

Chapter 2

A REFORMULATION OF CERTAIN SYNTACTIC TRANSFORMATIONS

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INTRODUCTION

In this paper, I will be principally concerned with reformulating the extraposition transformation of Rosenbaum (1967) in accordance with a general constraint on transformations proposed in my doctoral dissertation (Emonds 1970). It is therefore appropriate to begin by stating and explaining this "structure-preserving constraint."

The general theoretical and heuristic motivation for such a constraint is essentially the same as that found in Ross (1967). Like Ross, I start from the premise that certain restrictions on the applicability of various transformations are not *ad hoc* specifications forming part of individual rules, but are rather reflections of some deeper grammatical principles (constraints) which define the formal framework in which transformational rules operate.¹

A principal direction of Ross's work was to define the structural

conditions under which movement transformations operate. That is, Ross's constraints (for example, the coordinate structure constraint or the complex NP constraint, but the others as well) essentially specify that constituents *cannot be moved out of certain structural configurations*, even though these configurations otherwise satisfy the structural description of a transformation which would move these constituents.

The direction of my dissertation (Emonds 1969) is to try to define the conditions when the structural changes of transformations are actually applicable (more correctly, "satisfied"). That is, my constraint (the structure-preserving constraint) essentially specifies that constituents *cannot be moved into certain structural configurations*.

From a study of English transformations, I arrive in my dissertation at the following tentative hypothesis, subject of course to testing and refinement and perhaps rejection on the basis of other languages.² Constituents are to be divided into "phrase nodes" (NP, S, VP, PP, AP) and "nonphrase nodes." Various ways in which the class of phrase nodes may be formally characterizable are suggested, but in any case they can be listed as a set of substantive universals in linguistic theory. The structure-preserving constraint then requires that a phrase node X in a tree T can be moved, copied, or inserted into a new position in T, according to the structural change of a transformation whose structural description T satisfies, only if at least one of two conditions is satisfied: (a) In its new position in T, X is immediately dominated by the highest S. (A transformation having such an effect is a "root transformation.") (b) The new position of X is a position in which a phrase-structure rule, motivated independently of the transformation in question, can generate the category X. (A transformation having such an effect is a "structure-preserving transformation.")

Nonphrase nodes may also be moved, copied, or inserted by either a root or a structure-preserving transformation, but they may also be moved by a third type of transformation: a single, specified nonphrase node may be moved over a single, specified *adjacent* node (but not over more than one such node or over a variable). Such a rule is a "minor movement rule." (Further restrictions can be placed on this type of rule, but they are not of interest here as I will be concerned here only with rules which move phrase nodes.)

In defending the structure-preserving constraint in my dissertation, I show that a number of phrase node movement or insertion rules which apply freely in embedded sentences can be formulated as structure-preserving by making at most small modifications (which, on reflection, can be independently justified) in the usual statements of these rules. The rules which relate the second sentences in the pairs of (1) to the first ones (by moving or inserting the italicized constituents) are examples of this type of rule.

- (1) John wrote the letter.

The letter was written by *John*. (passive rules)

It seems to John that *Mary* prefers fish.

Mary seems to John to prefer fish. (subject raising)

It wouldn't be easy to clean this house.

This house wouldn't be easy to clean. (object raising)

The girls behaved as well as the boys.

The girls behaved *themselves* as well as the boys (identical or reflexive object)

There couldn't be any truth in that report.

That report couldn't have any truth in it. (*there*-replacement)

A man who hasn't got a family won't work as hard.

A man won't work as hard *who hasn't got a family*.
(extraposition from NP)

For other such rules, more justification is required to show that they are structure-preserving.³ For example, limiting ourselves to NP movement rules for the moment, three rules which have rarely if ever been formulated as structure-preserving by transformationalists are *wh*-fronting, *there*-insertion, and dative movement. (The formal mechanism for expressing a structure-preserving rule adopted in my dissertation is that the node of category X which is moved, copied, or inserted replaces another node of category X, already present in the tree, which dominates either nothing or some recoverable form such as *it*, *do*, *there*, etc.) The arguments that *wh*-fronting and *there*-insertion are structure-preserving are too long to reproduce here, but it might be helpful to see what kind of formulation of dative movement is required by the structure-preserving constraint.⁴

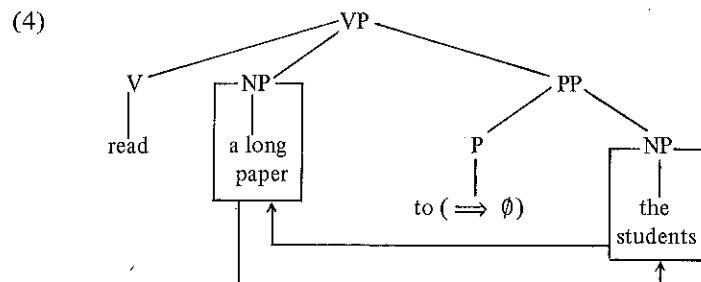
The dative movement rule encompasses two formal operations, the deletion of the preposition *to* or *for*, and the reversal of the order of the direct and the indirect object NP's. Thus, the dative movement rule derives (3) from (2).

- (2) John read a long paper to the students.

- (3) John read the students a long paper.

If we exclude extending the phrase structure rules of English in an *ad hoc* way, there is no way to state dative movement as a structure-preserving rule which moves a single constituent. However, if we make crucial use of the fact that dative movement reverses the order of two constituents of the same category, we can state the rule as structure-preserving. That is, a formulation

of dative movement in which both the direct and the indirect object NP's move, as in (4), is structure-preserving, since both NP's are replacing other (recoverable) NP's already present in the tree.



In most cases, the preposition which is deleted by the dative movement rule is not replaced in surface structure by another preposition. However, after some verbs, *with* is inserted in this position (in the structure-preserving fashion):

- (5) John supplied typing paper to the students.
John supplied the students *with* typing paper.

The coach credited the victory to the lineman.
The coach credited the lineman *with* the victory.

Thus, the structure-preserving formulation of dative movement is as in (6).

- (6) $[_{VP} X + V - NP - \begin{Bmatrix} to \\ for \end{Bmatrix} - NP - Y] \Rightarrow 1-4-\emptyset-2-5$

(There are other conditions on dative movement not taken up here; only certain verbs govern the rule, there are many inanimate indirect object NP's which cannot undergo the rule, after some verbs like *read*, *pay*, and *teach* the preposition drops even if no direct object is present, etc.)

Dative movement, as formulated here, is an instance of a rule in which more than one constituent is moved by a single transformation. Since it is desirable to limit possible complex transformational rules of this type, it might be concluded that the fact that the structure-preserving constraint gives rise to formulating dative movement in this way is a theoretical consideration which lessens the value of this constraint. Upon reflection, however, we can see that in fact the structure-preserving constraint automatically limits such rules in very strong ways. For example, the structure-preserving constraint requires that the only movement rules which can interchange constituents in embedded sentences must interchange

constituents of the same category. (It implies that a rule which interchanges a verb and an indirect object is impossible.)

Now it turns out that there is strong independent evidence that dative movement *must* be formulated as structure-preserving. This evidence is based on the placement of post-verbal particles (*in*, *out*, *up*, *down*, etc.) in sentences with indirect objects, and is presented in Emonds (1972). Thus, the structure-preserving constraint makes exactly the right prediction in the case of dative movement, and may well serve as a useful guide in research for correctly reformulating (and for discovering) other syntactic transformations.

