower the 'rank' of the coördination. For example, under wholesale reduction the source of *He works on Mondays and Tuesdays* would be *He works on Mondays and he works on Tuesdays*. At the start, there is a coördination of sentences, and CR can therefore remove only items which are daughters of the sentences, according to the Immediate Dominance Principle. This means that, under the most generous analysis (i.e. the one I have assumed), it can remove *he works*, giving *He works on Mondays and on Tuesdays*. But at this stage in the derivation, the conjuncts are still labeled as sentences; so each conjunct is a sentence with just one daughter, a prepositional phrase. The CR rule can't re-apply to these conjuncts, because their daughters aren't identical; but we WANT it to re-apply, in order to remove *on*. Consequently, what we have to do is to lower the rank of the coördination, changing it from a coördination of sentences to one of prepositional phrases. If this is done, of course CR can re-apply, removing *on* from the second conjunct, since *on* is the daughter of the conjunct. The result is the one we want, *He works on Mondays and Tuesdays*. The derivation is shown in Figure 8 (p. 556).

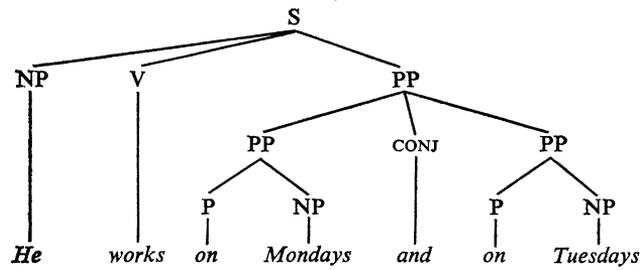
Any analysis which allows wholesale reduction needs a rule for lowering the rank of a coördination if each conjunct has just one daughter; Stockwell et al. (376) call this the Node-relabeling Schema, while Harries (160) calls it Regrouping, a term which I have used here. As we have seen, without such a rule CR couldn't keep on applying until it had removed all the identical material, because of the Immediate Dominance Principle. Moreover, there seems to be no justification for leaving these non-branching conjunct nodes in the surface structure, so it is better to prune them. In an analysis which DOESN'T allow wholesale coördination, on the other hand, there is only the second of these problems, the need to avoid non-branching conjuncts; so all we need in this analysis is some kind of surface-structure constraint to rule out such structures. The effect of this constraint will be to rule out one of the two otherwise possible structures for a sentence like *He sang and danced*—which could otherwise be either a coördination of sentences (with the verbs as the only remaining daughters of the conjuncts), or a simple sentence containing



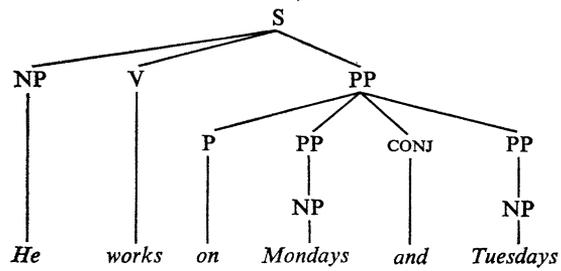
Conjunction Reduction



Regrouping



Conjunction Reduction



Regrouping

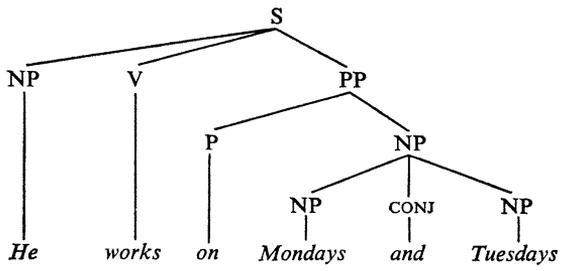


FIGURE 8

a coördination of verbs. I see no reason for treating such sentences as structurally ambiguous.

One rather peculiar fact about the interaction of CR with Regrouping, if both rules are needed, is that they can apply one after the other, as in Fig. 8; but they can't be ordered cyclically, applying to the tree from the bottom up. On the contrary, it can be seen that, if anything, they work from the top down in Fig. 8. But since there is only a single relevant S node (representing a coördination to which either rule could apply), we can't even speculate that, in the special case of these two rules, the cycle is turned upside down. Moreover, as we shall see in §5, these rules (or at least CR) seem to apply as late as any transformation can apply; so this too rules out the possibility of a cyclic interpretation.

