

Ross, John Robert [Haj].

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1967. Constraints on variables in syntax. PhD thesis, MIT. Published as Infinite syntax!, 1986, Ablex: Norwood, NJ. Pp. 70-77, 97-109,

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118-134, 147-149, 224-236.

Constraints on Reordering Transformations

4.0. Introduction

In this chapter and the next one, I will propose a set of constraints, some universal, some language-particular, which I will show to have roughly the same effect as the A-over-A principle. That is, I will show that with these constraints, it is possible to account for the six constructions in §2.2 which constitute evidence for the principle, while avoiding the counterexamples of §2.1. The A-over-A principle was postulated to be a constraint on transformational operations of all kinds. But I will attempt to show, in Chapter 6, that the constraints of Chapters 4 and 5 (and hence, the principle as well) should apply only to transformations which exhibit certain well-defined formal properties. The constraints of Chapter 4 affect only what I will refer to informally as *reordering transformations*—transformations which have the effect of moving one or more terms of the structural description around some other terms of it. (The precise definition of this notion will not be given until Chapter 6.) Two examples of reordering transformations are the *Question Rule* and the *Relative Clause Formation Rule*, which are stated very schematically in (4.1) and (4.2):

$$(4.1) \quad \text{Question}$$

$$Q - X - NP - Y$$

$$\begin{matrix} & & & & \text{OBLIG} \\ 1 & 2 & 3 & 4 & \implies \\ 1 & 3 + 2 & 0 & 4 & \end{matrix}$$

Condition: 3 dominates *wh* + *some*

(4.2) Relative Clause Formation

$$W - \left[{}_{NP}NP - [{}_S X - NP - Y] \right] - Z$$

$$\begin{matrix} & & & & & & \text{OBLIG} \\ 1 & 2 & 3 & 4 & 5 & 6 & \implies \\ 1 & 2 & 4 + 3 & 0 & 5 & 6 & \end{matrix}$$

Condition: 2 = 4

I will use ungrammatical questions and relative clauses to illustrate the effects that the constraints of this chapter have on all reordering transformations. In Chapter 6, I will present a list of all the other reordering transformations I know of, and show that they obey the same constraints.

4.1. The Complex NP Constraint

4.1.1. Klima's Principle. It is to Edward S. Klima that the essential insight underlying my formulation of this constraint is due. Noticing that the NP *that man* could be questioned in (4.3b), but not in (4.3a) (cf. (4.4)), Klima proposed the constraint stated in (4.5):

- (4.3) a. I read a statement which was about that man.
- b. I read a statement about that man.
- (4.4) a. *The man who I read a statement which was about is sick.
- b. The man who I read a statement about is sick.
- (4.5) Elements dominated by a sentence which is dominated by a noun phrase cannot be questioned or relativized.

If Klima's constraint is used in conjunction with the principle for S-deletion stated in (3.6), it can explain the difference in grammaticality between (4.4a) and (4.4b). For it is only in (4.3a) that the NP *that man* is contained in a sentence which is itself contained in an NP: when (4.3a) is converted into (4.4b) by the *Relative Clause Reduction Rule*, the node S which dominates the clause *which was about that man* in (4.3a) is pruned by (3.6).

Although I do not believe it is possible to maintain (4.5), for reasons I will present later, it will be seen that my final formulation of the

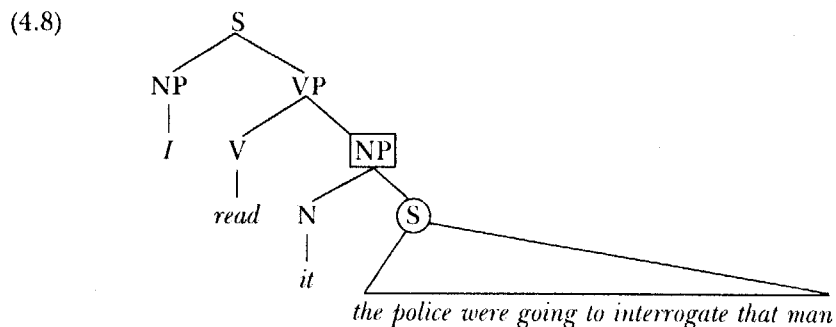
Complex NP Constraint makes crucial use of the central idea in Klima's formulation: the idea that node deletion affects the potential of constituents to undergo reordering transformations. This hypothesis may seem obvious, at the present stage of development of the theory of grammar, but when Klima first suggested it, when the theory of tree-pruning was much less well-developed than it is at present, it was far from being obvious. In fact, this idea is really the cornerstone of my research on variables.

4.1.2. Inadequacies of Klima's Principle. As I have intimated however, I find that (4.5) must be rejected in its present form. For consider the NP *that man* in (4.6): as (4.7) shows, it is relativizable:

(4.6) I read [_{NP}[_Sthat the police were going to interrogate that man]].

(4.7) the man who I read that the police were going to interrogate

Yet the *that*-clause which contains it would seem to be an NP, as I have indicated in the bracketing of (4.6). Presumably, the approximate deep structure of (4.6) is that shown in (4.8),



and unless some way is found of pruning the circled node S or the boxed node NP in (4.8), condition (4.5) will prevent the relativization of *that man*. There is abundant evidence that the first alternative is not feasible:

(4.9) a. I read that Bill had seen me.
b. *I read that Bill had seen myself.

(4.10) a. Evidence that he was drunk will be presented.
b. Evidence will be presented that he was drunk.

(4.11) a. That Bill_i was unpopular distressed him_i.¹
b. That he_i was unpopular distressed Bill_i.

The *Reflexivization Rule* does not "go down into" sentences (cf. Lees and Klima, 1963; Postal, 1966b). Thus the fact that (4.9a) is grammatical, while (4.9b) is not, is evidence that *that*-clauses are dominated by S at the time that reflexivization takes place. Similarly, the fact that *that*-clauses may be extraposed, as is the case in (4.10b), indicates that they are dominated by the node S at the time that this rule applies. Finally, the fact that backward pronominalization² into *that*-clauses is possible (cf. (4.11a)) also argues that they must be dominated by the node S. So it seems implausible that the circled node S should be deleted by some principle which supplements (3.6), and there is no independent support for such an additional pruning principle in any case. Therefore, the only other way to save (4.5) is to claim that the boxed node NP must be deleted in the process of converting (4.8) into the surface structure which underlies (4.6).

Can the node NP be deleted? In §3.2, I discussed briefly Kuroda's proposal to generalize the notion of tree-pruning in such a way that any non-branching node whose head had been deleted would be pruned. While it is *possible* to propose such a generalized version of (3.6), there is as yet no syntactic evidence which indicates that node deletion *must* prune out occurrences of NP or VP. The complex problems involving case-marking with respect to *amicī* and *eius* on the one hand and *meus* on the other, which I discussed in §3.1.3, might be solvable if use were made of some principle of NP deletion, but this has yet to be worked out in detail; and unless some other evidence can be found for NP pruning, invoking it to delete the boxed NP in (4.8) is merely *ad hoc*. For there are many pieces of evidence which show that *that*-clauses are dominated by NP at some point in their derivation:

(4.12) a. That the defendant had been rude was stoutly denied by his lawyer.
b. What I said was that she was lying.
c. Bill told me something awful: that ice won't sink.
d. Muriel said nothing else than that she had been insulted.

¹ Subscripts indicate identity of reference.

² This term is defined in Ross (1969c). There I argue that pronouns may precede the NP they refer to only if they are dominated by a subordinate clause which does not dominate that NP. (Cf. also §5.3.)

That-clauses passivize (4.12a), they occur after the copula in pseudo-cleft sentences (4.12b), after the colon in equative sentences (4.12c), and after *than* in sentences like (4.12d): in all of these contexts, phrases can occur which are unquestionably noun phrases (e.g., *Little Willy*, *potatoes*, *flying planes*, etc.), and Lakoff and I argue that the syntactic environments defined by (4.12) can only be filled with noun phrases (cf. Lakoff and Ross, in preparation a). If our arguments are correct, then *that*-clauses must be dominated by NP at some stage of their derivation. But it might be claimed that the late rule of *It-Deletion*,³ which deletes the abstract pronoun *it* when it immediately precedes a sentence, could change phrase-markers in such a way that the NP node which dominated *it S* would undergo pruning before *Question* and *Relative Clause Formation* had applied. Not enough is known about rule ordering at present for this possibility to be excluded, but it should be noted that even if it should prove to be possible to order *It-Deletion* before all reordering transformations, thereby accounting for the grammaticality of (4.7) by providing for the deletion of the boxed NP of (4.8), it would still be necessary to explain why there is no difference in grammaticality between (4.13a) and (4.13b):

- (4.13) a. This is a hat which I'm going to see to it that my ward buys.
b. This is a hat which I'm going to see that my ward buys.

After the verb *see* (*to*), the deletion of *it* is optional (in my dialect), and therefore, by the previous argument, while the *that*-clause in (4.13b) might not be dominated by NP, the *that*-clause in (4.13a) still would be. So unless some additional convention for NP pruning could be devised for this case too, (4.5) would not allow the generation of (4.13a). Again, I must reiterate that there is no known evidence for pruning NP under any other circumstances, so the *ad hoc* character of the explanation which is necessitated if (4.5) is adopted is readily apparent.

But there is an even more compelling reason to reject (4.5) than the ones above: as I pointed out in §2.4.1, it is in general the case that elements of reduced relative clauses and elements of full relative clauses behave exactly the same with respect to reordering transformations. This can be seen from the following examples: NP's which are in the same position as *Maxime* in the sentences of (4.14) cannot be questioned (cf. the ungrammaticality of (4.15):

³ Evidence that this rule must be placed late in the rule ordering is given in Lakoff and Ross (in prep. b). (Cf. also §5.1.1.)

- (4.14) a. Phineas knows a girl who is jealous of Maxime.
b. Phineas knows a girl who is behind Maxime.
c. Phineas knows a girl who is working with Maxime.
- (4.15) a. *Who does Phineas know a girl who is jealous of?
b. *Who does Phineas know a girl who is behind?
c. *Who does Phineas know a girl who is working with?

Nor can the NP be questioned, even after the relative clauses of (4.14) have been reduced, as evidenced by the ungrammaticality of (4.16):

- (4.16) a. *Who does Phineas know a girl jealous of?
b. *Who does Phineas know a girl behind?
c. *Who does Phineas know a girl working with?

It was facts like these which motivated the condition stated in (2.26), which I repeat for convenience here.

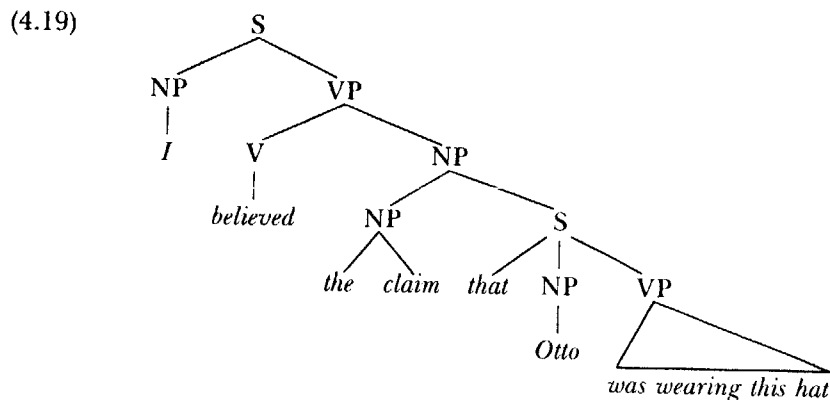
- (2.26) No element of a constituent of an NP which modifies the head noun may be questioned or relativized.

In the light of the facts of (4.15), and (4.16), it would appear that it is the grammaticality of (4.4b) which is problematic, not the ungrammaticality of the sentences in (4.16). And there are parallel facts which have to do with *Reflexivization*, which I will present in §4.1.6 below, which also support this interpretation. So condition (4.5), which takes the differences between the sentences in (4.4) to be typical, would seem to be a projection to an incorrect general conclusion from a case where special circumstances obtain. In the next section, I will give some evidence which allows the formulation of a broader-based generalization.

4.1.3. Statement of the Complex NP Constraint. The sentences of (4.17), which only differ in that the NP object of *believe* has a lexical head noun in the first, but not in the second, differ as to relativizability, as the corresponding sentences of (4.18) show:

- (4.17) a. I believed the claim that Otto was wearing this hat.
b. I believed that Otto was wearing this hat.
- (4.18) a. *The hat which I believed the claim that Otto was wearing is red.
b. The hat which I believed that Otto was wearing is red.

If the analysis proposed by Lakoff and me (Lakoff & Ross in preparation a) is correct, the derived structure of (4.17a) will be roughly that shown in (4.19).



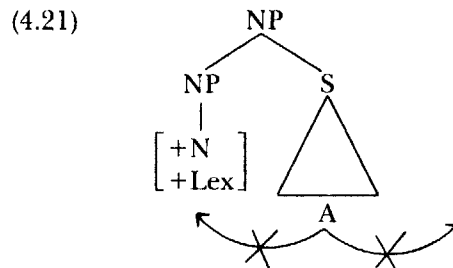
Whether or not we can show it to be correct that abstract nouns followed by sentential clauses in apposition to them have exactly the same $[_{NP}NP S]$ structure that we argue relative clauses have, it is clear that these constructions are highly similar. Condition (4.20), the Complex NP Constraint, is formulated in an effort to exploit this similarity to explain the ungrammaticality of sentences like (4.18a) and (4.15) on the same basis.