1. THE STATUS OF SENTENCE AND INFINITIVE COMPLEMENTS

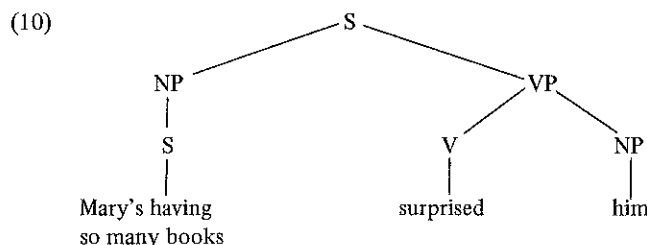
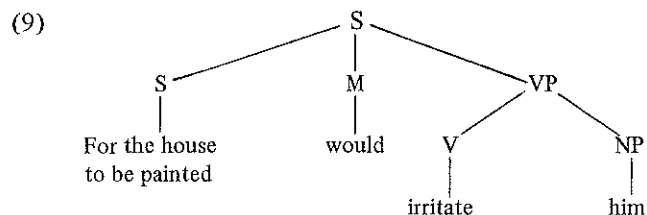
The principal subject of this paper is a more far-reaching reformulation of a grammatical transformation in view of the structure-preserving constraint: a reformulation of the extraposition rule of Rosenbaum (1967). However, I will begin not by considering the extraposition rule directly, but by justifying a claim which basically explains certain conditions on that rule. The claim is that embedded sentences are *not* instances of the constituent NP⁵ if they either have a finite verb and are introduced (optionally) by *that* or have an infinitive (with or without expressed subject). Examples of such constituents are indicated in (7).

- (7) John believed *(that) Mary was a foreign agent*.
John will see to it *that you have a reservation*.
Bill would prefer *for Mary to stay awhile*.
Barbara decided *to buy a car*.
That Bill knows German thoroughly is obvious to all.
To read so many magazines is a waste of time.
For the house to be painted would irritate him.

The arguments in this section will differentiate such constituents not only from NP's with head nouns but also from the gerund constructions italicized in (8).⁶

- (8) John regretted *stealing Mary's book*.
John will see to *your getting a ticket in time*.
Bill would prefer *buying fewer foreign books*.
Your being able to find a new job would be surprising.
Reading so many magazines seems a waste of time.
Mary's having so many books surprised him.

I claim that the last examples of (7) and (8) should be represented in surface structure as (9) and (10) respectively.

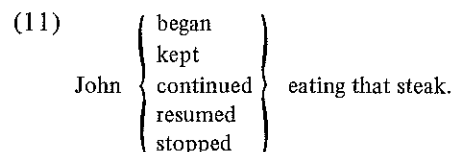


The deep structure I propose for (9) will be given in the course of the arguments to be presented.

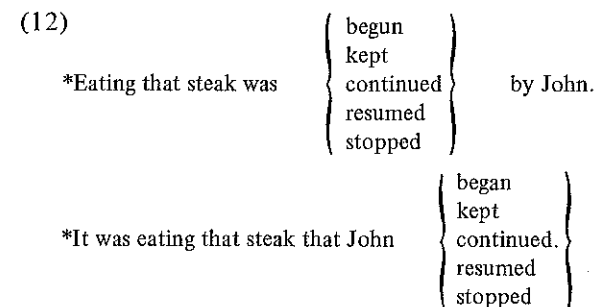
The analysis of sentence and infinitive subject and object complements to be given here is at variance with that given in Rosenbaum (1967). Nonetheless, many of the grammatical facts elucidated in that work are important for establishing certain aspects of my analysis. What I believe to be flaws in Rosenbaum's arguments will be discussed in this section. In section 2, I show how an alternative analysis, which makes crucial use of the structure-preserving constraint, accounts both for the facts accounted for by Rosenbaum and for certain *ad hoc* conditions which must be placed on his extraposition rule.⁷

1.1 Two Exceptional Classes of Gerunds

Although I will argue that only gerunds (and not sentences and infinitives) are instances of NP's, I agree with Rosenbaum (1967) that there are two classes of gerunds (i.e., VP's whose heads have *-ing* affixes and which are not participles) which are not NP's. One such class contains the complements to "verbs of temporal aspect," which includes *begin, start, finish, continue, commence, stop, keep, keep on, go on, resume, cease*, etc.:



We are concerned here only with the sense in which *John* is understood as subject of *eat*. Two reasons for not considering *eating that steak* in (11) as an NP are that this constituent cannot be the subject of a passive sentence (this argument due to Rosenbaum), nor can it be the focus constituent in a cleft construction, as can other NP's:



Another class of gerunds which are not NP's are the VP complements to many transitive verbs of perception (*see, watch, observe, notice, smell, hear, listen, feel*) and to a few other verbs like *find, catch*, etc.:

(13) I saw John *cleaning the table*.

*It was cleaning the table that I saw John.

They noticed some smoke *coming out of the window*.

*It was coming out of the window that they noticed some smoke.

John found her *studying algebra*.

*It was studying algebra that John found her.

Gerunds of this second class are reduced progressive forms of infinitives, as I will show. First, note that infinitives generally occur after transitive verbs of perception (but lack a characteristic *to*):

(14) I saw John clean the table.

They noticed some smoke come out of the window.

But infinitives in progressive form are superficially excluded after such verbs:

(15) *I saw John be cleaning the table.

*They noticed some smoke be coming out of the window.

We can account for this gap in the paradigm by deriving the sentences of

(13) from the underlying strings of (15) by a *be*-deletion rule. The underlying progressive nature of the forms in (13) is confirmed by observations like the following:

- (16) *The prisoners died* implies *The prisoners are dead*.
The prisoners were dying does not.
We saw the prisoners die implies *The prisoners are dead*.
We saw the prisoners dying does not.
We found the prisoners dying does not.

- (17) Question: *Where are the children?*
 Appropriate answers: *They are running across the street*.
I can see them running across the street.
 Inappropriate answers: *They run across the street*.
I can see them run across the street.

These reduced progressive infinitives will be treated like other infinitives in the rest of this paper. Similarly, from here on, when I use the term "gerund," I mean to exclude these reduced progressive infinitives and also the complements to verbs of temporal aspect.

1.2. The Deep Structure of Sentence and Infinitive Complements.

I agree with Rosenbaum that an S is generable at the end of VP's, AP's, and NP's by phrase structure rules like (18), (19), and (20).⁸

- (18) $VP \rightarrow \dots + (S)$
 (19) $AP \rightarrow \dots + (S)$
 (20) $NP \rightarrow \dots + (S)$

The S in (18) is the source of at least the sentence and infinitive complements to Rosenbaum's verb classes containing, as typical members, *tend* and *persuade*. (I return to the arguments favoring Rosenbaum's analysis of these verbs below.) The S's in (19) and (20) are the source of sentence and infinitive complements to nouns like *tendency*, *belief*, *preference*, etc. and to adjectives like *eager*, *happy*, *ready*, etc.

The crucial difference between my analysis and Rosenbaum's is that I take the S in (18) also to be the deep-structure source for the sentential and infinitival subject and object complements italicized in (7) above (where the verbs are *believe*, *prefer*, *irritate*, *seem*, etc.). That is, the arguments to be presented below show that sentence and infinitive complements are not generable by the rule $NP \rightarrow S$ and hence cannot have any other source but (18), (19), and (20).