To make things even more complicated, there are sentences in which the reducing can start off going down the tree, and end by going UP it. For instance, let us assume that the underlying structure for *John rests most of the time but works on Mondays and Tuesdays* is *John rests most of the time but John works on Mondays and John works on Tuesdays*. This structure contains two coördinations, with one acting as second conjunct in the other. The only coördination to which CR can apply is the lower one, from which *John works* can be removed, as we saw above, giving [[*John rests most of the time*] but [*John works* [*on Mondays*] and [*on Tuesdays*]]]. We can now do two things to the structure, and it makes no difference in what order we do them: we can move downward, regrouping *on Mondays and on Tuesdays* as in Fig. 8; or we can move upward, applying CR to *John*, which is now a daughter of both the second and first conjuncts in the top coördination. Once both these changes, and all the others in Fig. 8, have been carried out, the structure will look like this: [*John* [*rests most of the time*] but [*works on* [*Mondays and Tuesdays*]]].

Considering these oddities in ordering, it seems clear that if both CR and Regrouping are included in the grammar, they must be allowed to apply ANYWHERE in the derivation; i.e., whenever the relevant structural description is met, CR may occur and Regrouping must occur. On the other hand, if Regrouping doesn't exist, then there is no need to treat CR as an 'anywhere' rule—since the only reason for doing so, I believe, is its interaction with Regrouping. There seem to be few well-established cases of 'anywhere' rules (Ross 1970:252); so once again it would be marginally better not to allow wholesale reduction, and therefore not to need Regrouping, since this would reduce the range of formal properties of rules in a grammar.

Other analyses have been proposed for wholesale reduction; but none seem better than the one we have just considered, consisting simply of a mirror-image CR rule plus a Regrouping rule. For example, the one given by Stockwell et al. needs three rules, compared with our two, and has no compensating advantages that I can see.¹⁷

¹⁷ It might be argued that the analysis by Stockwell et al. is superior to ours in that it gives a more natural account of sentences with 'respectively' interpretations: it converts *John likes Mary and Bill likes Jane* directly into *John and Bill like Mary and Jane*. However, two points should be made. First, the rule which inserts *respectively* into such sentences has to be global, since it must know the source of the structure (*John and Bill like Mary and Jane* has another source, but at the point in the derivation where *Respectively* Insertion applies, the two derivations have converged). Second, there are languages in which 'respectively' interpretations are not allowed, so it seems wrong to treat them as basic.

However, as I have tried to show here and in the introduction, there seem to be no good reasons why we should WANT to allow wholesale reduction, and a number of reasons why it would be preferable not to do so.

4.3. CONSTRAINTS ON CR. Two kinds of constraint are relevant here. One is that, if a constituent is to be removed from one conjunct, it must be in some sense 'identical' to a constituent in the same position in each of the other conjuncts. The problem here is to decide what is meant by 'identical'. The other constraint is that the conjuncts in a coördination must in some sense be 'similar' (but NOT identical); and here, of course, the problem is the meaning of 'similar'. It will be seen, however, that the second constraint really applies to coördination in general, and is only indirectly relevant to CR as such. Thus there is no need for us to discuss it here, except to point out that it becomes a problem for CR if wholesale reduction is permitted. For instance, Schachter 1974 discusses sentences like **John ate quickly and a grilled sandwich* or **Running and to overeat may be unhealthy*; to rule out sentences like these, he proposes a 'Coördinate Constituent Constraint', requiring that conjuncts in a coördination must belong to the same syntactic category and must have the same semantic function. But if wholesale reduction is allowed, these two sentences could both be derived from well-formed underlying structures (*John ate quickly and John ate a grilled sandwich*; *Running may be unhealthy and to overeat may be unhealthy*); so the Coördinate Constituent Constraint must then be brought in as a constraint on CR, to stop it from applying to these underlying sentences (cf. also Baldi 1971).

