

Remarks and Replies

On "Gapping and the Order of Constituents"*

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1. Since the position of the verb in subordinate clauses and main clauses differs in German, it is not at all obvious what its position in deep structure should be. While most transformational analyses of German have assumed a base order SOV, a consequence of J. R. Ross's (1970) analysis of Gapping is that the underlying order of German must be SVO. The purpose of this paper is to suggest an alternative hypothesis about Gapping to show that no claim about deep structure order can be made on the basis of Gapping alone.

Gapping is a transformation which deletes verb(s) in a conjoined structure to produce sentences like "Suzie joined NOW and Martha Bread and Roses." Table 1 lists the possible outputs of Gapping. The starred outputs are those which apparently do not occur in any natural language.

TABLE 1

A	SVO + SO	C	SO + SOV
B	SOV + SO	*D	SO + SVO
E	VSO + SO	*F	SO + VSO

Some languages, like English, exhibit only one of the possible gapping patterns; others, like German, exhibit several such patterns. Ross (1970, 12) groups languages according to the gapping patterns they exhibit, as shown in the following chart (Ross does not consider gapping patterns E and *F):

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TABLE 2

*None	Only A English French German (main clauses)	*Only B	Only C Japanese Siouan
*Only AB	*Only AC	Only BC Hindi Turkish German (subordinate clauses)	ABC Russian Latin

To explain the distribution of the gapping patterns in various languages, Ross (1970, 18) makes the following set of hypotheses, which I shall refer to as the *Two-Way Gapping Proposal*:

- (1) a. Gapping is a single rule which operates both forward and backward. The direction of gapping depends on the input phrase structure configuration: forward if the identical elements are on left branches, backward if they are on right branches.
- b. Languages whose deep structure order is SOV always have the verb in clause-final position.
- c. Gapping is an anywhere rule in any language in whose grammar it appears.

Ross's hypotheses have important consequences for the theory of grammar. First, he must assume that Gapping is an "anywhere" rule¹ which can apply before or after Scrambling in order to get both B and C patterns in Russian. Second, the ordering arguments of his analysis lead him to conclude that no language with any kind of Extraposition, Verb Movement, or Scrambling rule can be SOV in the base; for otherwise, (backward) Gapping could apply to the coordinate structure SOV + SOV to produce SO + SOV, and then Scrambling could apply in turn to give *SO + SVO. Thus Ross is claiming that a language is SOV *if and only if* it has no movement rules which have the effect of making the verb nonfinal. If the interaction between Gapping and such movement rules is the only evidence used to determine underlying word order, then Ross's claim is true, of course, but by definition rather than empirically. Insofar as there is any independent evidence about underlying order, Ross's claim is probably false. For example, Siouan languages, which are rigid SOV languages, form

¹ Jackendoff (1971) has since argued that Gapping cannot be an anywhere rule in the grammar of English. Koutsoudas (1970) provides some metatheoretical arguments against Gapping's being an anywhere rule.

the imperative by placing the subject after the verb.² Other exceptions to Ross's generalization have been reported in the literature.³ Therefore, we need to look for an alternative explanation for the facts about distribution shown in Table 2.

Table 1 indicates that all kinds of forward Gapping occur (Column 1), but that backward Gapping (Column 2) occurs only when the identical verbs are clause-final. But note that output C could also be produced by the independently motivated rule of Node Raising (NR).⁴ Let us suppose that Gapping is not a two-way transformation as Ross suggested, but rather a one-way (forward) transformation, and that the outputs listed in Table 1 are actually produced by two different rules: Node Raising and Forward Gapping. Schematically, these two rules apply to the possible input strings with the results shown in Table 3:

TABLE 3

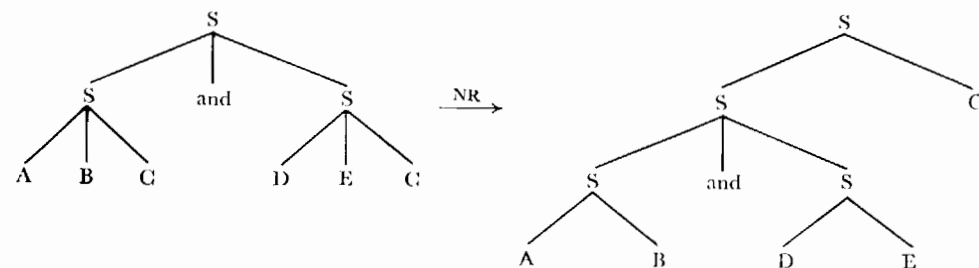
VS_1O_1 and VS_2O_2	\xrightarrow{NR}	S_1O_1 and VS_2O_2 *
S_1VO_1 and S_2VO_2	\xrightarrow{NR}	S_1O_1 and S_2VO_2 *
S_1O_1V and S_2O_2V	\xrightarrow{NR}	S_1O_1 and S_2O_2V (C)
VS_1O_1 and VS_2O_2	\xrightarrow{GAP}	VS_1O_1 and S_2O_2 (E)
S_1VO_1 and S_2VO_2	\xrightarrow{GAP}	S_1VO_1 and S_2O_2 (A)
S_1O_1V and S_2O_2V	\xrightarrow{GAP}	S_1O_1V and S_2O_2 (B)

* Structural Description not met; rule fails to apply.