Such a claim immediately raises numerous questions, perhaps the

most obvious being how I can account for the interpretations of the complements in (7) as objects and especially subjects, if I claim that these complements have the same postverbal deep-structure positions. I think this question can be adequately answered in a fairly simple way, and I return to it in section 2 after I have established my analysis on syntactic grounds. The question is essentially concerned with the semantic component, since it is in this component and not in syntax or phonology that grammatical relations are used.

An alternate way to state my position is to say that the phrase structure rule $NP \rightarrow S$ or alternatively $NP \rightarrow NP + VP$ always gives rise to gerunds and never to sentences and infinitives.

An initial advantage of my analysis is that the rule that differentiates between *to* and *-ing* can be related to structural difference between clauses which are NP's and those which are not, rather than in terms of an *ad hoc* syntactic feature, as in Rosenbaum (1967).⁹

I now turn to an examination of the various syntactic positions of the category NP and attempt to show that, in each such position, sentences and infinitives either do not occur or are not present in the given position in deep structure.

1.3 The Position of Object Complements.

It might at first be thought that the italicized clausal complements in (21) are NP's, whereas these same complements are extraposed to the end of the VP and are no longer NP's in the corresponding paraphrases of (22).

- (21) John already said *that he will pay up* yesterday.
 They proved *that John had taken bribes* in District Court.
 Mary promised *to be quiet* reluctantly.
 I like *it that they played those records* very much.
- (22) John already said yesterday *that he will pay up*.
 They proved in District Court *that John had taken bribes*.
 Mary promised reluctantly *to be quiet*.
 I like it very much *that they played those records*.

However, the adverbs which can precede or follow object clauses as in (21) and (22) are those adverbs which are not closely linked to the main verb: locative adverbs of space and time, manner adverbials, etc. These same classes of adverbs can in fact precede or follow *extraposed* subject clauses, as in (23).

- (23) It seems *that victory is unattainable* today.
 It seems today *that victory is unattainable*.

It means nothing *to speak of simultaneity* in Einstein's framework.

It means nothing in Einstein's framework *to speak of simultaneity*.

It isn't required *that the players be tall* in this school.

It isn't required in this school *that the players be tall*.

It pleased me *that they played those records* very much.

It pleased me very much *that they played those records*.

It doesn't frighten me *to watch horror movies* anymore.

It doesn't frighten me anymore *to watch horror movies*.

It isn't necessary *to be smart* on this campus.

It isn't necessary on this campus *to be smart*.

In my dissertation (Emonds 1969, sec. 4.3) I propose an adverb movement rule by which adverbs originally outside a VP may move inside it (so as to precede an extraposed S), in order to account for the alternations in (23). If we assume that the italicized complements in (21) and (22) have the same (extraposed) status as those in (23), this rule automatically accounts for (21) and (22), making an explanation of the latter alternation in terms of the extraposition rule redundant.

In other words, extraposition of S is not needed to explain (22). We can assume that extraposition is always *obligatory* from object position, and the rule which accounts for the variants in (23), whether it be an S movement or an adverb movement, automatically accounts for (21) and (22). Thus, (21) and (22) are irrelevant for deciding whether object clauses are ever found in the object NP position or whether they are always generated in extraposed position. The real test for deciding this question is the order of object clauses with respect to phrases which are subcategorized by the head verb, such as those italicized in (24).

(24) They told a fairy tale *to the children*.

They told *the children* a fairy tale.

*They told how to build a kite *to the children*.

They told *the children* how to build a kite.

*She won't tell she is sick *to the doctor*.

She won't tell *the doctor* she is sick.

You promised a new hat *to Mary*.

You promised *Mary* a new hat.

*You promised to be quiet *to Mary*.

You promised *Mary* to be quiet.

*You promised you would do the wash *to Mary*.

You promised *Mary* you would do the wash.

The man taught the importance of books *to his sons*.

The man taught *his sons* the importance of books.

*The man taught that books were important *to his sons*.

The man taught *his sons* that books were important.

I take this responsibility *upon myself*.

*I take to fix the lamp *upon myself*.

I take it *upon myself* to fix the lamp.

They expect some cooperation *of (from) you*.

*They expect that you cooperate *of you*.

They expect it *of you* that you cooperate.

John said something nasty *to Mary*.

*John said to leave him alone *to Mary*.

John said *to Mary* to leave him alone.

Bill got a free meal.

Bill got to eat out.

Bill got a free meal *for Joe*.

Bill got *Joe* a free meal.

*Bill got to eat out *for Joe*.¹⁰

Bill got Joe to eat out.

I make no attempt to explain in a principled fashion why an *it* sometimes appears in object position in (24) and sometimes does not. The italicized PP's in (24) are deep-structure sisters to V, and in every case an infinitive or sentence object complement must follow them. Thus, there is no distributional evidence that such complements occur in object NP position in deep structure.¹¹

1.4. Sentences and Infinitives after Exclusion of Prepositions.

A clearcut indication that infinitives and sentences are not in the same category as gerunds and noun phrases with head nouns is that the latter two but not the former two appear after the traditional class of prepositions (*from, at, into, toward, by, with, on account of, because of, despite, etc.*):

(25) John just came back from his job.

John just came back from driving a cab.

*John just came back from to drive a cab.

*John just came back from that he drove a cab.

He blamed it on Bill's strictness.

He blamed it on Bill's being too strict.

*He blamed it on for Bill to be too strict.

*He blamed it on that Bill was too strict.

Because of John's age, Mary gets a pension.

Because of John's being so old, Mary gets a pension.

*Because of for John to be so old, Mary gets a pension.

*Because of that John is so old, Mary gets a pension.

*Because John's age, Mary gets a pension.

*Because John's being so old, Mary gets a pension.

Because John is so old, Mary gets a pension.

It might be thought that the future participle, "about + infinitive," is an exception to the prohibition on infinitives after prepositions, but this *about* has no semantic or syntactic connection with the preposition *about*; for example, the future participle is not a PP:

(26) It is about New York that they are talking.

*It is about to leave that John seems.

Prepositions do appear in pseudo-cleft constructions which have sentences and infinitives in focus position, as in (27). This is sometimes taken as certain evidence that the traditional class of prepositions does appear before infinitives and sentences in underlying syntactic structure.

(27) What we are aware of is that she is poor.

What he insisted on was that we not pay for the food.

Whether (27) is evidence for this contention or not depends, however, on one's analysis of the pseudo-cleft construction of the form (28).

(28) $(S (\left\{ \begin{smallmatrix} \text{what} \\ \text{where} \\ \text{when} \end{smallmatrix} \right\}) - X - Y_S) - \text{be} - (C \text{ Focus constituent } C)$

Can (28) be derived by a deletion of the second X and Y in an assumed underlying structure of the form (29)?

(29) $(S X - (\text{wh-some } \left\{ \begin{smallmatrix} \text{thing} \\ \text{place} \\ \text{time} \end{smallmatrix} \right\}) - Y_S) - \text{be} - (S X - C - Y_S)$

Suppose the answer is yes, and consider (30). In the first example, X = *John should be doing*, Y = \emptyset , and C = *working the bar*.¹²

(30) What John should be doing is working the bar.

What John was doing to Bill was kicking him in the shins.