The other constraint, requiring the items that are removed by CR to be 'identical' to one another, raises some interesting problems. First, the identity in question involves more than just the syntactic class-membership of the items in question: in particular, they must have in some sense the same 'function' in the structure (Hudson 1973). Thus we cannot convert *That book I've just bought and that book is waiting to be read* into **That book I've just bought and is waiting to be read*, by removing the two instances of *that book*—whose syntactic class-membership must, one assumes, be the same in both conjuncts; the reason is that one is surface subject and the other isn't.¹⁸ Similarly, *Last night I went to a party and last night I really enjoyed* doesn't reduce to **Last night I went to a party and really enjoyed*, where in the first conjunct *last night* is a time-adverbial and in the second it is the object. Somehow or other, the syntactic structure should show these distinctions at the point where CR applies. But the one way in which it MUSTN'T show them is by distinguishing the dominance relations between the constituent and the conjunct sentence (say, by having a topicalized object Chomsky-adjoined to this sentence), because in all cases the constituents concerned can be shown to be DAUGHTERS of the conjunct—otherwise (according to the Immediate Dominance Principle) they couldn't be reduced in sentences like *That book I've just bought but haven't yet*

¹⁸ Pullum offers an alternative explanation for the ungrammaticality of sentences like **That book I've just bought and is waiting to be read*: he claims that the problem with sentences like this is that, after CR, the conjuncts are too different—one being a sentence, the other a VP. I believe he is wrong in this interpretation, since the same problem arises if one adds a time-adverbial to the second conjunct, thereby showing that it must be a full sentence, even after its subject has been removed by CR.

read. Somehow, then, a distinction has to be made between *that book* in subject function and *that book* in topicalized object function; and it may well turn out that the only way to do this is to attach explicit function labels such as 'subject' and 'topic' to nodes in the tree.¹⁹

On the other hand, what does NOT seem to be relevant to this concept of identity is 'function' in deep structure or semantic structure. In particular, it makes no difference whether a surface subject started life as a deep subject or object, or as an Agent, Patient or whatever. If it is the surface subject, and some other conjunct has the same item as surface subject, then it can be removed, as in *John likes his students and is liked by them*.

Another aspect of identity is that the items concerned apparently have to be PHONOLOGICALLY identical. As it happens, all the examples given in the literature to illustrate this requirement seem to be ones of RNR rather than CR (depending on how these rules turn out to be formulated in other languages, particularly German). I can't think of any relevant examples from English which would make the same point for CR, so it is just conjecture on my part that the same requirement will apply to both CR and RNR; but examples that show it for RNR are clear. Thus we can say *Mary already has, and John soon will, come*, but we can't replace *come* by *go*, because the underlying form in the first conjunct would have been *gone*, not *go*; the sentence with *come* is possible only because the past participle happens to be the same in form as its infinitive (Pullum 1974; similar arguments can be found in Eisenberg). Of course, these facts can be interpreted theoretically in two ways: either they mean that the CR rule must be sensitive to phonological identity and differences between forms (it would then be a syntactic rule referring to phonological structure, as in Hetzron 1972);²⁰ or they mean that whatever rules determine the form of a verb (say *go* vs. *gone*) must be sensitive to the syntactic environment of the verb, even to the extent of being able to look at the verbs on which it depended before CR took place. My own preference is for the latter interpretation, but this is not the place to argue the point.

In short, there are problems within the conventional framework of transformational grammar in formulating the CR rule so that it 'knows' which items are identical and which aren't; and the same applies even to RNR. (Of course, it is possible that RNR only has difficulties with phonological identity, and CR only with surface functional identity; but this doesn't change the situation much as far as the problems for transformational theory are concerned.)

5. ORDERING OF RULES FOR REDUCED COÖRDINATION. Like Koutsoudas (367), Eckman (211), and Maling (105), I assume that all the rules involved in forming reduced coördinations (CR, Conjunct Postposing, and RNR) must be able to apply after all the re-ordering transformations have applied, i.e. after the order of elements in the sentence has been finally fixed. Thus it must be possible to apply CR to structures where Subject-Verb Inversion and Do Support have already applied, in

¹⁹ For a discussion of the role of function labels in a generative grammar, cf. Hudson 1976.

²⁰ Pullum suggests the following constraint on the output of CR and RNR: 'all the conjuncts or corresponding constituents should be compatible with what follows in the sentence right down to the phonological level.'

order to derive sentences like *Do his parents like her and her parents like him?* (I owe the example to Geoff Pullum.) Otherwise it would not be possible to remove *do* from the two conjuncts, given that only constituents which are on the left-hand edge of their conjunct can be removed.