² G. H. Matthews, personal communication.

³ For example: Bach (1970), Koutsoudas (1970), Sanders and Tai (1970).

⁴ I shall assume here a Node Raising rule which Chomsky adjoins a constituent, creating a new node and deleting all identical lower occurrences of that constituent in the following manner:

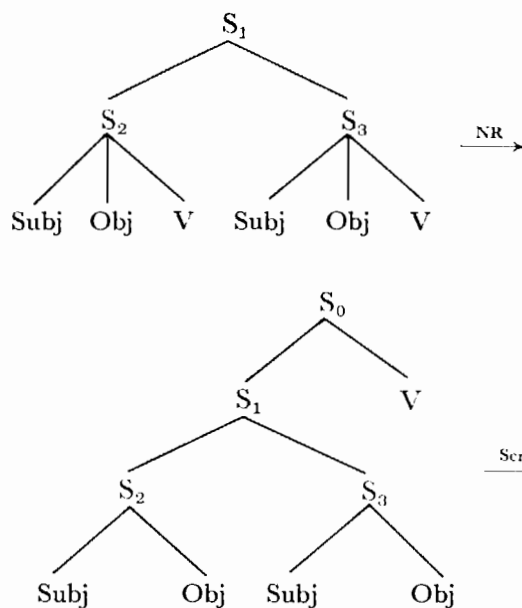


Formally, the difference between Gapping and Node Raising is that Gapping merely deletes all but one occurrence of identical verbs, whereas Node Raising raises any clause-final identical constituent, including verbs, before deleting all lower repetitions of that constituent. The string left behind is not necessarily a constituent. This is the same rule as that of Conjunction Reduction proposed in Ross (1967, Sections 4.2.4.1 and 6.1.2.3).⁵ I have used the more descriptive term *Node Raising* in order to distinguish this rule from other types of conjunction reduction. See also Howard (1967).

We see that these two rules do in fact produce all and only the well-formed outputs of Table 1. Under this assumption, there is another explanation for the distribution in Table 2. I shall refer to the following set of hypotheses as the *One-Way Gapping Proposal*:

- (2) a. Gapping operates only forward.⁵
- b. Node Raising and Gapping are ordered after any movement rules which affect the linear position of the verb.
- c. If a language has Gapping, then it also has Node Raising.

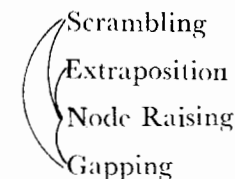
The order of Node Raising with respect to movement rules that affect the linear position of the verb is crucial, since any analysis of Gapping must block the generation of *D and *F. If Scrambling is last cyclic, then it must precede Node Raising in order to feed it ($SVO + SVO \xrightarrow{\text{Scramble}} SOV + SOV \xrightarrow{\text{NR}} SO + SOV$). Note that we need not prevent Scrambling from applying after Node Raising as well, since if Scrambling can apply only to constituents of the same S, then it cannot produce *D given the proposed derived structure for Node Raising (see fn. 4):



⁵ Under this proposal, Gapping is no longer an example of a mirror image rule in the sense of Langacker (1969). Note that the condition that Gapping works only forward is really the same condition as on Pronominalization (whether it is a condition on the applicability of a transformation or a condition on interpretation as coreferential). Pronominalization works only forward in coordinate structures, both backward and forward in subordinate structures. Gapping of course applies only to coordinate sentences.