In these sentences, X dominates *-ing*; but C dominates *-ing* also, implying

two *-ing*'s in the underlying right-hand S in (29), hardly a satisfying result. The problem is the assumption that (29) represents the underlying structure of a pseudo-cleft of the form (28).

The undesired consequence of this assumption can be avoided if we replace *wh-something* in (29) with W, where W dominates *wh-something* and is subject to other conditions. But then W can be constituents like *doing wh-something* or *of wh-something*, and it no longer is necessarily so that prepositions must precede sentences and infinitives (i.e., be the last element in X in [29]) in deep structure.

Thus, any analysis of the pseudo-cleft construction which assumes that the focus constituent is the remnant of a deep-structure sentence on the right-hand side of the copula does not require that I abandon the claim that infinitives and sentences do not appear as NP's after prepositions. There are other possible approaches to pseudo-cleft constructions, but I think that arguments to the same effect as the one I have given here could be constructed for any precise alternative analysis of pseudo-cleft sentences.

Infinitives and sentences do not appear before 's in gerunds and noun phrases with head nouns, but this alone proves nothing, since gerunds and certain other "complex" noun phrases, from which we are trying to differentiate them, do not either. However, there is a discernible difference in ungrammaticality between gerunds before 's and infinitives before 's, the latter being less acceptable. Compare:

(31) *Does he know about smoking pot's being illegal?

*(Worse) Does he know about to smoke pot's being illegal?

This intuition can be strengthened by noting that, in most American speech, 's can be omitted in many cases after the subject of a gerund. When this optional rule is applied to the sentences in (31), the result is that the first, but not the second, sounds completely acceptable:

(32) Does he know about smoking pot being illegal?

*Does he know about to smoke pot being illegal?

Cf. Does he know about it being illegal to smoke pot?

We agree about shoveling snow being ridiculous.

*We agree about to shovel snow being ridiculous.

Cf. We agree about it being ridiculous to shovel snow.

Actually, the same kind of change in acceptability between (31) and (32) appears when NP's with N heads, as well as gerunds, lose their 's:

(33) *I didn't know about the purchase of a car's putting them into bankruptcy.

I didn't know about the purchase of a car putting them into bankruptcy.

This further demonstrates the similarity between gerunds and other NP's, as well as the dissimilarity between gerunds and infinitives.

A few examples with NP's in appositive position to other NP's are perhaps in order. Very little is known about the special properties of this construction. However, in connection with our concern here, we can note that infinitives, although interpretable in this position, are not as natural as gerunds. Compare, for example, the infinitives and gerunds used as appositives in (34).

- (34) All this constant activity, buying food twice a day and going out every night, is wearing me out.

*All this constant activity, to buy food twice a day and to go out every night, is wearing me out.

We have finished the most irksome part, filling out the long registration form.

*We have finished the most irksome part, to fill out the long registration form.

This concludes my examination of nonsubject NP positions, in which we have seen that infinitives and sentences do not occur.

1.5 Sentences and Infinitives in Subject Position.

Sentences and infinitives occur in surface structure in subject position, as in the examples of (7), repeated here for convenience:

- (35) *That Bill knows German thoroughly* is obvious to all.
To read so many magazines is a waste of time.
For the house to be painted would irritate him.

According to the analysis I am pursuing, these sentences must be derived from the corresponding sentences in (36), since the only source for sentence and infinitive complements is the "extraposed" S (and perhaps VP) generated by (18).

- (36) It is obvious to all that Bill knows German thoroughly.
 It is a waste of time to read so many magazines.
 It would irritate him for the house to be painted.

A straightforward rule to accomplish this derivation would be one which replaces a subject NP dominating *it* (or, perhaps, dominating nothing at the point when the rule applies) with the complement S, as in (37). I will call

this rule "subject replacement." (Care will have to be taken to insure that the only S's which undergo subject replacement are those which are in fact interpreted as deep-structure subjects. I take up this question in section 2.)

- (37) (S (NP *it*) (M would) (VP (V irritate) (NP him) (S ^{for the house} to be painted)))
-

The result of applying subject replacement to (37) was given earlier as (9).

According to this formulation, subject replacement is not a structure-preserving rule. But the structure-preserving constraint then requires that it be a root transformation. That is, it must *not* apply in nonroot S's. This is in fact the case; gerunds, but not infinitives or sentences with finite verbs, are acceptable subjects in nonroot S's.¹³

- (38) *That for Bill to smoke bothers the teacher is quite possible.
 That it bothers the teacher for Bill to smoke is quite possible.
 That Bill's smoking cigarettes bothers the teacher is quite possible.
 ?It is quite possible that for Bill to smoke bothers the teacher.
 *For that you pay that tax to be necessary would be an inconvenience.
 For it to be necessary that you pay that tax would be an inconvenience.
 *It would be an inconvenience for that you pay that tax to be necessary.
 *He protested the decision that for the bill to be marked paid meant nothing.
 He protested the decision that it meant nothing for the bill to be marked paid.
 He protested the decision that the bill's being marked paid meant nothing.
 *John was happy that to own a car didn't disqualify you.
 John was happy that it didn't disqualify you to own a car.
 John was happy that owning a car didn't disqualify you.
 *I don't believe for you to study history hurts you.
 *I don't believe that you study history hurts you.
 I don't believe your studying history hurts you.
 *He didn't want that he was Indian to be known at his club.
 He didn't want it to be known at his club that he was Indian.
 *He didn't want his being Indian to be known at his club.
 *His being Indian wasn't known at his club.

*A day at the beach is more fun than to play golf is.
A day at the beach is more fun than playing golf is.

*To go by car doesn't seem as rewarding as to ride a horse used to seem.
Going by car doesn't seem as rewarding as riding a horse used to seem.

*He exercises so rarely that to lift those bricks is bad for his heart.
He exercises so rarely that lifting those bricks is bad for his heart.

*Although that the house is empty may depress you, it pleases me.
*Although for the house to be empty may depress you, it pleases me.
Although the house's being empty may depress you, it pleases me.

*The children for whom to diagram sentences is easy often become mathematicians.
The children for whom it is easy to diagram sentences often become mathematicians.
The children for whom diagramming sentences is easy often become mathematicians.

*She forgets how expensive to go to the dentist is.
She forgets how expensive going to the dentist is.

*The reason why that you have insurance doesn't protect you is that you're a foreigner.

*The reason why for you to have insurance doesn't protect you is that you're a foreigner.

The reason why your having insurance doesn't protect you is that you're a foreigner.

*Situations in which to write out a check is necessary should be avoided.

Situations in which writing out a check is necessary should be avoided.

*The salesman who that I bought a car seemed most important to was a Southerner.

*The salesman who for me to buy a car seemed most important to was a Southerner.

The salesman who my buying a car seemed most important to was a Southerner.

*She likes the kind of man that to see a few movies a year will satisfy.

She likes the kind of man that it will satisfy to see a few movies a year.

She likes the kind of man that seeing a few movies a year will satisfy.

The contrasts in grammaticality in (38) are a *necessary* consequence of the structure-preserving constraint if we assume that sentence and infinitive complements are generated at the end of the VP by (18), since a non-structure-preserving rule like subject replacement *cannot* apply in embedded sentences.

On the other hand, these contrasts must be accounted for in an *ad hoc* fashion in Rosenbaum's framework. That is, the extraposition rule must carry a condition that it is obligatory for a sentence or infinitive subject of a nonroot S.