(4.20) *The Complex NP Constraint*

No element contained in a sentence dominated by a noun phrase with a lexical head noun may be moved out of that noun phrase by a transformation.

To put it diagrammatically, (4.20) prevents any constituent A from being reordered out of the S in constituents like the NP shown in (4.21), as the X's on the two arrows pointing left or right from A indicate. (Note that (4.20) does not prohibit elements from reordering within the dominated sentence, and, in fact, there are many rules which effect such reorderings. Some will be discussed in §5.1.)

I have assumed the existence of a feature, $[\pm Lex]$, to distinguish between lexical items like *claim* in (4.17a) or *girl* in (4.14) on the one hand, and the abstract pronoun *it* of (4.13a) on the other. It is possible to move elements out of sentences in construction with the third of these, as (4.13a) attests, but not out of sentences in construction with the first two ([4.18a] and [4.15] are ungrammatical). Thus it will be necessary for



the theory of grammar to keep them distinct somehow. The feature $[\pm Lexical]$ may not turn out to be the correct one; I have chosen it not only on the basis of the facts just cited but also with regard to the following parallel case in Japanese.

4.1.4. Relativization in Japanese. In Japanese, and I believe in all other languages as well, no elements of a relative clause may be relativized. Japanese relative clauses invariably precede the noun they modify. Superficially, they appear to be formed by simply deleting the occurrence of the identical NP in the matrix sentence. Thus when the sentence (4.22) is embedded as a modifier onto the NP *sono sakana wa* 'this fish', which is the subject of (4.23), (4.24) results:

(4.22) *kodomo ga⁴ sakana o tabete iru.*
child fish eating is

'The child is eating the fish.'

(4.23) *Sono sakana wa ookii.*
That fish big

'That fish is big.'

(4.24) *Sono kodomo ga tabete iru sakana wa ookii.*
That child eating is fish big

'That fish which the child is eating is big.'

⁴ The Japanese words *wa*, *ga*, *o*, *ni*, etc. have been called "particles". They correspond very roughly to case endings and prepositions. *Ga* and *wa* are adjoined by transformations to the right of subject noun phrases, *o* to the right of direct objects, *ni* to the right of agent phrases, etc. The syntax of these postpositional particles and other problems in Japanese syntax have been investigated intensively by Kuroda (cf. Kuroda, 1965), and I will not discuss it further here. In the word-for-word glosses of Japanese examples, I will leave the particles untranslated.

noun can serve as subject of these verbs—only picture nouns can, as is shown by the ungrammaticality of (4.76).

- (4.76) * $\left\{ \begin{array}{l} \text{the space between my eyes} \\ \text{sentencehood} \\ \text{Harry's civil rights} \\ \text{Marilyn's arrival} \\ \text{etc.} \end{array} \right\} \left\{ \begin{array}{l} \text{told of the conflict} \\ \text{described the country} \\ \text{stated that we were at} \\ \text{fault} \end{array} \right\}$

The fact that the deverbal nouns in (4.73a) behave the same way as the apparently basic nouns in (4.73b) with respect to relativization and questioning (cf. (4.4)), reflexivization (cf. (4.62)), and with respect to the curious selectional facts pointed out in (4.75) provides strong evidence for treating all picture nouns alike. Warshawsky suggests that verbs may be basic for picture nouns, and that hypothetical verbs (cf. Lakoff 1970) such as *to story*, *to column*, etc. be postulated as underlying the nouns of (4.73b). This proposal seems quite reasonable, but in the absence of a detailed analysis along these lines, little more can be said about it at present.

In passing, it should be remarked that there are a number of prepositional phrase adjuncts to noun phrases which exhibit behavior similar to that of picture nouns. As (4.16b) shows, it is not in general the case that elements of postnominal prepositional phrases can be questioned. But this is the case in the sentences of (4.77), as (4.78) shows:

- (4.77) a. I gave Tom a key $\left\{ \begin{array}{l} \text{to} \\ \text{for} \end{array} \right\}$ that door.
 b. Harold has books by some young novelists.
 c. Billy is looking for a road into the cavern.
- (4.78) a. Which door did I give Tom a key $\left\{ \begin{array}{l} \text{to} \\ \text{for} \end{array} \right\}$?
 b. Which novelists does Harold have books by?
 c. ?Which cavern is Billy looking for a road into?

Considerations of the same sort as previously discussed would suggest that NP's like *a key to this door* and *a road into the cavern* should not be

derived from *?a key which is to this door* and *?a road which is into the cavern*, which are at best of dubious grammaticality in any event. But what their deep structures might be is at present an unsolved problem.

4.1.7. Summary of Section 4.1. To conclude this discussion, the constraint which I stated in (4.20) correctly prevents elements of relative clauses from being questioned or relativized. The remarks of footnote 8 and §4.1.5 indicate that this constraint is stated too strongly at present, and the remarks in §4.1.6 show that the differences between the sentences of (4.4), although they appear to fall within the scope of (4.20), are in fact much more complex than has been realized. I know of no other counterexamples to the Complex NP Constraint, and I therefore submit it for inclusion in the list of putative linguistic universals, subject to whatever modifications are necessary to avoid the extra strength pointed out in footnote 8 and §4.1.5.

4.2. The Coordinate Structure Constraint

4.2.1. Statement of the Constraint. In §2.2, in case F, it was pointed out that conjoined NP cannot be questioned: this was attested to by the ungrammaticality of (2.18) and (2.19), which I repeat here for convenience.

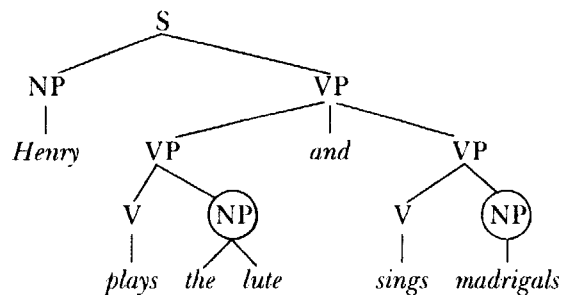
(2.18) *What sofa will he put the chair between some table and?

(2.19) *What table will he put the chair between and some sofa?

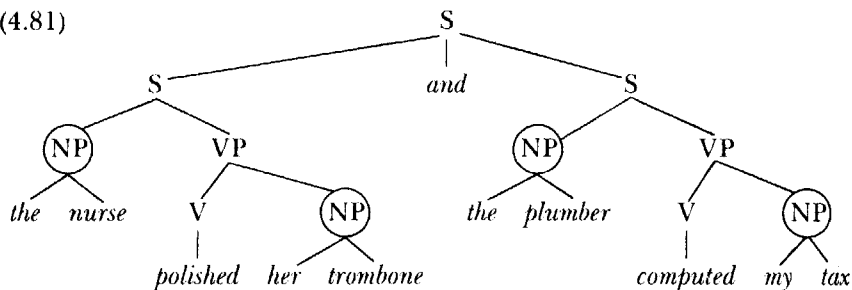
The impossibility of questioning the circled NP nodes in diagram (4.79) can be successfully accounted for by invoking the A-over-A principle, but this principle does not prevent the circled NP nodes in diagrams (4.80) or (4.81) from being questioned or relativized. However, all of the circled nodes must somehow be restricted from being moved, as the ungrammatical sentences of (4.82) show:

- (4.79)

(4.80)



(4.81)



- (4.82) a. *The lute which Henry plays and sings madrigals is warped.
- b. *The madrigals which Henry plays the lute and sings sound lousy.
- c. *The nurse who polished her trombone and the plumber computed my tax was a blonde.
- d. *Which trombone did the nurse polish and the plumber computed my tax?
- e. *The plumber who the nurse polished her trombone and computed my tax was a hefty fellow.
- f. *Whose tax did the nurse polish her trombone and the plumber compute?

(4.83)



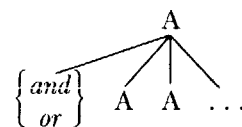
I know of no principled way of excluding such structures as those shown in (4.80) and (4.81) from being introduced as relative clauses, i.e., at the node S in (4.83), so it appears to be necessary to add the following constraint to the meta-theory:

(4.84) *The Coordinate Structure Constraint*
 In a coordinate structure, no conjunct may be moved, nor

may any element contained in a conjunct be moved out of that conjunct.

4.2.2. Definition of "Coordinate Structure." I propose to define the notion *coordinate structure* as any structure conforming to the schematic diagram in (4.85):

(4.85)

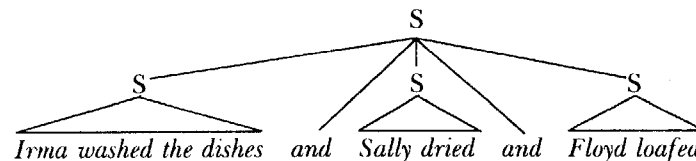


Of course, since (4.85) is intended to be a universal definition, it must be understood as containing not the English morphemes *and* and *or*, but rather a more abstract, language-independent representation of these terms.¹⁰ Furthermore, the conjunction should be understood as either preceding all its conjuncts, as in English, French, etc., or following them, as in Japanese. Coordinate structures contain at least two conjuncts, but may contain any higher number of them.

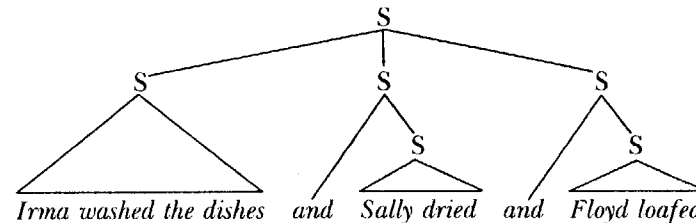
As for the deep structure position of the conjunction with respect to the conjuncts, there are many reasons for believing that the structure of (4.86) is not that shown in (4.87), but is rather that shown in (4.88). There, each occurrence of the conjunction *and* forms a constituent with the following sentence instead of being coordinate with it, as in (4.87).

(4.86) Irma washed the dishes, and Sally dried, and Floyd loafed.

(4.87)



(4.88)



¹⁰ If it should turn out to be possible to treat disjunction as the negation of conjunction, (4.85) will admit of simplification.

One syntactic reason is that if a conjoined sentence like (4.89) is broken up into two sentences, as in (4.90), the conjunction always goes with the second sentence, as in (4.90a), never with the first, as in (4.90b):

(4.89) John left, and he didn't even say goodbye.

(4.90) a. John left. And he didn't even say goodbye.
b. *John left and. He didn't even say goodbye.

A second syntactic reason is that there are languages in which coordinating conjunctions can become enclitics, which are then inserted into one conjunct; this is the case with *que* 'and' in Latin, and with the word *aber* 'but' in German. Such enclitics are always associated with the following conjunct, never with the preceding one. Thus (4.91) may be converted into (4.92a), but not into (4.92b):

(4.91) *Sie will tanzen, aber ich will nach Hause gehen.*
'She wants to dance, but I want to go home.'

(4.92) a. *Sie will tanzen; ich will aber nach Hause gehen.*
b. **Sie will aber tanzen; ich will nach Hause gehen.*¹¹

A third syntactic reason for regarding (4.88) as the correct structure is the following: since the *Appositive Clause Formation Rule* must convert sentences like (4.93a) into (4.93b) (but cf. §6.2.4.1).

(4.93) a. Even Harold failed, and he is the smartest boy in our class.
b. Even Harold, $\left\{ \begin{array}{l} \text{and he} \\ \text{who} \end{array} \right\}$ is the smartest boy
in our class, failed.

there are very general theoretical grounds for arguing that the string *and he is the smartest boy in our class* in (4.93a) is a constituent, for except for this case, transformations can be constrained so that only constituents may be adjoined.

Phonological evidence indicates strongly that the bracketing of the subject NP of (4.94) must be that shown in (4.95a), and not that shown in (4.95b) or (4.95c):

(4.94) Tom, and Dick, and Harry all love watermelon.

(4.95) a. ([Tom] [and Dick] [and Harry]) all love watermelon.
b. ([Tom] [and] [Dick] [and] [Harry]) all love watermelon.
c. ([Tom and] [Dick and] [Harry]) all love watermelon.

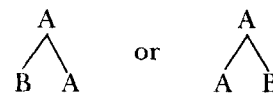
for intonational pauses come before coordinating conjunctions, not after them or equally on both sides of them.