The only kind of transformation which has to FOLLOW any of these rules is the kind which establishes concord—between subject and verb, or between subject and reflexive pronoun. This is the case, in fact, only with Conjunct Postposing, which can split a coordinate subject up and make it into a simple subject: cf. *John and Mary are eating bread and cake*, or *John and Mary are looking at themselves*, with *John is eating bread, and Mary cake* or (?) *John is looking at himself, and Mary herself*. However, it is at least possible that such rules aren't transformations at all; they may be 'morphological' rules, for determining phonological form, which can take account of the properties of the subject. Note, e.g., that the properties of the subject are irrelevant to some verbs (past tenses of all verbs except *be*, and modals), so it would be best if the rules could refer to the subject only if the verb concerned required it. This is a restriction which would be hard to put on a transformational rule; but it would be easy, one assumes, in a morphological rule.

It seems, then, that our three rules can follow most other transformations, and it may be that they can follow ALL other transformations. The question is whether they MUST follow all other rules (leaving concord rules aside). The answer appears to be yes. In particular, it is necessary to prevent Extraposition from applying after Conjunct Postposing, alias Gapping. Consider what happens when we start with a sentence like this: *That John was tall and that he was handsome surprised Mary and Jane*. If we first apply Conjunct Postposing, we get *That John was tall surprised Mary, and that he was handsome, Jane*. But if we now apply Extraposition to the first conjunct, the result is ungrammatical: **It surprised Mary that John was tall, and that he was handsome, Jane*. The only way of avoiding this sentence seems to be by some kind of extrinsic ordering, with Extraposition ordered before Conjunct Postposing—unless a place can be found for Extraposition in the cycle, leaving Conjunct Postposing outside the cycle. I leave this issue open.

I also find it very hard to decide whether there is any ordering among the three rules—such that, e.g., CR has to take place before Conjunct Postposing, or vice versa. However, it seems that such an ordering might be possible, ruling out the application of Conjunct Postposing after CR. We might start, e.g., with *John and Bill saw Mary and Jane, and John and Bill were pleased*. To this we can apply CR, giving *John and Bill saw Mary and Jane, and were pleased*. Now we can try to apply Conjunct Postposing; but the result is **John saw Mary, and Bill Jane, and were pleased*, which I take to be ungrammatical. The question is whether the sequence CR followed by Conjunct Postposing has to be excluded by extrinsic ordering or by some other means—e.g., CR has the effect of raising *John and Bill* out of the first clause, and it may be that Conjunct Postposing can be formulated so that it won't apply when one of the coordinations has been raised. Again, we must leave this question open.

What this rather inconclusive discussion suggests—and it does no more than that—is that our three rules should be ordered extrinsically toward the end of the postcyclic rules. Whatever the truth of the matter is in the question of their ordering

in a grammar, it is clear that they apply to structures which are very near the surface.

6. CONCLUSIONS. There appear to be three processes which can be applied specifically to coördinate structures: Conjunction Reduction, which 'factors out' material to the left; Right-node Raising, which does the same to material on the right; and Conjunct Postposing, which allows one or more coördinations within a clause to be turned into a coördination of clauses. Each of these processes is subject to a different set of constraints, and presumably they are not all found in all languages of the world. If the claim that there are three separate processes is right, typological comparisons need to start by identifying which of them occur in which languages (and other languages might be expected to have other processes not found in English), and what variations, if any, exist in the constraints on them. This means, unfortunately, that it isn't sufficient to ask what patterns of subjects, objects, and verbs are involved in a language; instead, we have to ask, for example, whether reduction to the right is constrained like RNR or like CR—a much more difficult question to answer.

Another general conclusion is that these processes show a remarkable respect for surface structure: none of them change the order of elements within a conjunct; Conjunct Postposing doesn't allow two NP's to be postposed if another separated them in the original; CR removes one item only if it is identical in its surface structure 'function' to another item; and RNR even respects the phonological identities of the items that it merges. This leads to two speculations. First, it may be that all these constraints (and others not repeated here) have the effect of avoiding performance difficulties, of the kind discussed by Hankamer: they make it easy for the listener to see what belongs with what, or to reconstruct the original form. Second, it might not be so difficult to generate all the structures resulting from these three rules without recourse to transformations at all. Admittedly, this is out of the question if we use the transformational type of apparatus, especially phrase-structure rules; but if we abandon this, I believe surface structures can be generated directly, as I have argued in Hudson 1976; and this, I believe, is as true of reduced coördinations as it is of other types of surface structure.

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