A previous attempt to attribute this condition to a more general principle was made by Ross (1967). He proposed that it is due to a general prohibition on the configuration (NP S) in the "sentence interior" position. As Ross himself pointed out, however, the fact that gerunds, which may be S's dominated by NP's, occur in sentence interior position casts doubt on the generality of this constraint. A clearer counterexample is provided by "headless" relative clauses, which occur quite freely in sentence interior position:

(39) She won't tell {what she heard
*she is sick} to the doctor.

The man taught

{what he had learned from the missionaries}
*that the missionaries were evil} to his sons.

He takes {whatever is necessary to prove his point
*that his assumptions are unchallengeable} for granted.

John was happy (that) {what he had done
*to own a car} hadn't disqualified him.

I never assumed {what I heard on the news
*that we were in danger} was true.

He drives so fast that {what we save on fares is spent on fines.
*for me to watch for signs is difficult.}

Although {what I have learned
*that I own a yacht} doesn't impress you, it did her.

The children for whom {whatever the teacher says
*that the teacher is always right} is gospel aren't very interesting.

He protested the decision that
 { however much had not been paid would be added to his taxes }
 { *for the bill to be marked paid meant nothing. }
 For { what that company makes }
 { *that they make saddles } to be well-known would surprise me.

I conclude that the condition that infinitives and sentences *must* be extraposed in nonroot S's is an *ad hoc* condition in Rosenbaum's framework, and not the consequence of a universal principle.

The subject replacement rule (i.e., my counterpart to extraposition) has further similarities to root transformations. As Ross noted in formulating the constraint just discussed, a sentence or infinitive complement cannot appear in subject position if *anything* (at least, anything which is not separated from the subject by a comma) precedes this position:

- (40) Why did { *that Mary liked old records } irritate him?
 { Mary's liking old records }
 Is { *that this stock will be sold } certain?
 { ?this stock's being sold }
 Cf. ?This stock's being sold is certain.
 When was { *to arrive an hour early } a requirement?
 { arriving an hour early }
 *Never will for us to be comfortable be possible in this climate.
 Never will it be possible for us to be comfortable in this climate.
 A disease like that { *to take a lot of pills }
 { ?taking a lot of pills } won't cure.
 { ?frequent exercise }

This is automatically accounted for in the analysis I am pursuing, once we note that this is a general condition on all the fronting root transformations of English: only one of them can apply in a given S. To see that this is so, I first list the preposing root transformations studied in chapter 1 of my dissertation, along with sentences in which the italicized constituents have been fronted by each of the rules in question;

- (41) (a) Directional adverb preposing:
 Away ran John.
 Into that house ran the boys.
 (b) Negated constituent preposing:
 Never will she buy a car.
 Only a few students did he meet in the East.
 (c) Direct quotation preposing:
 "Bill likes corn," John said, "but I don't."

- (d) Nonfactive complement preposing:
 All the people in the crowd, he assumed, were carrying flags.
 (e) Topicalization:
 These steps I never swept with a broom.
 Her John likes.
 (f) VP preposing:
 She never has bought a car, and *buy one* she never will.
 He said I would like her, and *like her* I do.
 (g) Left dislocation:
 John, he ran away.
 My brother, he met only a few students.
 (h) Comparative substitution:
 Easier for us to solve would be a problem from number theory.
 Equally as welcome would be a theorem from geometry.
 (i) Participle preposing:
 Speaking to the president now is our top reporter.
 (j) PP substitution:
 Among the guests was standing John.

Also subject to this condition on fronting transformations, for reasons unknown to me, is the nonroot transformation of *wh*-fronting:

- (41) (k) *Wh*-fronting:
 Which plays of his have we read?
 What would be easier to solve?

Note, first, that the ungrammatical examples of (40) are forbidden combinations of the preposing root transformations of subject replacement with rules (41b), (41e), and (41k). Furthermore, combinations of rules (41a) through (41k) with each other, all of which produce ungrammaticality, are given in (42). The notation (x-y) after the examples in (42) means that first rule (41x) and then rule (41y) applies to yield the example in question.

- (42) *John, away he ran. (a-g)
 *Away, John, he ran. (g-a)
 *That house into ran the boys. (a-e)
 *She never has bought a car, and buy one never will she. (b-f)

*She never has bought a car, and never $\left\{ \begin{array}{l} \text{will buy one she} \\ \text{buy one she will} \end{array} \right\}$ (f-b)

*These steps never did I sweep with a broom. (b-e)

*Never did these steps I sweep with a broom. (e-b)

*Never these steps did I sweep with a broom. (e-b)

*Which plays of his $\left\{ \begin{array}{l} \text{never have} \\ \text{have never} \end{array} \right\}$ we read? (b-k)

*Never $\left\{ \begin{array}{l} \text{which plays of his have} \\ \text{have which plays of his} \end{array} \right\}$ we read? (k-b)

*Who into the house dashed? (a-k)

*Into the house who dashed? (k-a)

*What $\left\{ \begin{array}{l} \text{these steps did} \\ \text{did these steps} \end{array} \right\}$ you use to sweep with? (e-k)

*These steps $\left\{ \begin{array}{l} \text{what did} \\ \text{did what} \end{array} \right\}$ you use to sweep with? (k-e)

What did he assume all the people in the crowd were carrying?

All the people in the crowd, he assumed, were carrying flags.

*All the people in the crowd, what did he assume, were carrying? (k-d)

*My brother, only a few students did he meet in the East. (b-g)

*Only a few students, my brother, did he meet in the East. (g-b)

*"Bill likes corn," John, he said, "but I don't." (g-c)

*John, "Bill likes corn," he said, "but I don't." (c-g)

*He said I would like her, and her like I do. (f-e)

*John said she would help him willingly, and help willingly him she does. (e-f)

*John, her he likes. (e-g)

*Her, John, he likes. (g-e)

*The president speaking to now is our top reporter. (i-e)

*Speaking to now the president is our top reporter. (e-i)

*Was among the guests standing John? (j-k)

*Among the guests was John standing? (k-j)

*What would easier to solve be? (h-k)

*Easier to solve what would be? (k-j)

Thus, all the preposing root transformations (and *wh*-movement) can

apply only if no other transformation of the same type applies in the same root S. (I do not pretend to have captured this restriction in a formal way; I use it only to show that subject replacement is like other root transformations.) This restriction predicts, as a special case, the ungrammaticality of subject replacement in the root sentences of (40), since, in these examples, a constituent precedes the subject NP position as a result of a preposing root transformation (or *wh*-fronting).¹⁴

A study of the sentence and infinitive complements which occur in subject position thus favors the view that they originate at the end of the VP in deep structure. For it is this assumption, coupled with the structure-preserving constraint, which automatically predicts the ungrammaticality of the sentence and infinitive subjects in (38) and (40). In Rosenbaum's framework, on the other hand, these facts can be accounted for only by an *ad hoc* condition making extraposition of a sentence or infinitive complement not immediately dominated by a root S obligatory rather than optional.

1.6. Other Arguments Confirming the non-NP Status of Infinitives and Sentences.

(i) In noun phrases with noun heads, at some point in the transformational derivation a rule must insert 's in the context: [NP[NP X_{NP}] Y]. This is not a deep-structure condition, because it is not an NP in this position in deep structure which receives the 's in phrases like *John's expulsion by the principal*. But according to this rule, gerunds should be noun phrases and sentences and infinitives should not be, since the initial (subject) NP in gerunds but not in infinitives and sentences can be followed by an 's suffix.