So there is good evidence to indicate that the correct structure of (4.86) must be that given in (4.88). But how does this structure arise? Lakoff and I (in prep. b.) propose that there be a phrase structure rule schema like (4.96) in the base:

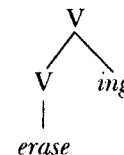
(4.96) $S \rightarrow \left\{ \begin{array}{l} \text{and} \\ \text{or} \end{array} \right\} S^n$ where $n \geq 2$

and that later the *and* or *or* which is introduced by (4.96) be copied and Chomsky-adjoined¹² to each of the indefinitely many S's that are intro-

¹² There is evidence, first noted by Chomsky, that a type of adjunction operation is required which produces one of the two structures below, if B is adjoined to A:



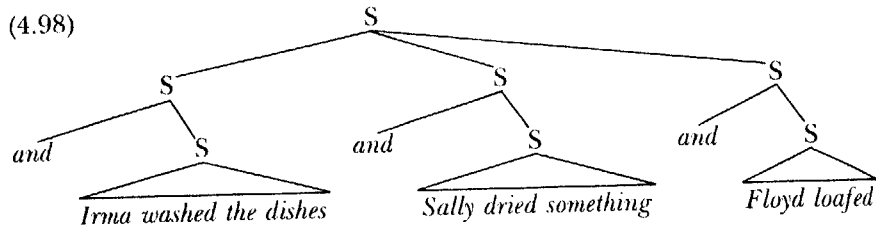
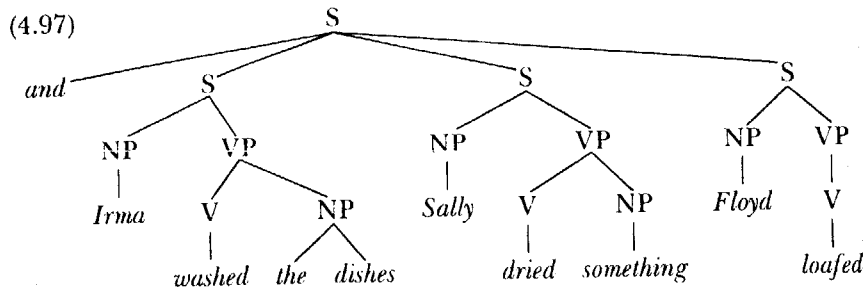
depending on whether it is adjoined to the left or right of A. The motivation for the creation of the new node A is as follows: in such a sentence as *the boy is erasing the blackboard*, it seems clear that the result of adjoining the present participle ending, *-ing*, to a verb should be a node of some sort. But the stress rules will only work properly if the formative *erase* is dominated exhaustively by the node V (for a discussion of the stress rules of English, cf. Chomsky and Halle (to appear)). This would indicate that the correct derived structure is



To distinguish this kind of adjunction from what has been called "sister-adjunction" (cf. Fraser, 1963), I refer to it as *Chomsky-adjunction*. It is at present an open question as to whether both types of adjunction need be countenanced within the theory of derived constituent structure. Some consequences of using Chomsky-adjunction in the complement system are explored in Lakoff and Ross (in prep. b.), where the proposed analysis of sentence coordination is based in an essential way upon this kind of adjunction.

¹¹ Sentence (4.92b) is perfectly grammatical, and it means 'But she wants to dance, (so) I want to go home.' I have only starred it because it is not related to (4.91).

duced by (4.96) by a rule of *Conjunction Copying*. So the deep structure of (4.86) would be approximately that shown in (4.97), which the rule of *Conjunction Copying* will convert to (4.98).



To derive (4.88) from (4.98), the first instance of *and* is deleted by a general rule which I will not state here. It is deleted obligatorily if the conjuncts are sentences, as is the case in (4.98), but it may optionally be converted into *both* if the conjuncts are NP, VP, or V. The rules for conjunction with *or* are similar in all respects, except that the initial *or* may be converted into *either* in front of all conjuncts. Languages like French, where the first conjunction does not have a suppletive alternant, provide further motivation for this analysis:

- (4.99) a. *Et Jean et Pierre sont fatigués.*
and John and Peter are tired.
'Both John and Peter are tired.'
- b. *Ou Jean ou Pierre doit le faire.*
Or John or Peter must it do.
'Either John or Peter must do it.'

One final point in favor of this analysis should be mentioned: the semantic interpretation of conjunctions, under this analysis, is much

more in line with the traditional logical analysis of conjunctions, which treats them as *n*-place predicates, than would be the case if the previously accepted analyses were adopted. That is, if (4.97) is adopted as the deep structure of (4.86), the conjunctions *and* or *or* are only different semantically from such two-place relations as *see*, etc. in that the former can have an indefinitely large number of arguments, while the latter are binary. But if some such structure as (4.87) is postulated as the deep structure of (4.86), then quite dissimilar projection rules will have to be constructed to interpret (4.87) semantically. Also, the fact that *and*, *or*, and *see* are semantically similar, in that all are relations, will not be expressed formally.

4.2.3. Other Sources of *And*. Given the above definition of coordinate structure, the first clause of the Coordinate Structure Constraint will exclude (2.18) and (2.19), while the second will exclude all the sentences of (4.82). The latter sentences could neither be excluded by the A-over-A principle nor by the Complex NP Constraint of §4.1, so it appears that condition (4.84) is necessary for reasons which are independent of the problems raised by (2.18) and (2.19). Thus (4.84) can be used to explain their ungrammaticality, just as the A-over-A principle was.

It should be pointed out that there are instances of the morpheme *and* which must be derived from different sources than the two major sources discussed in Lakoff and Peters (1969). For instance, as (4.101) shows, there is a difference in relativizability between (4.100a) and (4.100b), even though both sentences in (4.100) appear to contain structures that are coordinate, by definition (4.85).

- (4.100) a. I went to the store and bought some whisky.
b. I went to the store and Mike bought some whisky.
- (4.101) a. Here's the whisky which I went to the store and bought.
b. *Here's the whisky which I went to the store and Mike bought.

However, as George Lakoff has pointed out to me, there are clear syntactic indications that the relative clause in (4.101a) is not an instance of ordinary sentence conjunction. First of all, it is only with non-stative verbs as the main verb of the second conjunct that sentences like (4.101a) can be constructed.

- (4.102) a. Tony has a Fiat and yearns for a tall friend.
b. *The tall friend who Tony has a Fiat and yearns for is cruel to him.

Secondly, the second conjunct cannot be negative:

- (4.103) a. I went to the movies and didn't pick up the shirts.
 b. *The shirts which I went to the movies and didn't pick up will cost us a lot of money.

Thirdly, there are restrictions on the tenses that may appear in such sentences as (4.101a). Thus (4.104a) parallels (4.100a) in everything but tense, but the NP *the whisky* is not relativizable, as (4.104b) indicates:

- (4.104) a. I went to the store and have bought some excellent whisky.
 b. *The excellent whisky which I went to the store and have bought was very costly.

One reading of (4.100a) is synonymous with (4.105a), which contains a purpose clause, while the ungrammatical sentences of (4.102b), (4.103b), and (4.104b) are matched by correspondingly ungrammatical purpose clauses in (4.105b), (4.105c), and (4.105d), respectively. These correspondences suggest that the reading of (4.100a) which allows the formation of the relative clause of (4.101a) must be derived from whatever structure underlies (4.105a). Note, by the way, that relativization is also possible in (4.105a), as (4.106) shows:

- (4.105) a. I went to the store to buy some whisky.
 b. *Tony has a Fiat to yearn for a tall friend.
 c. *I went to the movies $\left\{ \begin{array}{l} \text{not to} \\ \text{to not} \end{array} \right\}$ pick the shirts up.
 d. *I went to the store to have bought some whisky.

- (4.106) Here's the whisky which I went to the store to buy.

There are other instances of the morpheme *and* which a similar line of argument suggests should not be derived from coordinate nodes in deep structure. For example, consider the sentences in (4.107):

- (4.107) a. She's gone and ruined her dress now.
 b. I've got to try and find that screw.
 c. Aunt Hattie wants you to be nice and kiss your granny.

As I have no plausible analysis for these sentences, I will merely point out that they are not subject to (4.84):

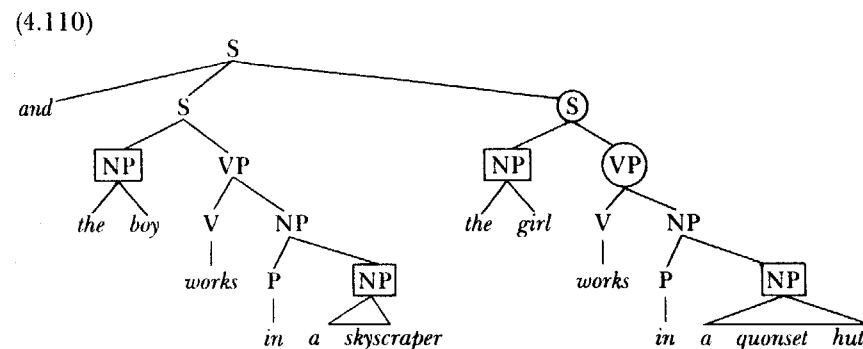
- (4.108) a. Which dress has she gone and ruined now?
 b. The screw which I've got to try and find holds the frammiss to the myolator.
 c. Which granny does Aunt Hattie want me to be nice and kiss?

The fact that the sentences of (4.108) and sentence (4.101a) are grammatical might mean that (4.84) is simply wrong, but the facts I presented in (4.102)–(4.106) suggest that this may not be so, at least with regard to (4.101a). Rather, it may be the case that none of these sentences contain coordinate structures at the time when questions, relative clauses, etc. are formed, but only are converted into coordinate structures later, or that they never contain coordinate structures at all. In fact, I know of no other test for coordinate structure than the one (4.84) provides, and it therefore seems quite reasonable to me to assume that one of these last two possibilities is correct.

It is perhaps worthwhile to show how (4.84) can provide a test for coordinate structure. (4.109a) can be converted into (4.109b) by the rule of *Gapping* (Ross 1967):

- (4.109) a. The boy works in a skyscraper and the girl works in a quonset hut.
 b. The boy works in a skyscraper and the girl in a quonset hut.

The structure underlying these sentences is that shown in (4.110).



When *Gapping* applies to (4.110), deleting the second occurrence of the verb *works*, it might be proposed that either the node VP which immediately dominates it or the circled node S should be pruned, or both. There is no evidence which argues for or against retention of the circled node VP. However, if the circled S were pruned, (4.110) would

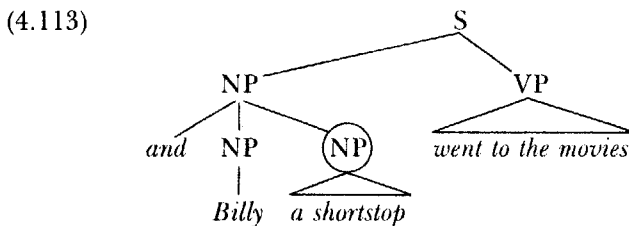
cease to be a coordinate structure, under the definition given in (4.85), and the boxed NP's in (4.110) should become movable. The fact that they do not (cf. [4.111])

- (4.111) a. *Which boy works in a skyscraper and the girl in a quonset hut?
 b. *The skyscraper which the boy works in and the girl in a quonset hut belongs to Uncle Sam.
 c. *The girl who the boy works in a skyscraper and in a quonset hut has a dimple on her nose.
 d. *Which quonset hut does the boy work in a skyscraper and the girl in?

is most simply accounted for by assuming that (4.110) retains its coordinate structure even after *Gapping* has applied; i.e., that the putative convention which pruned the circled S was incorrect.

It can also be shown that coordinate structure can disappear in the course of a derivation. So, for instance, Lakoff and Peters (1968) argue that (4.112) should be derived from (4.113) by a sequence of optional rules which convert an occurrence of *and* to *with* and then adjoin the *with*-phrase to the main VP of the sentence.¹³

- (4.112) Billy went to the movies with a shortstop.



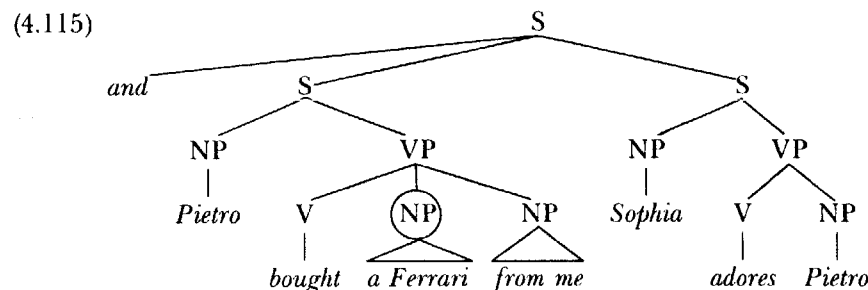
The circled NP is not relativizable unless *Conjunct Movement* has applied (cf. [4.114]):

- (4.114) a. The shortstop who Billy went to the movies with will wed me ere the morn.

¹³ As (4.84) is presently formulated, such a rule would be impossible: no conjunct can be moved. But in §6.3 below I will show the Lakoff-Peters rule of *Conjunct Movement* is formally different in one crucial respect from the rules of *Relative Clause Formation* and *Question*, and that it is this difference that makes the former possible and the latter two impossible.

- b. *The shortstop who Billy and went to the movies will wed me ere the morn.

Similarly, in the conjoined structure (4.115), the circled NP can only be relativized if the second conjoined sentence has been inserted into the first as an appositive clause.



- (4.116) a. *The Ferrari which Pietro bought from me and Sophia adores him cost a bundle.¹⁴
 b. The Ferrari which Pietro, who Sophia adores, bought from me cost him a bundle.

These two facts illustrate a perhaps obvious point: whether or not a constituent can be moved depends not on deep structure, but on derived structure.