Although backward Gapping is shown to be a case of a more general rule, Node Raising, it is impossible to collapse forward Gapping with NP Deletion rules in all languages. Given a conjoined string $ab_1c + db_2e$, where $a \neq d$, $c \neq e$, and $b_1 = b_2$, b_2 can be deleted (i.e. gapped) if b_1 is a verb, but not necessarily if b_1 is an NP. Consider German: *Ich wusste, dass Heinrich den Brief diktierte und Heidi schrieb* 'I knew that Heinrich dictated the

However, following Jackendoff, we will assume that Gapping is not an "anywhere" or "nearly anywhere" rule. Node Raising is also fed by other movement rules, for example Extraposition and Dative Movement.⁶ Finally, Howard (1967, 23) and Jackendoff (1971, 24-25) have argued independently that Node Raising must apply before Gapping. (Both arguments are based on the fact that for Gapping, the second VP can have only one unlike constituent, and all like constituents must delete.) Assuming a theory of strictly ordered rules, we have the following order on the last cycle (where a line between two rules indicates crucial ordering, and the absence of a line indicates noncrucial ordering):



Node Raising can only apply to clause-final verbs. Under this analysis, if a language is SVO and lacks a movement rule which would make the verb clause-final, then Node Raising will never have a chance to apply to the verb, and only A but not *D will be produced, since Gapping works only forward. Such is the case in English. *D and *F will always be starred outputs since (forward) Gapping is, in all languages, ordered after Scrambling and other reordering rules affecting the linear position of the verb.

The One-Way Gapping Proposal makes the predictions about the distribution of the gapped outputs in Table 1 which are enumerated on the next page in Table 4. To find which gapping patterns will be found in a given language, one need only determine the permissible surface structure orders and look under the appropriate input column. A language which scrambles like Russian will have both SOV and SVO as possible inputs, and therefore will have A-, B- and C-type outputs. These predictions agree with those of Ross's chart in that no language will have only output types B, AB, or AC. They differ in that the One-Way Gapping Proposal makes the

letter, and Heidi wrote.' *Den brief* is not interpreted as object of *schrieb*. Thus, in many languages, the second occurrence of two identical NPs can be pronominalized but not deleted (or the identical NPs can undergo raising if they are clause-final).

⁶ Consider, for example, the type of complement construction illustrated by:

- (i) The members of the church voted to name Nixon Churchman of the Year.

The same conditions which govern the acceptability of postposing the object *Nixon* in (i) also govern the acceptability of Conjunction Reduction in the conjoined sentences (ii):

- (ii) The committee nominated Nixon and the members of the Church voted to name Nixon Churchman of the Year.

Thus the ungrammaticality of (iii) predicts the ungrammaticality of (iv):

- (iii) *The members of the Church voted to name Churchman of the Year Nixon.
- (iv) *The committee nominated and the members of the church voted to name Churchman of the Year Nixon.

TABLE 4

Rules in Grammar	Input order		
	SOV	SVO	VSO
Node Raising	C	none	none
Both Gapping and Node Raising	BC	A	E

further prediction that only languages without SOV inputs can exhibit no Gapping whatsoever. And in fact, Bach (1970) has observed that Chinese and Thai have no Gapping; both are SVO languages according to Greenberg (1961). Note that German falls very neatly into place in Table 4: it exhibits orders B and C (at least for simple tenses) in subordinate clauses where the input order is SOV, but only A in main clauses, where the input order is SVO.

To conclude, if the One-Way Gapping Proposal is correct, then no claim about base order can be made on the basis of Gapping, since it is only the input order of constituents after the application of reordering rules, and not the deep structure order, that is relevant.

2. It remains only to justify the above assumption that Gapping is a one-way and not a two-way rule. The following two arguments, due to Ross (personal communication), show that backward Gapping, unlike forward Gapping, exhibits the same behavior as Node Raising, and suggest that they are in fact the same rule.

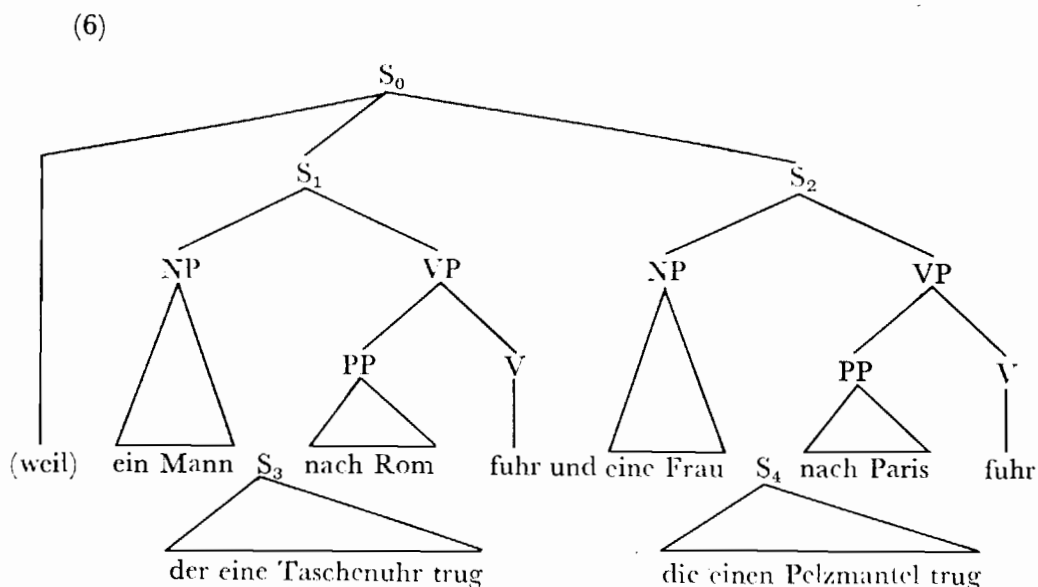
First there are different conditions on forward and backward Gapping. In some dialects of German, backward and forward Gapping behave differently with respect to the perfect and modal auxiliaries in subordinate clauses, as shown by the following gapped sentences:

- (3) a. Peter las den Brief und Heidi das Buch.
 b. Weil Peter den Brief und Heidi das Buch las, wurde keine Mathematik getan.
 c. Weil Peter den Brief las, und Heidi das Buch, wurde keine Mathematik getan.
 'Because Peter read the letter, and Heidi the book, no math was done.'
- (4) a. Peter hat den Brief geschrieben und Heidi das Buch gelesen.
 b. Weil Peter den Brief geschrieben und Heidi das Buch gelesen hat, wurde keine Mathematik getan.
 c. ?*Weil Peter den Brief geschrieben hat und Heidi das Buch gelesen, wurde keine Mathematik getan.
 'Because Peter wrote the letter and Heidi read the book, no math was done.'

- (5) a. Peter will den Brief schreiben und Heidi das Buch lesen.
 b. Weil Peter den Brief schreiben und Heidi das Buch lesen will, wird keine Mathematik getan werden.
 c. ?*Weil Peter den Brief schreiben will und Heidi das Buch lesen, wird keine Mathematik getan werden.
 'Because Peter wants to write the letter and Heidi wants to read the book, no math will be done.'

The (a) and (c) sentences are produced by forward Gapping; the (b) sentences by "backward Gapping". It is the contrast among (c) sentences that is important here. We have seen that forward Gapping cannot apply to auxiliary verbs in subordinate clauses, but that there is no such condition on "backward Gapping". This strange fact can be most naturally stated under the One-Way Gapping Proposal.

Second, the only condition on the so-called "backward Gapping" rule is that the verb be in absolute final position in surface structure. Consider the following sentence with conjoined subordinate clauses:



This sentence has four variations, depending on whether or not the relative clauses S₃ and S₄ have been optionally extraposed:

- (7) a. Weil ein Mann, der eine Taschenuhr trug, nach Rom fuhr, und eine Frau, die einen Pelzmantel trug, nach Paris fuhr, ...
 b. Weil ein Mann nach Rom fuhr, der eine Taschenuhr trug, und eine Frau, die einen Pelzmantel trug, nach Paris fuhr, ...
 c. Weil ein Mann, der eine Taschenuhr trug, nach Rom fuhr, und eine Frau nach Paris fuhr, die einen Pelzmantel trug, ...

- d. Weil ein Mann nach Rom fuhr, der eine Taschenuhr trug, und eine Frau nach Paris fuhr, die einen Pelzmantel trug, . . .
 'Because a man who wore a pocketwatch traveled to Rome, and a woman who wore a fur coat traveled to Paris, . . .'

All four variations can be gapped forward to delete the second occurrence of *fuhr*, but only (7a) can be "gapped" backward to delete the first occurrence of *fuhr*, since only in (7a) are both occurrences of *fuhr* in final position in the respective sentences:

- (8) a. Weil ein Mann, der eine Taschenuhr trug, nach Rom, und eine Frau, die einen Pelzmantel trug, nach Paris fuhr, . . .
 b. *Weil ein Mann nach Rom, der eine Taschenuhr trug, und eine Frau, die einen Pelzmantel trug, nach Paris fuhr, . . .
 c. *Weil ein Mann, der eine Taschenuhr trug, nach Rom, und eine Frau, nach Paris fuhr, die einen Pelzmantel trug, . . .
 d. *Weil ein Mann nach Rom, der eine Taschenuhr trug, und eine Frau nach Paris fuhr, die einen Pelzmantel trug, . . .

This condition is the same condition as the one on Node Raising which can only apply to identical clause-final constituents. Just as "backward Gapping" cannot apply to the verb if Extraposition or some other transformation has moved a constituent to the right of the verb, Node Raising cannot apply to an NP if any transformation such as Dative Movement has made that NP non-clause-final. If the two rules are collapsed, this similarity can be captured. The apparent asymmetries of (7) will follow naturally. The One-Way Gapping Proposal predicts that whatever conditions are found to constrain Node Raising will also be found to constrain "backward Gapping".

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