(ii) If sentences and infinitives are not NP's, they should not conjoin freely with NP's. It was pointed out by Gleitman (1965) that this is the case. On the other hand, gerunds and NP's with head nouns can be conjoined.

(43) She used to like watching television and physical exercise both.

*She used to like watching television and to play volleyball both.

*She used to like to watch television and physical exercise both. (where *physical exercise* is object of *like*)

*She used to like physical exercise and to watch television both.

Outdoor bathrooms and pitching a tent every day would bother me.

*To pitch a tent every day and outdoor bathrooms would bother me.

*Eating canned foods and to pitch a tent every day would bother me.

He proposed a 20% reduction for the elderly and discontinuing the translation service.

*He proposed a 20% reduction for the elderly and that the office be moved to the suburbs.

*He proposed discontinuing the translation service and that the office be moved to the suburbs.

(iii) Rosenbaum noted that the extraposition does not apply to gerunds:¹⁵

- (44) *It was understandable John's owning two cars.
 *It is irritating everybody in the back seat John's driving fast.
 *It never scared him when he was young sleeping in the dark.

Some speakers of English find the starred sentences of (44) acceptable, but even these demand that a commalike pause precede the extraposed gerunds, so that what is probably involved is the right dislocation rule (a root transformation) discussed in Ross (1967) and in chapter 1 of my dissertation.

- (45) It was understandable, John's purchase of a gun.
 It irritates everybody in the back seat, John's big cigar.
 It never scared him when he was young, the skeleton in the closet.

Since gerunds do not appear "in extraposition" from the subject, the extraposition rule in Rosenbaum's framework must be made to depend on an *ad hoc* difference between gerunds and infinitives. But the counterpart of the extraposition rule in the framework of this study, the subject replacement rule, does not depend (is not formulated in terms of) such an *ad hoc* feature. This is because gerunds and infinitives have different rather than the same underlying sources. This formal advantage is the result of generating both subject and object sentence and infinitive complements at the end of the VP.

(iv) I will try to show in section 2 that certain (though not all) of Rosenbaum's conclusions about clausal complements from the way such complements behave in the pseudo-cleft construction are in error, and that this construction is not a diagnostic context for the category NP.

On the other hand, we can replace Rosenbaum's pseudo-cleft test for NP status (which I will show to be unsatisfactory) with a more appropriate one, the cleft test. Examples of the cleft construction, with the focus constituent italicized, are given in (46).

- (46) It's *the custard pie* that I disliked.
 It was *a tax break* that I counted on.
 Was it *John* that broke the window?
 It was *to John* that she spoke.
 It's *because of the flood* that they are leaving.
 It is *with great pleasure* that I present our speaker.
 It was *buying a new hat* that I enjoyed.
 It was *John's knowing the location of the mailbox* that surprised her.
 It was *because it was raining* that they left.
 *It's *very unhappy* that Bill is.
 *It was *useless* that the meeting seemed.
 *It was *explicitly* that he rejected our assumptions.
 *It was *too carefully* that she spoke.
 *It is *blow up some buildings* that you should do.
 *It is *playing for time* that they are doing.
 Cf. What you should do is blow up some buildings.
 Cf. What they are doing is playing for time.
 *It was *throwing away some letters* that John noticed Bill.
 *It was *ask John for money* that I heard you.
 *It was *stealing my money* that she caught him.
 *It was *drinking beer from the bottle* that she kept.
 *It was *to report on time* that we failed.
 *It was *that he passed out* that John drank so much.

The cleft construction appears to be a near-perfect diagnostic for the categories NP and PP.¹⁶ In particular, the gerund can appear in focus position, as in two of the examples of (46). By this test, however, sentences and infinitives are not noun phrases:

- (47) *It was *to buy a new hat* that I wanted.
 *It's *for John to drive carelessly* that upsets me.
 *It is *to always be on time* that you should decide.
 *It was *that you explain your motives* that was important.
 *It's *that John has come too late* that Bill realizes.
 *Was it *that Mary had cashed the check* that Bill regretted?
 Cf. It's *John's driving carelessly* that upsets me.
 It was *explaining your motives* that was important.
 Was it *Mary's having cashed the check* that Bill regretted?

The ungrammaticality of the examples of (47) is automatically explained when we generate sentence and infinitive complements at the end of the VP (and not as NP's) and design the grammar so that just NP's and PP's appear in focus position in cleft sentences. (In chapter 4 of my dissertation, I show

that this latter condition is in fact another automatic consequence of the structure-preserving constraint and not a special condition on rules that form the cleft sentence construction.)

(v) According to Rosenbaum's analysis, the italicized subject clauses in (48) are NP's.

- (48) *For John to arrive* would cause embarrassment.
That the children are always late shows the necessity of discipline.
That you spoke out of turn didn't help the situation.
To suggest devaluation would anger the bankers.
That the boys were dancing together was amusing John.

However, the agent-postposing (passive) rule does not apply to these supposed NP's. Rosenbaum apparently was under the impression that agent postposing and a subsequent rule deleting *by* would produce grammatical sentences, but this is not the case either:

- (49) *Embarrassment would be caused (by) for John to arrive.
 *The necessity of discipline is shown (by) that the children are always late.
 *The situation wasn't helped (by) that you spoke out of turn.
 *The bankers would be angered (by) to suggest devaluation.
 *John was being amused (by) that the boys were dancing together.

Rosenbaum was probably led to this conclusion by the existence of sentences like those in (50).

- (50) John was disturbed (*by) that the neighbors were so noisy.
 Mary was pleased (*by) that she had found a job.

But such sentences are due to the fact that *disturbed* and *pleased* are "passive adjectives," similar to *sorry* and *glad* in (51), as well as passive verb forms:

- (51) John was sorry (*by) that the neighbors were so noisy.
 Mary was glad (*by) that she had found a job.

We know the passive forms that appear in sentences like (50) are adjectives because they can be modified by characteristically adjectival modifiers like *very*.

- (52) John was very disturbed that the neighbors were so noisy.
 Mary was very pleased that she had found a job.
 John was very sorry that the neighbors were so noisy.
 Mary was very glad that she had found a job.
 *Embarrassment would be very caused by his arrival.
 *The necessity of discipline is very shown by their tardiness.
 *The situation wasn't very helped by your comments.
 *John was being very amused by their antics.

(*Angered* and *amused* are also passive adjectives and can be used alone with *very*; the ungrammaticality of the last two examples in [49] is due to the fact that these adjectives cannot be used with infinitive complements or with the progressive.)

Another proof that the passive forms in (50) are adjectives is their ability to appear after *seem*:

- (53) John seemed $\left\{ \begin{smallmatrix} \text{disturbed} \\ \text{sorry} \end{smallmatrix} \right\}$ that the neighbors were so noisy.
 Mary seemed $\left\{ \begin{smallmatrix} \text{pleased} \\ \text{glad} \end{smallmatrix} \right\}$ that she had found a job.
 *Embarrassment seemed caused by his arrival.
 *The necessity of discipline seemed shown by their tardiness.
 *The situation didn't seem helped by your comments.