4.2.4. Across-The-Board Movement Rules

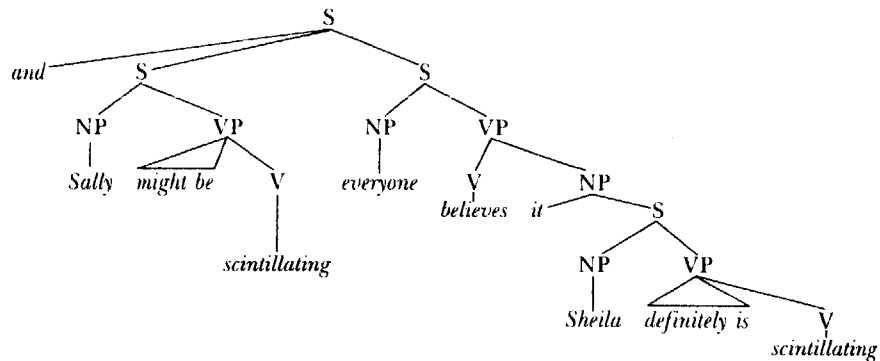
4.2.4.1. *Conjunction Reduction.* There is an important class of rules to which (4.84) does not apply. These are rule schemata which move a constituent out of all the conjuncts of a coordinate structure. In Lakoff and Ross (in preparation b), an analysis of conjoined sentences is explored which takes the process which converts such sentences as (4.117a) into (4.117b) as being the fundamental process in conjunction.

- (4.117) a. Sally might be scintillating, and everyone believes Sheila definitely is scintillating.
 b. Sally might be, and everyone believes Sheila definitely is, scintillating.

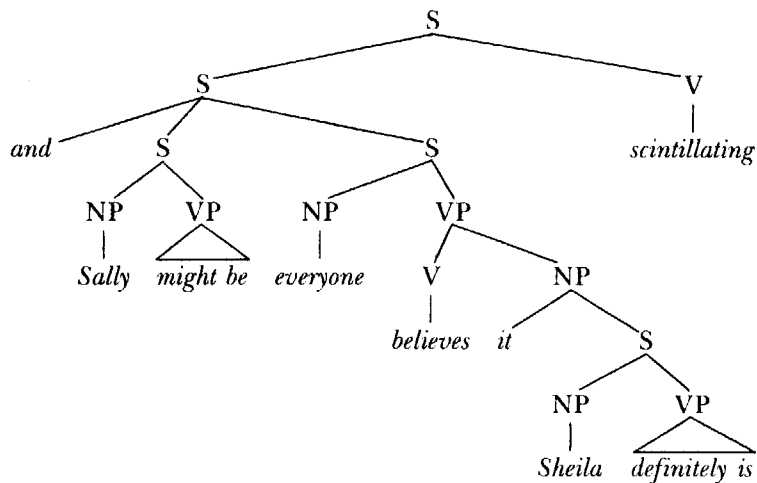
¹⁴ (4.116a) is acceptable only if strong pauses follow *bought* and *him*, i.e., if the second clause of (4.115) has become a parenthetical insert into the first clause and is therefore no longer coordinate with it.

We propose a rule of *Conjunction Reduction* which Chomsky-adjoints to the right or left of the coordinate node a copy of some constituent which occurs in all conjuncts, on a right or left branch, respectively, and then deletes the original nodes. Thus this rule converts (4.118), which underlies (4.117), into (4.119).

(4.118)



(4.119)



It is important to note that *Conjunction Reduction* must work “across the board”—the element adjoined to the coordinate node must occur in each conjunct. Thus (4.120a) can be converted to (4.120b), but not (4.121a) to (4.121b):

(4.120) a. Tom picked these grapes, and I washed these grapes, and Ergot will prepare these grapes.

b. Tom picked, and I washed, and Ergot will prepare, these grapes.

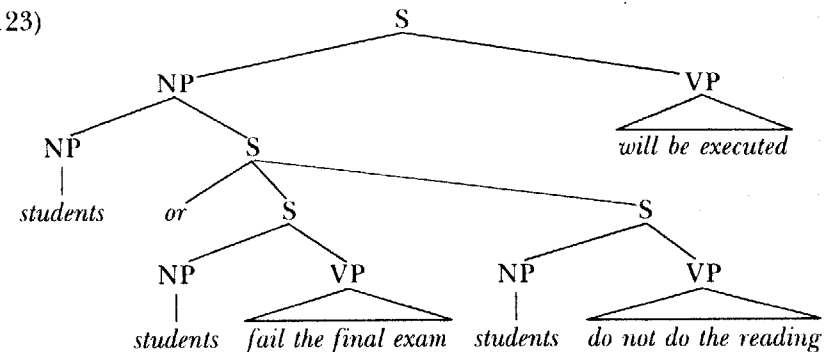
(4.121) a. Tom picked these grapes, and I washed some turnips, and Ergot will prepare these grapes.

b. *Tom picked, and I washed some turnips, and Ergot will prepare, these grapes.

It appears that the rule of *Relative Clause Formation* must also apply “across the board”; the relative clause in (4.122) would seem to have to derive from a structure with an embedded disjunction, as in (4.123), rather than sentence (4.124), whose main clause is a disjunction, because (4.124) is not synonymous with (4.122).

(4.122) Students who fail the final exam or who do not do the reading will be executed.

(4.123)



(4.124) Students who fail the final exam will be executed or students who do not do the reading will be executed.

It is obvious that there are many rules which do not necessarily apply across the board. Passives can be conjoined with actives (cf. [4.125a]), and *Particle Movement* and *Extraposition* may apply in some conjuncts but not in others (cf. (4.125b) and (4.125c)).

(4.125) a. John has been captured by the cops and I'm afraid he'll talk.

b. I heated up the coffee and Sally wiped the table off.

c. That Peter showed up is a miracle and it is doubtful that he'll ever come again.

- (4.153) Harry will be in the Marines next year and Herman was drafted last night.

The exact nature of deep structure constraints on conjoined sentences is an interesting topic which has been studied far too little and which I can contribute nothing to at present. Why, for instance, should there be a difference between (4.138c) and (4.139c)? Whatever the answer to this and similar questions turns out to be, my basic point remains valid: there are both transformational and deep structural constraints which must be formulated to apply to all conjuncts in a coordinate structure.

4.2.4.4. More Constraints. Sentences such as those in (4.154) raise problems which may be related to across-the-board constraints.

- (4.154) a. Sasha is gobbling down blintzes faster than I can reheat them.
 b. I want to peruse that contract before filing it away.
 c. Fred tore the curtain in rolling it up.

Although the sentences are so complex that reliable judgments are difficult to come by, I believe it to be the case that when relative clauses are formed from the sentences in (4.154), both the NP's (*blintzes*, *that contract*, and *the curtain*) themselves and their anaphoric pronouns may seem to be relativized at once, as is the case in the sentences in (4.155).

- (4.155) a. ??The blintzes which Sasha is gobbling down faster than I can reheat are extremely tasty, if I do say so.
 b. ?I suspect that the contract which I wanted to peruse before filing away may have some loopholes.
 c. The curtain which Fred tore in rolling up was the kind gift of my maternal Aunt Priscilla.

I believe it is theoretically possible to relativize any number of NP's at once, although the resulting sentences are somewhat less than felicitous: the *a*-sentences below have been converted into relative clauses in the corresponding *b*-sentences.

- (4.156) a. I want to peruse that contract before damaging it while filing it away.
 b. ?The contract which I want to peruse before damaging while filing away is written on Peruvian papyrus.

- (4.157) a. ?I want to peruse that contract after copying it by treating it in milk while pressing it between two pieces of marble in flattening it out.
 b. ?*The contract which I want to peruse after copying by treating in milk while pressing between two pieces of marble in flattening out is a beautiful piece of art.

Whether or not such tortured constructions as this last are to be accorded some degree of Englishness is not of great importance for this study, since I cannot even propose a rule which will generate less questionable examples, such as (4.155) and (4.156b). What makes these sentences similar to the ones discussed in §4.2.4.2 above is the fact that not only does it seem possible to relativize some NP simultaneously from a number of clauses, but it does not seem possible to relativize an NP from only the second of these clauses. Thus if the anaphoric pronouns of (4.154) are replaced by different NP's, as in (4.158), these NP's cannot be relativized, as (4.159) shows.

- (4.158) a. Sasha is gobbling down blintzes faster than I can reheat the fishballs.
 b. I want to peruse that contract before filing away the deed.
 c. Fred tore the curtain in rolling up the wallpaper.
 (4.159) a. *I think Anita may have poisoned the fishballs which Sasha is gobbling down blintzes faster than I can reheat.
 b. *The deed which I want to peruse that contract before filing away is probably a forgery.
 c. ?*The wallpaper which Fred tore the curtain in rolling up had a pleasing geometrical pattern.

The similarity stops here, however; for, bafflingly, it is possible to relativize NP's in just the first of these clauses (cf. (4.160)):

- (4.160) a. The blintzes which Sasha is gobbling down faster than I can reheat the fishballs are extremely tasty, if I do say so.
 b. I suspect that the contract which I want to peruse before filing away the deed may have some loopholes.
 c. The curtain which Fred tore in rolling the wallpaper up was the kind gift of my maternal Aunt Priscilla.

Notice that it is similarly possible to relativize just the NP's *blintzes*, *that contract*, and *the curtain* in (4.154):

- (4.161) a. The blintzes which Sasha is gobbling down faster than I can reheat them are extremely tasty, if I do say so.
 b. ?I suspect that the contract which I wanted to peruse before filing it away may have some loopholes.
 c. ?The curtain which Fred tore in rolling it up was the kind gift of my maternal Aunt Priscilla.

These facts suggest that it may be incorrect to attempt to derive the sentences in (4.155) directly from (4.154) by some kind of modified across-the-board rule. The sentences in (4.161) may be a necessary first step in this derivation, with a rule of pronoun deletion applying optionally to (4.161) to produce (4.155). This idea is given additional support by the fact that there are differences in acceptability among the sentences of (4.155) which are exactly reversed in the sentences of (4.161). That is, (4.155a) is far more awkward for me than (4.155b), which in turn is slightly more awkward than the fully grammatical (4.155c). But in (4.161), it is the *a*-version which is fully grammatical, the *b*-version which is slightly doubtful, and the *c*-version which is the most dubious of all. These differences can be accounted for if it is assumed that the rule of Pronoun Deletion which transforms (4.161) into (4.155) is obligatory in the case of (4.161c), optional in the case of (4.161b), and not applicable in the case of (4.161a). This attempt at explanation does not yet have much force, for I have no idea what features of the environment the optionality of this rule depends upon, nor how to state the rule, but perhaps it is at least a correct line of attack on this problem.

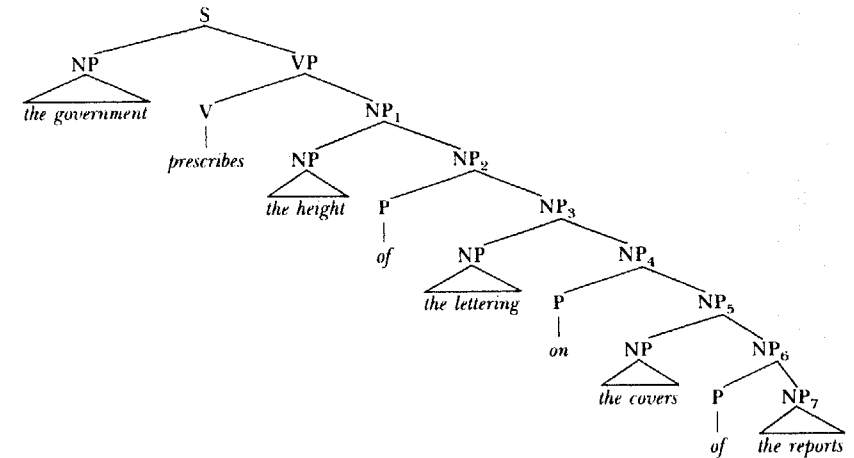
4.2.5. Summary of Section 4.2. In conclusion, I have tried to show in the above sections that case F of §2.2 can be excluded by a constraint of great generality, the Coordinate Structure Constraint, which is needed independently of the other constraints of this chapter. It is more powerful than the A-over-A principle, which cannot exclude sentences like (4.82). It can be used as a criterion for coordinate structure, and on this basis, it was argued in §4.2.3 that nodes which are coordinate in deep structure may cease to be so in the course of a derivation and that nodes which appear to be coordinate in surface structure may not be. The statement of the constraint in (4.84) was shown to require modification to account for the facts of the class of across-the-board rules, which must operate in all conjuncts simultaneously. A tentative hypothesis about the formal properties of such across-the-board rules was advanced. At present, I know of no rules which are not subject to the Coordinate Structure Constraint, except for the rule of *Appositive Clause Formation*, which I will discuss in §6.2.4 below, so I propose that this constraint be added to the theory of grammar.

4.3. The Pied Piping Convention

4.3.1. Arguments for the Convention. In this section, I will suggest a constraint which can successfully account for the evidence for the A-over-A principle which was presented in cases D and E of §2.2, and a convention which will provide for the generation of all the relative clauses in the sentences of (4.163). These must all be derived from (4.162), the approximate structure of sentence (2.3), which I have repeated here, for convenience.

- (2.3) The government prescribes the height of the lettering on the covers of the reports.