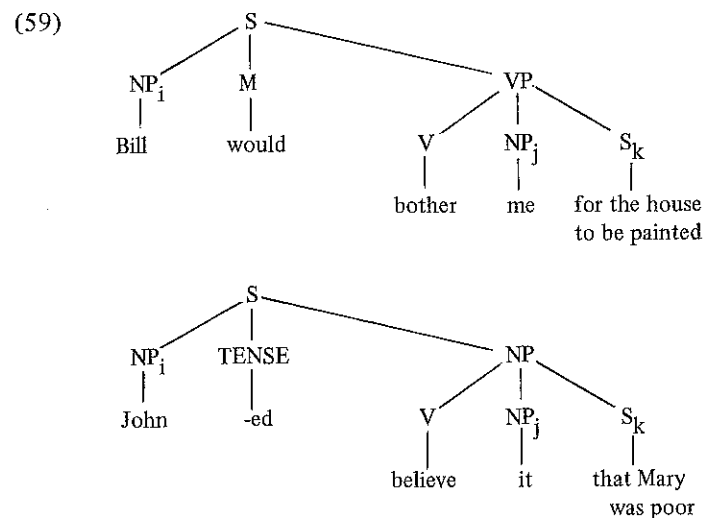
Finally, we know the passive forms in (50) are not verbs because they could occur with the progressive if they were:

- (54) That the neighbors were so noisy was disturbing John.
 That John is looking for a job is pleasing Mary.
 That John didn't have a job was depressing Mary.
 *John was being disturbed that the neighbors were so noisy.
 *Mary is being pleased that John is looking for a job.
 *Mary was being depressed that John didn't have a job.

These three arguments show that agent postposing does not move sentences and infinitives. This means that the extraposition rule requires an *ad hoc* condition in Rosenbaum's framework. This condition simply states that sentences and infinitives do not act like NP's as far as the agent postposing rule is concerned, thus reflecting directly my contention that these constructions are never NP's.

In the framework I am proposing, the italicized subject clauses in

subjects and objects. That is, no special subcategorization conditions are needed to exclude the trees of (59); the projection rule for forming the meaning of an S from the lexical meaning of the main verb of S cannot operate on trees with superfluous constituents not specified in the meaning of that verb.



The theory of verb complementation I am proposing agrees with that of Rosenbaum's in that the distribution of the deep-structure *it*'s whose antecedents are sentence and infinitive (but not gerund) complements is essentially the same in both theories. In Rosenbaum's analysis, NP complement clauses are generated by the phrase structure rule: $NP \rightarrow IT + S$, where a surface-structure IT dominates the terminal symbol *it*. In each case (excepting the complements to a very few verbs like *seem*, which I discuss in the next section) in which Rosenbaum postulates a deep-structure configuration $[NP IT S]$ for a sentence or infinitive complement, I postulate a deep structure $[NP_i it]$, where S_i appears simultaneously at the end of VP "in extraposition." The difference between the two analyses is that Rosenbaum considered IT to always be a deep-structure sister to its S antecedent, while I consider the corresponding *it* to be a coreferential with its antecedent S, which is in extraposition.

Rosenbaum's rule of IT-deletion, ordered after his extraposition rule, is essentially (60).

$$(60) [NP IT - S] \quad \emptyset - 2$$

Certain discrepancies, as in (61), must be accounted for in Rosenbaum's framework by special conditions either on (60) or on the extraposition rule itself.

- (61) John believed (it) that Mary was coming.
 John thought (*it) that Mary was coming.
 John liked it that Mary was coming.
 *John liked that Mary was coming.

In the framework I am proposing, the corresponding special conditions which determine the examples of (61) aside, *it*-deletion can be restated as (62), since NP_i can only dominate *it* if a coreferential S_i appears in the same tree.

$$(62) NP_i - S_i \Rightarrow \emptyset - 2$$

Similarly, the subject replacement rule must be stated in terms of coreferential indices, as in (63).

$$(63) NP_i - X - S_i - Y \Rightarrow 3 - 2 - \emptyset - 4, \text{ where no NP, PP or S dominates 3 but not 1.}$$

The condition on (63) prevents S's which are "too far down" in the tree from replacing the subject. An example of such an S is the one italicized in (64).

- (64) It would have been pointed out by John if *there had been any danger*.

The formulation of subject replacement in terms of coreferential indices prevents subject replacement from applying to the italicized S's in (65).

- (65) The government's action wasn't surprising, but it persuaded John *that the president wasn't lying*.
 That observation is interesting, but it doesn't prove *that we should abandon our efforts*.

A third rule in the grammar of English besides *it*-deletion and subject replacement (as they are formulated here) which is stated in terms of coreferential indices is the equi-NP deletion rule, also discussed in Rosenbaum (1967).

There is a further condition on subject replacement which it is appropriate to discuss here. The rule is obligatory when a verb has both a subject complement *and* an object or oblique complement, as in (66).

- (66) That John has blood on his hands proves that Mary is innocent.
 *It proves that Mary is innocent that John has blood on his hands.

To see that movie is to relive the past.

*It is to relive the past to see that movie.

That John was late persuaded me that the train was delayed.

*It persuaded me that the train was delayed that John was late.

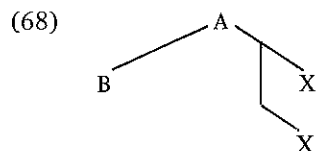
In fact, when such a verb is in a nonroot S (which means subject replacement is impossible), there is no way to obtain grammaticality without resorting to paraphrase:

(67) *The decision that (that) John has blood on his hands proves that Mary is innocent is ridiculous.

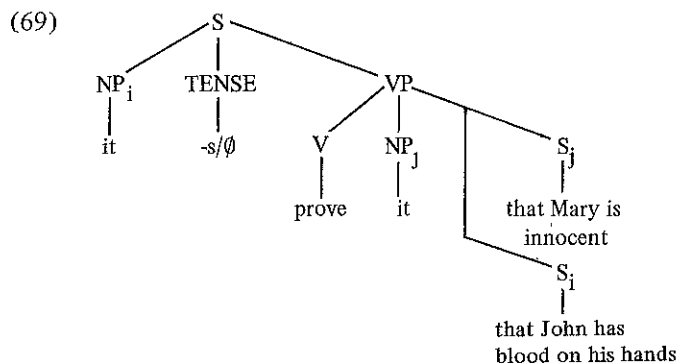
*The decision that it proves that Mary is innocent that John has blood on his hands is ridiculous.

Cf. The decision that John's having blood on his hands proves that Mary is innocent is ridiculous.

I will now show how the ungrammatical examples in (66) are a natural consequence of other factors in the grammar, and not of a special condition on subject replacement. In the discussion of passive noun phrases in section 2.6 of my dissertation, I introduced the concept of a "doubly filled node" in deep structure, whereby two constituents of the same category can occupy one phrase-structure position, as in (68), provided that only one such constituent is present at the level of surface structure.



For verbs like *prove*, *mean*, *imply*, *be*, *persuade*, *convince*, *show*, etc. as exemplified in (66) my analysis requires that I assume a deep structure (69), which is a special case of (68).²⁰



That fact that subject replacement, (63), is formulated in terms of coreferential indices means that S_i in (69) *may* move to the position of NP_i in a root S. The fact that a doubly filled node is never permitted in surface structure means that S_i *must* so move. This explains the ungrammaticality of the starred examples in (66) and (67).

2.2 Rosenbaum's Verb Phrase Complements.

Rosenbaum noted that some verbs which take object clause complements appear in the passive, as in (70), and that some do not, as in (71).