(4.162)

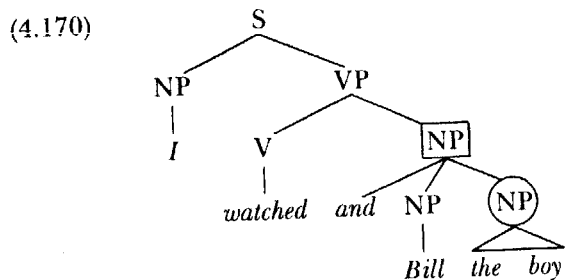


- (4.163) a. Reports which the government prescribes the height of the lettering on the covers of are invariably boring.
 b. Reports the covers of which the government prescribes the height of the lettering on almost always put me to sleep.
 c. Reports the lettering on the covers of which the government prescribes the height of are a shocking waste of public funds.
 d. Reports the height of the lettering on the covers of which the government prescribes should be abolished.

It can be seen that if the structure in (4.162) were embedded as a relative clause modifier in an NP whose head noun is *report*, the rule of

I will not attempt a more precise formulation of this restriction here: instead, I will point out two further inadequacies in the formulation of (4.166).

First, if the structure shown in (4.170) were to be embedded as a relative clause on an NP whose head noun were *the boy*, the Coordinate Structure Constraint would not allow the formation of (4.171):

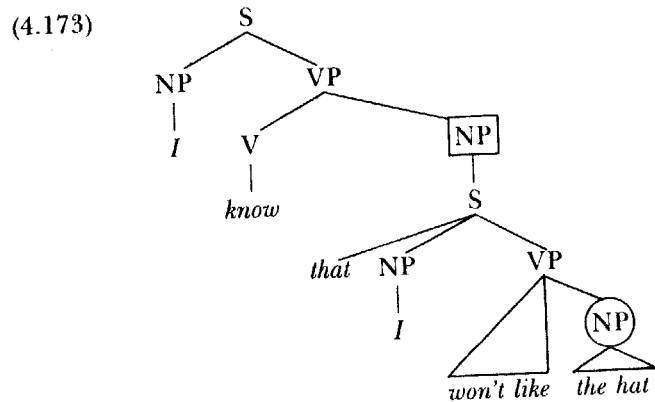


(4.171) *The boy who I watched [Bill and] was vain.

However, the circled node NP is dominated by the boxed node NP, and convention (4.166) would allow this higher node to be preposed, which would result in the ungrammatical (4.172):

(4.172) *The boy Bill and who(m) I watched was vain.

The ungrammaticality of this sentence indicates the necessity of revising (4.166) in such a way that if an NP dominating the specified NP is coordinate, neither it nor any higher NP can be moved. I will incorporate such a revision into the final version of the convention, which will be stated in (4.180).



The second inadequacy of (4.166) can be seen in connection with phrase-marker (4.173). While it is true that the circled node NP can be relativized, as (4.174) shows:

(4.174) They will give me a hat which I know that I won't like.

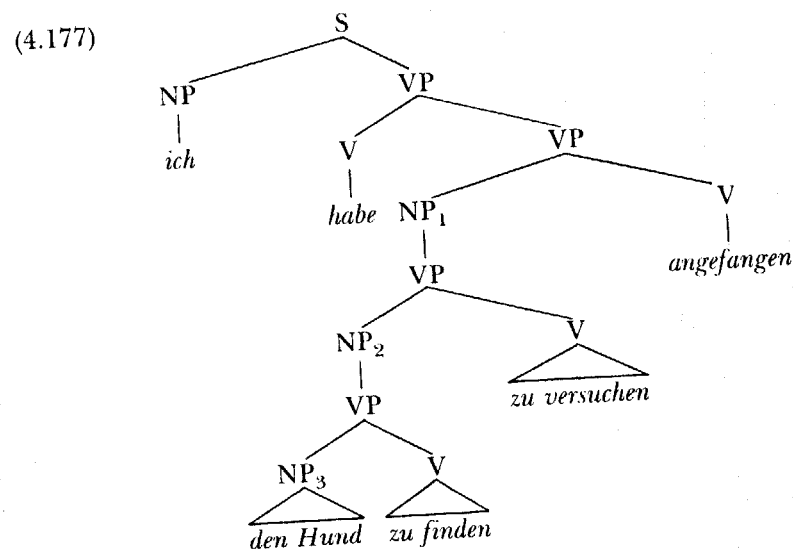
once again, (4.166) would allow the preposing of the boxed node NP, and the ungrammatical (4.175) would be produced:

(4.175) *They will give me a hat that I won't like which I know.

The modification of (4.166) that seems to be required here is that if a branch of a phrase-marker has an occurrence of the node S intervening between two occurrences of the node NP, only the lower one can be reordered. This restriction does not extend to the node VP, however, as can be seen from the following example.

The approximate structure of the German sentence in (4.176) is that shown in (4.177).

(4.176) *Ich habe den Hund zu finden zu versuchen angefangen.*
 I have the dog to find to try begun
 'I have begun to try to find the dog.'



If the structure which underlies (4.177) has been embedded as a relative clause on the subject NP of the structure underlying (4.178), the

rule of *Relative Clause Formation* must produce all three of the clauses in the sentences of (4.179).

(4.178) *Der Hund ist ein Bernardiner.*

'The dog is a St. Bernard.'

(4.179) a. *Der Hund, den ich zu finden zu versuchen angefangen habe, ist ein Bernardiner.*²¹

b. *Der Hund, den zu finden ich zu versuchen angefangen habe, ist ein Bernardiner.*

c. *Der Hund, den zu finden zu versuchen ich angefangen habe, ist ein Bernardiner.*

'The dog which I have begun to try to find is a St. Bernard.'

In (4.179a), only the specified node, NP₃ in (4.177), has been preposed, while in (4.179b), the phrase dominated by NP₂, which contains NP₃, has been preposed, and in (4.179c), the largest NP, NP₁, has been preposed. Note that these three NP nodes are separated by two VP nodes in (4.177), but that (4.166) is still operative. This then indicates that it is only the node S, as was claimed above, to which reference must be made in revising (4.166).²²

In (4.180), I have modified the convention given in (4.166) in such a way as to overcome the two inadequacies I have just discussed.

(4.180) *The Pied Piping Convention*²³

Any transformation which is stated in such a way as to effect the reordering of some specified node NP, where this node is preceded and followed by variables in the structural index of the rule, may apply to this NP or to any

²¹ The verb *habe* 'have' has been moved to the end of the relative clauses in (4.179) by a rule which moves verbs to the end of all dependent clauses.

²² Actually, there is some question as to whether the occurrences of the node S which NP₂ and NP₁ dominate in deep structure will have been pruned by the time the rule of *Relative Clause Formation* applies. At present, I am not sure that pruning must have already applied. If it has not, the problems under discussion multiply enormously, for then it would presumably be necessary to distinguish between sentences with finite main verbs and those with nonfinite main verbs in the revised version of (4.166).

²³ I am grateful to Robin Lakoff for suggesting this descriptive and picturesque terminology. Just as the children of Hamelin followed the Pied Piper out of town, so the constituents of larger noun phrases follow the specified noun phrase when it is reordered. This choice of terminology from the realm of fairy tales should not, however, be construed by an overly literal reader as a disclaimer on my part of the psychological reality of (4.180).

non-coordinate NP which dominates it, as long as there are no occurrences of any coordinate node, nor of the node S, on the branch connecting the higher node and the specified node.

4.3.2. Details of the Convention

4.3.2.0. Outline of Section 4.3.2. The convention stated in (4.180) stipulates that any NP above some specified one may be reordered, instead of the specified one, but there are environments where the lower NP may not be moved, and only some higher one can, consonant with the conditions imposed in (4.180). In other words, pied piping is obligatory in some contexts.²⁴ In §4.3.2.1, I will describe two environments in which pied piping is obligatory, whether the specified NP is to be moved to the right or to the left, and in §4.3.2.2, I will cite several environments in which pied piping cannot apply. In §4.3.2.3, I will discuss the one environment I know of in which pied piping is obligatory if an NP is moved in one direction, but not if it is moved in the other. In §4.3.2.4, I will show how the constraints on pied piping developed in these sections interact with the rule of *Conjunction Reduction*, and in §4.3.2.5, I will explore the question of the theoretical status of the various conditions on (4.180) which are discussed in §§4.3.2.1–4.3.2.4.

4.3.2.1. Environments for Obligatory Pied Piping. For English, and for many other languages, the following constraint, which has the effect of making pied piping obligatory in the stated environment, obtains:

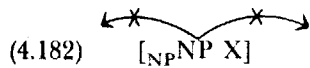
(4.181) *The Left Branch Condition*

No NP which is the leftmost constituent of a larger NP can be reordered out of this NP by a transformational rule.

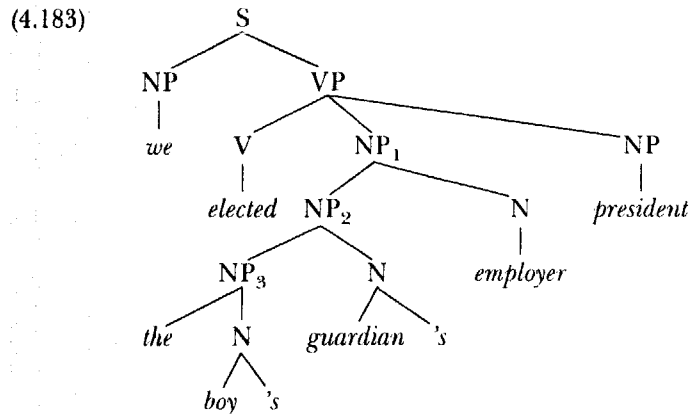
In other words, (4.181) prohibits the NP shown in (4.182) from moving along the paths of either of the arrows.

²⁴ There are certain nomenclative *Feinschmeckers* who have taken issue with the formulation of this sentence, pointing out that following the original Pied Piper was obligatory for all the children of the town except one, who was lame, so that the phrase "obligatory pied piping" is a case of terminological coals to Newcastle. These critics suggest that since convention (4.180) describes optional accompaniment, such accompaniment should best be dubbed "fellow traveling", or the like, with the term "pied piping" being reserved for cases of mandatory accompaniment, such as those described below.

While the point they make is valid, I have chosen to disregard it, eschewing an exact parallel to the fairy tale in question in the interest of a less elaborate set of terms.



This constraint accounts for the following facts: if the structure shown in (4.183) is embedded as a relative clause modifier of a NP whose head noun is *boy*, only one output is possible—(4.184a).



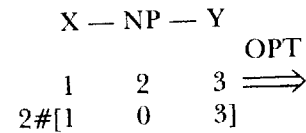
- (4.184) a. The boy whose guardian's employer we elected president ratted on us.
 b. *The boy whose guardian's we elected employer president ratted on us.
 c. *The boy whose we elected guardian's employer president ratted on us.

Sentence (4.184c) is excluded by (4.181), because the rule of *Relative Clause Formation* has moved the lowest NP, NP₃, from the left branch of NP₁. In (4.184b), it is NP₂ that has been moved from this branch. Since the *Left Branch Condition* prohibits both of these operations, only the largest NP which (4.180) allows to be moved, NP₁, can be moved to the front of the sentence, and when this happens, (4.184a) is the result.

Parallel facts can be adduced for nonrestrictive relative clauses, which differ from restrictives in being preceded and followed by heavy intonation breaks. They derive from coordinate sentences in deep structure, and they are formed by a rule different from (4.135). If commas are inserted into the sentences of (4.184), after *boy* and *investigated*, thus forcing a nonrestrictive interpretation of the clauses, their grammaticality is unchanged.

Another rule which is affected by this condition is the rule of *Topicalization*, (4.185), which converts (4.186a) to (4.186b).

(4.185) *Topicalization*



- (4.186) a. I'm going to ask Bill to make the old geezer take up these points later.
 b. These points I'm going to ask Bill to make the old geezer take up later.

If rule (4.185) is applied to (4.183), once again it will be seen that only NP₁ can be topicalized, as in (4.187a). If either NP₂ or NP₃ is topicalized, as in (4.187b) and (4.187c), respectively, ungrammatical sentences result:

- (4.187) a. The boy's guardian's employer we elected president.
 b. *The boy's guardian's we elected employer president.
 c. *The boy's we elected guardian's employer president.

A rule that was stated in (3.26), *Complex NP Shift*, which performs almost the same operation as (4.185), except that it moves the NP in the opposite direction, is also subject to the *Left Branch Condition*. This rule may apply to (4.183) to move NP₁ over *president* (cf. [4.188a]),²⁵ but neither NP₂ nor NP₃ can be so moved, as the ungrammaticality of (4.188b) and (4.188c) demonstrates.

- (4.188) a. We elected president the boy's guardian's employer.
 b. *We elected employer president the boy's guardian's.
 c. *We elected guardian's employer president the boy's.

Finally, the *Question Rule* is subject to the condition: if NP₃ in (4.183) is questioned, it cannot be moved to the front of the sentence alone—pied piping must apply to carry NP₁ with it, as (4.189) shows.

²⁵ The fact that NP₁ does not dominate S and that (4.188a) is still grammatical simply indicates that (3.26) is formulated incorrectly, and that condition 1 on that rule must be revised. It is abandoned entirely in (3.57), the final statement of this rule.

- (4.189) a. Which boy's guardian's employer did we elect president?
 b. *Which boy's guardian's did we elect employer president?
 c. *Which boy's did we elect guardian's employer president?

One of the facts which supports the analysis of predicate adjectives which is implicit in diagram (3.25) above is the fact that when adverbs of degree which occur in pre-adjectival or pre-adverbial position are questioned, the questioned constituent, *how*, cannot be moved to the front of the sentence alone, as in (4.190a) and (4.191a), but is fronted only if the adjective or adverb is moved with it, as in (4.190b) and (4.191b).

- (4.190) a. *How is Peter sane?²⁶
 b. How sane is Peter?

- (4.191) a. *How have you picked up TNT carelessly?
 b. How carelessly have you picked up TNT?

These facts can be explained by (4.181), if *how* is analyzed as deriving from an underlying NP, and the adjective *sane* and the adverb *carelessly* are dominated by NP at the stage of derivations at which questions are formed. Note also that if the degree adverb *that* in (4.192) is questioned, pied piping must apply to move not only *tall*, but also *a man* to the front of the sentence.

- (4.192) Sheila married that tall a man.

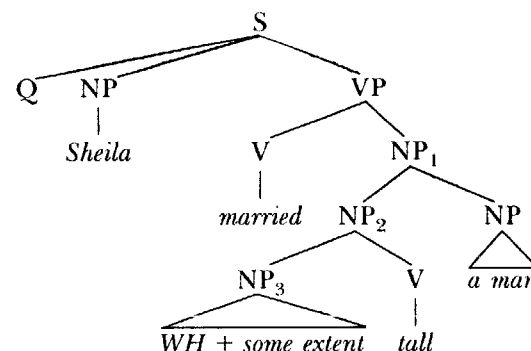
- (4.193) a. How tall a man did Sheila marry?
 b. *How tall did Sheila marry a man?
 c. *How did Sheila marry tall a man?

These facts are accounted for if the structure of (4.193a) at the point when the *Question Rule* applies is that shown in (4.194), for (4.181) will not permit either NP₃ or NP₂ to be moved out of NP₁.

One other set of facts deserves mention in connection with this analysis of adjectives. In German, it is possible to topicalize adverbs—thus the manner adverb *genüßlich* 'with pleasure' in (4.195a) can occur at the front of the sentence, as in (4.195b).

²⁶ I have starred (4.190a) because it is unrelated to (4.190b)—the *how* in (4.190a) does not replace *to what extent*, but rather something like *in what respect* or *in what way*. Note also that the echo questions for these two sentences differ: (4.190a) is related to *Peter is sane HOW?* but (4.190b) to *Peter is HOW sane?* Similarly, although (4.191a) is grammatical, it is not related to (4.191b).

(4.194)



- (4.195) a. *Wir haben die Bohnen genüßlich verschlungen.*
 we have the beans with pleasure gobbled up.
 'We gobbled up the beans with pleasure.'
 b. *Genüßlich haben wir die Bohnen verschlungen.*

If an analysis in which adverbs are treated as being derived from NP's can be maintained, not only will it be unnecessary to complicate rule (4.185) to derive (4.195b) from the structure which underlies (4.195a), but it will be possible to explain the following additional facts. In German, the adverb *fast* 'almost' normally precedes the adjective it modifies, but it can also follow it (cf. (4.196)). The adverb *sehr* 'very', however, occurs only pre-adjectivally (cf. (4.197)).

- (4.196) a. *Gwendolyn ist fast hübsch.*
 'Gwendolyn is almost pretty.'
 b. *Gwendolyn ist hübsch, fast.*
- (4.197) a. *Liselotte ist sehr hübsch.*
 'Liselotte is very pretty.'
 b. **Liselotte ist hübsch, sehr.*

These facts suggest that whatever rule it is that moves *fast* around *hübsch* in (4.196) be made obligatory for degree adverbs like *sehr*. If this reordering rule adjoins the adverbs which are moved around the adjectives to the adjectives, and if this reordering rule precedes the rule of *Topicalization*, the fact that *fast* can be topicalized with or without *hübsch*

(cf. [4.198]), but that *sehr* cannot be topicalized by itself (cf. [4.199]) is accounted for by the Left Branch Condition.

- (4.198) a. *Fast hübsch ist Gwendolyn.*
b. *Fast ist Gwendolyn hübsch.*

- (4.199) a. *Sehr hübsch ist Liselotte.*
b. **Sehr ist Liselotte hübsch.*

Of course, it is possible to account for these facts concerning adjectives and adverbs in other ways than by assuming that both types of constituents are dominated by NP up to some point in derivations, but the analysis sketched here has the virtue of allowing a simpler statement of the rules of *Topicalization* and *Question*, as well as of constraints like (4.181), than can otherwise be achieved, as far as I can see. However, since I have not made a detailed study of adverbs, it may be the case that this analysis will have to be excluded because it engenders complications in other parts of the grammar.

In passing, it should be noted that case D and case E of §2.2, which provide evidence for the A-over-A principle, are special cases of the Left Branch Condition, which will block the derivation of the ungrammatical (2.11) and (2.15).

Another environment in which pied piping is obligatory in German, French, Italian, Russian, Finnish, and in many other languages, is that stated in (4.200).

- (4.200) No NP may be moved out of the environment [_{NP}P ____].

In these languages, only sentences like (4.201) are possible—sentences corresponding to those in (4.202), where a NP has been moved away from its preposition, are ungrammatical.

- (4.201) a. On which bed does Tom sleep?
b. The bed on which Tom slept was hard.

- (4.202) a. Which bed did Tom sleep on?
b. The bed which Tom slept on was hard.

Kuroda has pointed out similar facts for English with respect to a certain class of nouns (cf. Kuroda, 1964). He noted that it is just with the class of nouns that cannot be pronominalized, i.e., nouns like *time*, *way*, *manner*, *place*, etc., that sentences like (4.202) are impossible. That is, the

sentences in (4.203) cannot be converted into the corresponding ones in (4.204) by normal rules of pronominalization.

- (4.203) a. My sister arrived at a time when no busses were running and my brother arrived at a time when no busses were running too.
b. Jack disappeared in a mysterious manner and Marian disappeared in a mysterious manner too.
c. I live at the place where Route 150 crosses Scrak River and my dad lives at the place where Route 150 crosses Scrak River too.
- (4.204) a. *My sister arrived at a time when no busses were running and my brother arrived at one too.
b. *Jack disappeared in a mysterious manner and Marion disappeared in one too.
c. *I live at the place where Route 150 crosses Scrak River and my dad lives at it too.

Furthermore, prepositions cannot be left behind in such constructions either (cf. [4.205]).

- (4.205) a. *What time did you arrive at?
b. *The manner which Jack disappeared in was creepy.
c. *The place which I live at is the place where Route 150 crosses Scrak River.²⁷

The facts indicate that though the constraint in (4.200) does not obtain for English, the modified version shown in (4.206) does:

- (4.206) No NP whose head noun is not pronominalizable may be moved out of the environment [_{NP}P ____].

The three constraints discussed in this section—(4.181), (4.200), and (4.206)—are all cases where the optionality which is built into (4.180) is abrogated in favor of higher NP nodes. That is, if NP_i dominates NP_j, (4.180) in general allows either NP to reorder, but the three constraints above limit this freedom: they state environments in

²⁷ Note that *place* is ambiguous: it can mean 'residence, dwelling', and in this sense, the preposition can be left behind (*Whose place do you live at?*).

which only the higher NP can reorder. In the next section, I will discuss two constraints which have the opposite effect.

4.3.2.2. Environments Which Block Pied Piping. After most verb-particle combinations whose object is a prepositional phrase, such as *do away with*, *make up to*, *sit in on*, *get away with*, etc., while the NP in the prepositional phrase is movable, the preposition may not be moved with it. Thus though the sentences in (4.207) are possible, corresponding ones in (4.208) are not.

- (4.207) a. The only relatives who I'd like to do away with are my aunts.
 b. Who is she trying to make up to now?
 c. That meeting I'd like to sit in on.
- (4.208) a. *The only relatives with whom I'd like to do away are my aunts.
 b. *To whom is she trying to make up now?
 c. *On that meeting I'd like to sit in.

For some reason which I do not understand, there are other verbs which seem to be of exactly the same syntactic type for which such constructions as (4.208) are permissible. Thus the sentences in (4.209) are markedly better, for me, than those in (4.208):

- (4.209) a. ?The abuse with which she puts up is phenomenal.
 b. For whose rights do you expect me to speak up?
 c. For these principles I have never hesitated to speak out.

Similar facts obtain for such syntactic idioms as *get wind of*, *make light of*, *get hold of*, etc. Normally, in my speech at least, the preposition must be left behind for most of these idioms—compare (4.210) and (4.211).

- (4.210) a. One plan which I got wind of was calculated to keep us in suspense.
 b. Did you notice which difficulties she made light of?
 c. Who are you trying to get hold of?
- (4.211) a. *One plan of which I got wind was calculated to keep us in suspense.
 b. ?*Did you notice of which difficulties she made light?
 c. *Of whom are you trying to get hold?

However, there are certain of these syntactic idioms for which the preposition seems to be movable, just as was the case with the verb-particle combinations shown in (4.209):

- (4.212) a. The only offer of which I plan to take advantage will give me an eleven-month paid vacation.
 b. ?In the countries of which I've been keeping track, the existing political systems are fantastically corrupt.
 c. The scenes to which the censors took objection had to do with the mixed marriage of a snail and a giant panda.

I believe that sentences like those in (4.209) and (4.212) are the exception, rather than the rule, so presumably some constraint like (4.213) must be stated for English.

- (4.213) No NP with the analysis [_{NP}P NP] may be moved if it follows an idiomatic V-A sequence, where A is some single constituent.

The constituent A may be:

1. a particle (cf. (4.207) and (4.208)),
2. an adjective (as in *make light of*, *make sure of*, etc.),
3. a verb (as in *make do with*, *let fly at*, *let go of*, *get hold of*, *get rid of* [if *rid* should be analyzed as a verb here], *lay claim to*, *hold sway over*, *pay heed to*, etc.),
4. a noun (as in *get wind of*, *set fire to*, *lay siege to*, *make use of*, *lose track of*, *take charge of*, *take umbrage at*, etc.), or
5. possibly an NP (e.g., *get the drop on*, *make no bones about*, *set one's sights on*).

There is a possibility, as Paul Kiparsky has pointed out to me, that the difference between (4.211) and (4.212) may correlate with whether the idiom in question has a single or a double passive. That is, in many cases, verbs like those in (4.212), where the preposition may be moved, allow either the first element after the verb or the object of the preposition to become the subject of the passive.

- (4.214) a. Advantage will be taken of his offer.
 b. His offer will be taken advantage of.
- (4.215) a. ?In this experiment, track must be kept of fourteen variables simultaneously.

As far as I know, it is only in highly inflected languages, in whose grammars the rule of *Scrambling* appears, that the Left Branch Condition is not operative. But it is not the case that no such languages make use of the condition. In Finnish, for example, sentences like (4.248) are not possible. At present, therefore, I am unable to predict when a language will exhibit the Left Branch Condition and when not.

Thus it appears that with the possible exception of (4.231), all of the constraints on pied piping which were discussed in §§4.3.2.1–4.3.2.4 must be stated in the grammar of each language that exhibits them. But must each such condition be stated on each rule which it influences? Must the Left Branch Condition be built into the English rules of *Relative Clause Formation*, *Appositive Clause Formation*, *Topicalization*, *Complex NP Shift*, and *Question*? To repeat the Left Branch Condition on each of these five rules is to make the claim that it is an accidental fact about this particular set of five rules that they are all subject to (4.181). I am making the opposite claim: that *any* reordering transformation would be subject to (4.181).

To reflect this claim formally, the theory of grammar must be changed. At present, the theory only permits conditions which are stated on particular rules, like the identity condition on *Relative Clause Formation*, or meta-conditions, like the Complex NP Constraint, which are stated in the theory. But the constraints on pied piping which are under discussion cannot be correctly accommodated under either of these possibilities: they are not universal, and to state them on each transformation which they affect is to miss a generalization. What is necessary is that the grammar of every natural language be provided with a *conditions box*, in which all such language-particular constraints are stated once for the whole language. By a universal convention of interpretation, all conditions in the conditions box will be understood to be conditions on the operation of every rule in the grammar.

To give some concrete examples, for English, the conditions box will contain, among others, (4.181), (4.206), (4.213), and (4.231). For French, Italian, and German, it will contain (4.181), (4.200), and (4.231). It should not be thought that only conditions on pied piping will appear in this box. In Finnish, for example, it is the case that no element can be moved out of complement clauses which are introduced by *että* 'that'. That is, while such sentences as (4.249a) are possible in English, no corresponding sentence is possible in Finnish, as the ungrammaticality of (4.249b) shows.

- (4.249) a. Which hat do you believe (that) she never wore?
 b. **Mitä hattua uskoit ettei hän koskaan käyttänyt?*
 which hat you believed that not she ever used.

Thus far, with one exception (cf. Ch. 5, fn. 15), all the constraints which I know to appear in the conditions box of any language are constraints on reordering transformations, but there is of course no reason to expect that only that type of constraint will be found to occupy condition boxes in other languages.

4.3.3. Summary of Section 4.3. To recapitulate the discussion of pied piping, the need for a convention of some sort is clearly indicated by the existence of structures like (4.162), which allow for the formation of relative clauses whose number is in principle unbounded. One possibility would be to devise some notational convention under which an infinite family of rules like those in (4.135), (4.164), and (4.165) could be abbreviated by some sort of finite schema—a notational convention which would only be made use of to handle these facts. Instead, I have chosen the convention stated in (4.180), which, though still somewhat *ad hoc*, is weaker than a new notational convention would be, and thus yields a more restrictive characterization of the class of possible transformations, and hence of the notion of natural language. In §4.3.2 I discussed a number of cases where pied piping is obligatory and suggested that the theory of grammar be changed so that every particular grammar contains a conditions box in which constraints of various types, which affect all rules of the grammar, can be stated. Such constraints are intermediate in generality between particular conditions on particular rules and meta-constraints like the Complex NP Constraint and the Coordinate Structure Constraint.

4.4. The Sentential Subject Constraint

4.4.1. Introduction. Compare (4.250a) with its two passives, (4.250b) and (4.250c).

- (4.250) a. The reporters expected that the principal would fire some teacher.
 b. That the principal would fire some teacher was expected by the reporters.
 c. It was expected by the reporters that the principal would fire some teacher.

Noun phrases in the *that*-clauses of (4.250a) and (4.250c) can be relativized, but not those in the *that*-clause of (4.250b), as (4.251) shows.

6

On the Notion "Reordering Transformation"

6.0. Outline

In Chapter 4, I presented evidence which showed that the rules of *Relative Clause Formation* and *Question* are subject to a variety of constraints. Since the facts cited in §5.3.4 above show that these constraints do not affect rules of pronominalization, the question arises as to whether there are other rules than just the two studied in Chapter 4 which are subject to the constraints, and if so, whether it is possible to predict from the formal statement of a rule whether that rule will obey the constraints or not. This question has already been begged: the constraints in Chapter 4 were stated not in terms of the specific rules of *Relative Clause Formation* or *Question*, which were used to exemplify the effect of the constraints, but rather in terms of "reordering transformations." In this chapter, I will give a precise characterization of this pre-systematic term.

In §6.1, I will describe briefly a large number of rules, some apparently related, some not, showing that each is subject to the constraints. In §6.2, I will show that transformations which reorder a constituent, but leave behind a pro-form, to indicate the place the copied constituent occupied before the operation of the rule, are not affected by the constraints, and that it is rather transformations which "chop" a constituent and move it from its original position without leaving any trace which are subject to the constraints. In §6.3, I will show that even chopping transformations are not subject to the constraints unless the chopped constituent is moved over a variable. In §6.4, I will show that the feature-changing rules discussed in §5.1.3 also obey the constraints. This fact leads to a theory of *islands*, the maximal domains of chopping and fea-

ture-changing rules. In §6.5, a brief summary of the characterization arrived at is given.

6.1. Some Rules Obeying the Constraints

6.1.0. The Generality of the Constraints. At the outset of my research on variables, I investigated the German rule which preposes various types of constituents to the front of a sentence, thereby triggering a rule which inverts subject and verb. Thus, for example, (6.1a) becomes (6.1b), (6.1c), or (6.1d).

- (6.1) a. *Ich sprach gestern mit Orje über Liebe.*
'I spoke yesterday with Orje about love.'
- b. *Gestern sprach ich mit Orje über Liebe.*
- c. *Mit Orje sprach ich gestern über Liebe.*
- d. *Über Liebe sprach ich gestern mit Orje.*

I noticed that this rule obeyed the same constraints as the rules of *Relative Clause Formation* and *Question* and the rules involved in cleft sentences, like (6.2), and pseudocleft sentences, like (6.3).

- (6.2) *Es war gestern, daß ich mit Orje über Liebe sprach.*
It was yesterday that I with Orje about love spoke.
'It was yesterday that I spoke with Orje about love.'
- (6.3) *Worüber ich gestern mit Orje sprach war Liebe.*
Where about I yesterday with Orje spoke was love.
'What I spoke with Orje about yesterday was love.'

At that time, I concluded that the way to explain the similarity of the constraints on these rules was to assume that one rule was basic, and was a component of the operations of the other three rules. But Noam Chomsky pointed out to me an alternative possibility: this similarity of constraints might be derivable from some formal property shared by the four rules, rather than from some assumed common function or component. My further research proved Chomsky correct: there are a large

number of transformations which obey the same constraints as the four rules that I had originally noticed, rules whose operations are far too dissimilar for it to be possible that there is one rule which is basic to each of these.

In my brief discussion of each of these rules, I will first give an example which is sufficiently complex to suggest that the scope of the rule is unboundedly large, and then give examples to show that the rule is subject to the Complex NP Constraint (CNPC), the Coordinate Structure Constraint (CSC), the Sentential Subject Constraint (SSC), and, where possible, the Left Branch Condition on pied piping (LBC). I have partitioned the rules into three arbitrary groups: the rules in §6.1.1 produce clauses which resemble questions or relative clauses, some of which may derive from rules which can be collapsed with the rules of *Question and Relative Clause Formation*¹ The rules in §6.1.2 share only the property of producing structures which in no way resemble relative

¹ It has been assumed since the inception of transformational grammar (cf., e.g., Harris, 1957, section 11.2) that these two rules are the same, an assumption that I find extremely dubious. The arguments that have been used are that the relative pronouns (except for *that*) are a subset of the *wh*-words used in questions, and that both rules are subject to the same constraints. But if the main argument of this chapter is correct, that all chopping transformations which move constituents over variables are subject to the same constraints, then we can disregard the second argument for assuming the existence of a "WH-Rule", such as Chomsky's rule (6), which I quoted in §2.4.0. And the first argument for such a rule, which is essentially a morphological one, is weak. Although there are many parallels between the uses of *wh*-words in questions and in relative clauses, there are also puzzling differences. So while it is desirable to relate two uses of *who* as a replacement for human nouns in both questions and relative clauses, anyone who assumes the two rules to be the same will encounter a problem in the fact that *whose* can be used for both human and non-human nouns in relatives (*the boy whose body was lithe snored on the car whose body was dented still runs*), but only for human nouns in questions (*Whose body was lithe? *Whose body was dented?*)

A more important argument against identifying these rules can be derived from the following considerations. In sentences introduced by the expletive *there*, the subject NP cannot be relativized (**The two men who there were guarding the door wore shoulder holsters*). It cannot be argued that sentences beginning with *there* are frozen to relativization, for such strings as *This is a problem which there are a lot of people working on* are grammatical. Nor can it be argued that there is a restriction in the English conditions box which prohibits any reordering transformation from moving the subject of a *there*-sentence, for such subjects can be questioned (*How many men were there guarding the door?*). To me, it seems most likely that the reason that such subjects behave differently under *Relative Clause Formation* and *Question* will be connected with the fact that subjects of *there*-sentences are always indefinite, and with a restriction on the former rule that the identical NP in the constituent sentence always be definite. But whether or not this analysis proves to be correct, unless the facts just presented can be explained even on the assumption that the rules of *Question* and *Relative Clause Formation* are the same, it seems to me that the only arguments I know of which argue for this are far too weak to be regarded as having established such an identity.

clauses. The rules in §6.1.3 constitute the only counterevidence I know of (but cf. §6.4) to the claim that only "reordering transformations" are subject to the constraints of Chapter 4.

6.1.1. Relative-Like Constructions

6.1.1.1. Exclamatory Sentences. One rule which results in question-like structures is the rule which produces exclamatory sentences, like those in (6.4).

- (6.4) a. How brave he is!
 b. How surprisingly well he dances!
 c. The bravery of our boys in Vietnam, Thailand, Cambodia, Korea, Malaya, Iceland, Nepal, Egypt, Turkey, Kazakhstan, Morocco, Haiti, Peru, Chile, Quebec, the Honduras, Baffinland, Monaco, and all the other places in the world where freedom needs protection!

I imagine that sentences like (6.4c), which consist of a single abstract NP, spoken reverentially, will derive from sentences like (6.4a), where *he* is replaced by *our boys in Vietnam, etc.*, but I do not know how the rules that effect this conversion should be formulated.

Although the sentences in (6.4) resemble questions, they are much more limited, for there are many question words that cannot head an exclamatory sentence, as (6.5) shows.

- (6.5) a. *Whether he left!
 b. *Why he knows the answer!²
 c. *Which boy is tall!

It seems likely to me that the restriction which is operative here is that it is only sentences with degree adverbs that can function in exclamatory sentences. This is indicated by the fact that if the word *bravery*, which is derived from a lexical item allowing degree modifiers (*very brave*), is replaced in (6.4c) by an abstract noun like *arrival*, whose underlying lexical item does not admit of degree modification (**very arrive, *arrive*

² This sentence is, of course, perfectly grammatical as an expression of surprise, but on such a reading, the *wh*-word *why* does not replace a purpose adverb, as it usually does in questions (witness the grammaticality of *Why, he left for that reason after all!*), and can be followed by a pause, unlike the word *how* in (6.4a) and (6.4b). These facts are indicative of the clear intuitive difference between this reading of (6.5b) and the exclamatory sentences of (6.4).

very), the sentence becomes ungrammatical. But there are several classes of counterexamples to this generalization, such as the sentences in (6.6), and although these seem intuitively to be different from the sentences in (6.4), I have no convincing arguments which show this to necessarily be the case.

- (6.6) a. ☆ When my daughter came home last night!³
 b. ☆ What my husband eats!
 c. ☆ Where my son and that girl he married are living!

But no matter what the source for such sentences as those in (6.4) is, it is clear that the rule which forms them must be able to move the *wh*-ed constituents to the front of the sentence from indefinitely deeply embedded structures (cf. (6.7)).

- (6.7) How brave everybody must think you expect me to believe he is!

That this rule is subject to the CNPC, the CSC, and the SSC, can be seen from (6.8), (6.9), and (6.10), respectively.

- (6.8) a. *How brave I know a boy who is!
 b. How brave they must believe (*the claim) that you are!⁴
- (6.9) a. *How brave he is tall and!
 b. *How brave Mike is cowardly and Sam is!
- (6.10) a. *How brave that Tom is must be believed!
 b. How brave it must be believed (?that) Tom is!⁵

That it is also subject to the LBC can be seen from the fact that it is (6.4a) that is grammatical, and not (6.11).

³ The six-pointed star which I have prefixed to these examples, one of McCawley's many *bahnbrechenden Erfindungen* (cf. McCawley, 1964, fn. 2), indicates that these sentences are only grammatical if Yiddish. A particularly clear example of such a sentence, for which I am indebted to David M. Perlmutter, is ☆ *Egg creams you want, bananas you'll get*.

⁴ In sentence (4.18), I showed that while elements of clauses which follow *believe* can be relativized, elements of clauses which follow *believe the claim* cannot. Since such sentences provide such a clear case of the operation of the CNPC, I will use them as a paradigm example of this constraint throughout §6.1.

⁵ For some reason I cannot explain, elements cannot be extracted by the rule which makes exclamatory sentences from most extraposed clauses, although elements can be relativized here. Compare, e.g., **How brave it is certain that Tom is!* with *Here is a house which it is certain that Tom lived in*.

- (6.11) *How he is brave!⁶

The reason that (6.11) is ungrammatical is the same as the one given for the ungrammaticality of (4.190), in §4.3.2.1.

6.1.1.2. *Wh*-Adverbial Clauses. The first constructions which exhibit relative-clause-like structures are clauses introduced by *where*, *when*, *after*, *before*, *since*, *until*, and *while*. Michael L. Geis has proposed⁷ that all of these clauses be treated as deriving from relative clauses on such head nouns as *place* or *time*. Thus *at the time at which* becomes *at the time when*, which may, by deletion of the NP *at the time*, result in a clause introduced by the single word *when*. It can be seen from (6.12) that the source in the constituent sentence for the phrase *at that time*, from which this word derives, can be indefinitely far down the tree.

- (6.12) Bill left when everyone will believe that the police have forced me to confess that I shot Sandra.

In this sentence, the word *when* refers to the time of the shooting of Sandra. That the rule which forms such adverbial clauses, if it is different from the rule of *Relative Clause Formation*, which I doubt, is subject to the CNPC, the CSC, and the SSC can be seen from (6.13), (6.14), and (6.15), respectively.

- (6.13) a. *Bill left when I am looking at a girl who checked Strzyk.
 b. Bill left when I believe (*the claim)(?that) the bomb had just exploded.
- (6.14) When I am awake (*at that time) and Susan is asleep, Bill will leave.
- (6.15) a. *Bill left when that no one else was awake is certain.⁸
 b. Bill left when it is certain that no one else was awake.

⁶ This sentence is acceptable with the meaning "I don't see how he is so brave", if prefixed by the six-pointed star discussed in footnote 3. It cannot, however, have the intended meaning of (6.4a).

⁷ Personal communication.

⁸ Of course, since (6.15a) contains an internal sentence which is exhaustively dominated by NP, the output condition stated in (3.27) will lower its acceptability. But it should not be considered to be merely unacceptable, for the following sentence, where *when* modifies *had been established*, while awkward, is still far better than (6.15a): *Bill left when that noone else was awake had been established*.

Sentences similar to these, which show the other adverbial clauses mentioned to be subject to the three major constraints, can also be constructed, but I will not undertake this here.

6.1.1.3. For-To Phrases. The second type of relative-clause-like construction is exemplified in (6.16).

(6.16) Here's a knife for you to cut up the onions with.

For-to phrases can modify noun phrases in the same way as relative clauses. The subjects of these clauses can be deleted under interesting conditions, as shown in (6.17).

- (6.17) a. I brought a razor to shave $\left\{ \begin{array}{l} \text{myself} \\ * \text{himself} \end{array} \right\}$ with.
 b. I brought a razor with which to shave $\left\{ \begin{array}{l} \text{myself} \\ * \text{himself} \end{array} \right\}$.
 c. I brought John a razor to shave $\left\{ \begin{array}{l} * \text{myself} \\ \text{himself} \end{array} \right\}$ with.
 d. I brought John a razor with which to shave $\left\{ \begin{array}{l} * \text{myself} \\ \text{himself} \end{array} \right\}$.

The presence of the relative pronoun *which* in (6.17b) and (6.17d) suggests that whatever rule forms these clauses always preposes this pronoun to the front of the clause, deleting it obligatorily just in case the embedded subject has not been deleted. Thus (6.16) would be derived from the structure which underlies (6.18).

(6.18) *Here's a knife which for you to cut up the onions with.

Somehow, the rule which forms these clauses must prevent a preposition which precedes the NP to be relativized from pied piping, unless the subject of the clause has been (or will be?) deleted. Nothing can save a structure like (6.19), where the preposition *with* has pied piped, except possibly some ad hoc rule to reinsert the preposition where it came from, a rule unstatable under present conventions, in any account.

(6.19) *Here's a knife with which for you to cut up the onions.

Constituents can be moved by this rule from indefinitely far down the tree, as (6.20) shows.

(6.20) Here's a plate for you to make Bob try to begin to force his sister to leave the cookies on.

I am not sure whether this rule can relativize elements from within *that*-clauses at all, but if so, it is only elements dominated by VP in such clauses, not subjects, that can be relativized. (6.21a) may be grammatical, but (6.22b) is almost certainly not.

- (6.21) a. ?Here's a knife for you to say that you cut up the onions with.
 b. *Here's a knife for you to say was on the table.

Thus we see that this rule, even if it should someday prove to be collapsible with the rule of *Relative Clause Formation*, will have to have a number of special restrictions imposed on it. And yet the sentences in (6.22), (6.23), and (6.24) show it to be subject to the CNPC, the CSC, and the SSC, respectively.

- (6.22) a. *Here's a pole for you to kiss the girl who tied the string around.
 b. ?Here's a razor for you to announce (*the possibility) that you will shave with.
 (6.23) *Here's a razor for you to chop up these nuts with this cleaver and.
 (6.24) a. *Here's a razor for that you will be shaved with to be announced.
 b. ??Here's a razor for it to be announced that you will be shaved with.

Whether or not the LBC can be shown to be operative for this rule will depend upon it being possible to set up a contrast between such sentences as those in (6.25).

- (6.25) a. ?I loaned Maggie a Swiss Army knife with whose corkscrew to open the padlock.
 b. *I loaned Maggie a Swiss Army knife whose to open the padlock with corkscrew.

While it is clear that (6.25b) is word salad, I am not sure that (6.25a) is fully grammatical. If not, this rule cannot be shown to be subject to the LBC.

6.1.1.4. Appositive Clauses. It is well-known that appositive clauses obey the same restrictions restrictive relative clauses do, but it may not have been observed before that sentential clauses, like those in (6.26), also do.

- (6.26) a. Fluffy is sick, which few people realize.
 b. Fluffy is sick, which I'm not sure you know Sarah expects me to believe Joan realizes.

Sentence (6.26b) suggests that this rule must be able to propose the relative pronoun *which*, which stands for the sentence *Fluffy is sick*, from indefinitely deeply embedded positions, and sentences (6.27), (6.28), and (6.29) show that it too is subject to the CNPC, the CSC, and the SSC.

- (6.27) a. *Fluffy is sick, which I slapped a boy who wouldn't acknowledge.
 b. Fluffy is sick, which I believe (*the claim) that few people realize.

(6.28) *Fluffy is sick, which I fell asleep and Tom suddenly realized.

- (6.29) a. *Fluffy is sick, which that no one here realizes is certain.
 b. Fluffy is sick, which it is certain that no one here realizes.

The same restrictions apply to sentential *as*-clauses: the word *as* can be substituted for *which* in sentences (6.26)–(6.29) with no change in grammaticality, although this is not in general true. The sentences in (6.30) show that the rule which forms *as*-clauses must be sensitive both to the presence of certain types of negation and to the syntactic environment from which the constituent which *as* replaces comes.⁹

- (6.30) a. Fluffy is sick, $\left\{ \begin{array}{l} \text{which} \\ *as \end{array} \right\}$ nobody knows.
 b. Fluffy is sick, $\left\{ \begin{array}{l} \text{which} \\ as \end{array} \right\}$ not everybody knows.
 c. Fluffy is sick, $\left\{ \begin{array}{l} \text{which} \\ *as \end{array} \right\}$ surprises me.

These restrictions on *as*-clauses are unlike any known to obtain on relative clauses, restrictive or appositive, so I am highly doubtful that the rule which forms *as*-clauses can be collapsed with other rules which form relative clauses.

6.1.1.5. Cleft, Pseudocleft, and Topicalized Sentences. The rules that form cleft sentences, pseudocleft sentences, and topicalized sentences are also subject to the constraints. The sentences in (6.32) show them all to be subject to the CNPC, and those in (6.33), (6.34), and (6.35) show them to be subject to the CSC, the SSC, and the LBC, respectively, while the sentences in (6.31) show their scope to be unbounded.

- (6.31) a. It was this hat that Tom said Al thought you wanted me to make Jack put on.
 b. What Tom said Al thought you wanted me to make Jack put on was this hat.
 c. This hat Tom said Al thought you wanted me to make Jack put on.

- (6.32) a. *It is this hat that I know the boy who is wearing.
 b. It is this hat that I believe (*the claim) that he was wearing.
 c. *What I know the boy who was wearing is this hat.
 d. What I believe (*the claim) that he was wearing is this hat.
 e. *This hat I know the boy who was wearing.
 f. This hat I believe (*the claim) that he was wearing.

- (6.33) a. *It is this hat that the gloves and were on the table.
 b. *What the gloves and were on the table was this hat.
 c. *This hat the gloves and were on the table.

- (6.34) a. *It is this hat that that he was wearing is certain.
 b. It is this hat that it is certain that he was wearing.
 c. *What that he was wearing is certain is this hat.
 d. What it is certain that he was wearing is this hat.
 e. *This hat that he was wearing is certain.
 f. This hat it is certain that he was wearing.

- (6.35) a. *It was John's that I stole bike.
 b. *The one whose I stole bike was John's.
 c. *John's I stole bike.

Because of the many additional similarities shared by these constructions, I am inclined to think they all derive from the same deep

⁹ These facts were first pointed out by Katharine Gilbert, in Gilbert (1967).

structure source, although I can propose none that is convincing. But all that is at issue here is the fact that the set or sets of rules that produce these constructions are all subject to the constraints of Chapter 4.

6.1.1.6. "Half the Doctor" Constructions. The next relative-clause-like construction I will consider is that exemplified in (6.36).

(6.36) Maxwell isn't (half) the doctor that his father was.

The fact that the element *half* can precede the modified NP in (6.36) shows that this sentence cannot be considered to be an instance of a predicate nominal modified by a relative clause, as in (6.37),

(6.37) Maxwell is the man who won the Nobel Prize for horoscopy.

for if *half* is present in (6.36), the "relative clause" must be present, as the ungrammaticality of (6.38) indicates.¹⁰

(6.38) *Maxwell isn't half the doctor.

It seems probable that (6.36) can be related to such sentences as those in (6.39),

(6.39) a. Maxwell is quite $\left\{ \begin{array}{c} a \\ the \end{array} \right\}$ doctor.

b. Maxwell isn't much of a doctor.

c. Maxwell is more of a doctor than his son is.

but no analysis of these constructions has been deep enough for this to be established positively. One final point of interest about these constructions is that the "relativized" element seems to have to follow the copula *be* in both the matrix and constituent sentences. When this strange constraint is violated, ungrammatical sentences such as those in (6.40) result.

(6.40) a. *Maxwell isn't (half) the doctor that was here.
b. *Maxwell isn't (half) the doctor that polished off the vodka.
c. *(Half) the doctor that Maxwell's father was sat down.

¹⁰ This fact was pointed out to me by Morris Halle.

As (6.41) suggests, the *that*-clause of (6.36) is not bounded in length:

(6.41) Maxwell isn't (half) the doctor that I feared Marge would realize Tom had confessed that he knew Bill expected him to be.

Whatever rule it is that forms such clauses, it is subject to the CNPC, the CSC, and the SSC, as sentences (6.42), (6.43), and (6.44), respectively, show.

(6.42) a. *Maxwell isn't half the doctor that I know an African chief who is.

b. Maxwell isn't half the doctor that people around here believe (*the claim) that his father was.

(6.43) *Maxwell isn't half the doctor that his sister is a psychologist and his father was.

(6.44) a. *Maxwell isn't half the doctor that that he would be if he studied is certain.

b. Maxwell isn't half the doctor that it is certain that he would be if he studied.

6.1.1.7. Superlative Clauses. The last two cases of relative-clause-like constructions that I will discuss are those exemplified in (6.45).

(6.45) a. He's the happiest that I've ever seen him.

b. The hardest that it ever snowed was last January 12th.

I have grouped these two constructions together only on the basis of the fact that they both contain superlatives. What their deep structures are in fact, and whether the same rules are used in forming each, is anyone's guess. The grammar of superlatives, if it is not the most poorly understood of all problems yet investigated within the framework of generative grammar, is certainly not far off the pace.¹¹

That both of the *that*-clauses in (6.45) can be extended without bound is suggested by the random degree of complexity attained in (6.46).

¹¹ A rough estimate of the perils that await the unwary grammarian who stumbles into this quagmire can be obtained from a quick perusal of the myriad confusions and inconsistencies in Ross (1964).

- (6.46) a. He's the happiest that any of my friends could estimate anybody would expect you to believe that I've ever seen him.
 b. The hardest that I think I remember him ever telling me that he had heard of it snowing around here was last January 12th.

The rules that produce such constructions are subject to the three constraints of Chapter 4, as sentences (6.47)–(6.49) show.

- (6.47) a. *He's the happiest that we ever talked to the boy who had seen him.
 b. He's the happiest that I believe (*the claim) that he's ever been.
 c. *The hardest that I ever knew a man who said that it had snowed was last January 12th.
 d. The hardest that I believe (*the claim) that it ever snowed was last January 12th.
- (6.48) a. *He's the happiest that I've ever seen him drunk and.
 b. *The hardest that all the power lines were down and it snowed was last January 12th.
- (6.49) a. *He is the happiest that that he has ever been is believed.
 b. He is the happiest that it is believed that he has ever been.
 c. *The hardest that that it has snowed here is believed was last January 12th.
 d. The hardest that it is believed that it has snowed here was last January 12th.

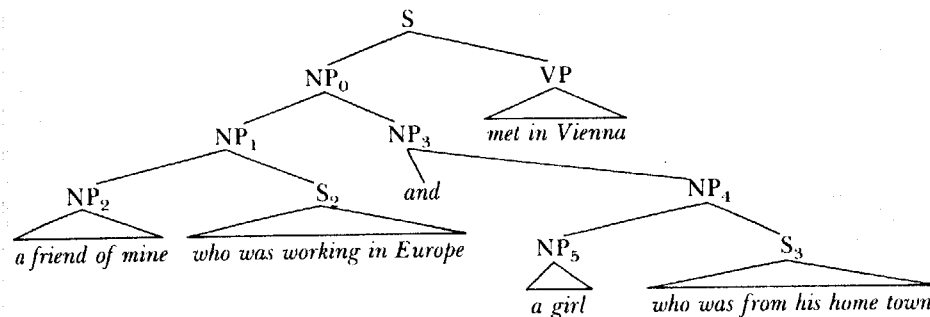
6.1.2. Non-Relative-Like Constructions

6.1.2.0. Introduction. While no arguments are available (and I doubt that any are forthcoming) that all the above structures are offshoots of either the rule of *Relative Clause Formation* or the rule of *Question*, since all the constructions discussed exhibit some clause headed by a *wh*-word or the word *that*, it is at least logically possible that an analysis will someday be discovered which makes use of one of these two rules to derive all of these constructions. But in the case of those constructions that I will discuss in this section, such an analysis would be inconceivable, for the structures produced contain relative-clause-like structures only incidentally, if at all.

6.1.2.1. Extraposition from NP. The rule of *Extraposition from NP*, (1.10), because of its formal structure, is upward bounded, so it is impos-

sible to show with such sentences as (4.18) that it is subject to the CNPC; the same obtains for the SSC. It is, however, possible to show that it must be subject to the CSC. For consider structure (6.50): If the rule of *Extraposition from NP* applied to this structure to move S_2 out of NP_1 , or S_3 out of NP_4 , one of the ungrammatical sentences in (6.51) would be generated.

(6.50)



- (6.51) a. *A friend of mine and a girl who was from his home town met in Vienna who was working in Europe.
 b. *A friend of mine who was working in Europe and a girl met in Vienna who was from his home town.

A similar example can be constructed to show that *Extraposition*, (4.126), must also be subject to the CSC. If *Extraposition* does not apply to this structure, the rule of *It-Deletion*, which was stated in (4.128), will delete both occurrences of *it* in (6.52), and the grammatical (6.53) will result.

(6.52)