(70) That the house was old was denied by John.
It was denied by John that the house was old.

To remain silent was preferred by John.
It was preferred by John to remain silent.

(71) *To buy the *Times* would be

tended
started
continued
condescended
hesitated
hastened
failed

 by many of my friends.

*It would be

tended
started
continued
condescended
hesitated
hastened
failed

 by many of my friends to buy the *Times*.

*That he could pass without trying was

guessed
quipped

 by John.

*It was

guessed
quipped

 by John that he could pass without trying.

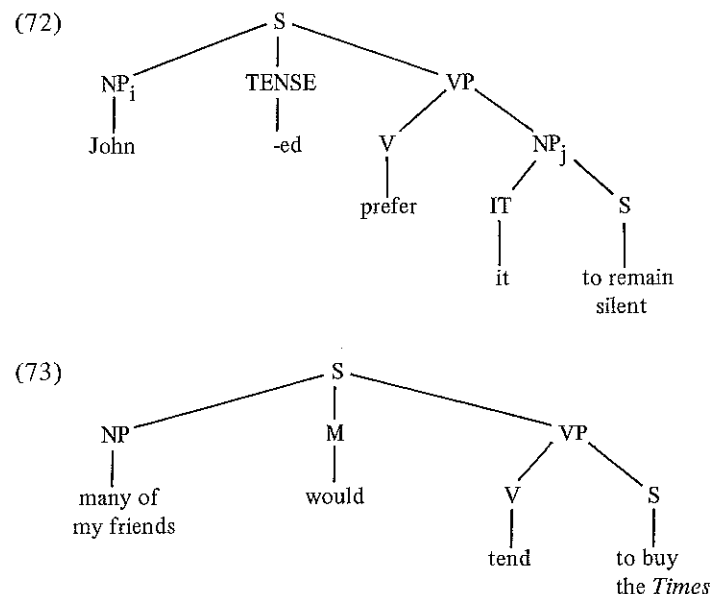
*Sobbing mournfully was

begun
started
kept on
resumed
continued
ceased
stopped

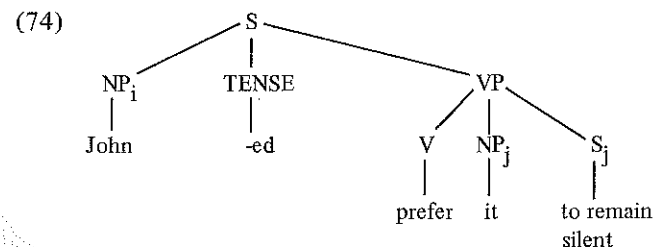
 by John.

*It was $\left\{ \begin{array}{l} \text{begun} \\ \text{started} \\ \text{kept} \\ \text{resumed} \\ \text{continued} \\ \text{ceased} \\ \text{stopped} \end{array} \right\}$ by John sobbing mournfully.

Rosenbaum attributed this difference to the difference between the underlying structures (72) and (73).²¹



In my analysis of complementation, (72) is replaced by (74), as discussed in the preceding section. However, I retain Rosenbaum's structure (73) for the complements of the verbs in (71) without modification. Thus, I attribute the difference between (70) and (71) to the difference between the underlying structures (74) and (73).



In either my analysis or Rosenbaum's, NP preposing cannot apply to (73) because there is no NP following the main verb. This accounts for the examples in (71).

Similarly, *wh*-fronting cannot apply to the nonexistent object NP in (73).²²

(75)

*Whatever he $\left\{ \begin{array}{l} \text{tended} \\ \text{hesitated} \\ \text{condescended} \\ \text{hastened} \\ \text{quipped} \\ \text{kept on} \\ \text{resumed} \\ \text{ceased} \end{array} \right\}$ was usually a failure.

*John wonders what she $\left\{ \begin{array}{l} \text{tended} \\ \text{hesitated} \\ \text{hastened} \\ \text{condescended} \\ \text{quipped} \\ \text{kept on} \\ \text{resumed} \\ \text{ceased} \end{array} \right\}$.

In connection with the impossibility of applying *wh*-fronting to a (nonexistent) object NP in structures like (73), it is appropriate to comment on Rosenbaum's conclusions about the nonappearance of the verbs in (71) in the left-hand-side sentences of the pseudo-cleft construction:

(76)

*Under pressure, what I $\left\{ \begin{array}{l} \text{tend} \\ \text{start} \\ \text{continue} \\ \text{condescend} \\ \text{hesitate} \\ \text{hasten} \\ \text{fail} \end{array} \right\}$ (to) is to visit my psychiatrist.

*What John $\left\{ \begin{array}{l} \text{guessed} \\ \text{quipped} \end{array} \right\}$ was that he could pass without trying.

*What she $\left\{ \begin{array}{l} \text{began} \\ \text{started} \\ \text{kept} \\ \text{continued} \\ \text{resumed} \\ \text{ceased} \\ \text{stopped} \end{array} \right\}$ was sobbing mournfully.

It seems to me that Rosenbaum applied a faulty argument to data like (76) and yet came to the right conclusion. Rosenbaum assumed that the ungrammaticality of the examples in (76) was due to the fact that only NP's could appear to the right of the main copula in the pseudo-cleft construction (i.e., in "focus" position). But this assumption obliterates the well-motivated distinctions among the phrase nodes NP, AP, PP, VP, and S. In particular, the fact that just NP's and PP's appear in focus position in the *cleft* construction (discussed in section 1) could not be stated if this assumption were accepted.

The examples of (77) show that the opposite of Rosenbaum's assumption holds: any of the five major phrase nodes can appear in focus position in the pseudo-cleft construction:

- (77) What I dislike is custard pie. (NP)
 What we counted on was getting a tax break. (NP)
 What John is is very brave. (AP)
 What Bill seems is quite dishonest. (AP)
 What upsets me is for her to be late. (S)
 What you don't realize is that John is cheating. (S)
 What you should do is blow up some buildings. (VP)
 What John is doing is kicking me in the shins. (VP)
 Where he rolled was down the hill. (PP)

The limitations on what can appear in focus position in the pseudo-cleft constructions are due to limitations on what *wh*-words can occur in the "headless relative" S on the left side of the copula. In the most restricted dialect, only *what* can so appear (meaning that the last example in (77) is ungrammatical). In my dialect, *what*, *where*, and *when* can so appear; in still another, I understand that any *wh*-word can so appear, as in (78).

- (78) ?How I came was by boat.
 ?Why John left was because he had a cold.
 ?Who Mary likes is John.

In spite of this misleading assumption about the nature of the focus constituent in pseudo-cleft construction, the structure assigned by Rosenbaum to the verbs appearing in (76) can account for the

ungrammaticality in (76) adequately. According to him, a typical verb in (76) appears in the following basic structure:

(79) [_S NP (VP V S)]

Now suppose the pseudo-cleft construction is formed by deleting the second X-Y (under identity with the first X-Y) in (80), where C stands for the focus constituent.

(80) [_S X - W - Y] - TENSE - be - [_S X - C - Y]

It is clear that W must be able to dominate *wh* if a pseudo-cleft is to be formed from (80). But suppose that the sentence X-C-Y is *I condescended to visit my psychiatrist*, and the pseudo-cleft sentence to be formed has as focus constituent the VP *to visit my psychiatrist*. (I differ from Rosenbaum in that it is perfectly permissible in my analysis for a VP to be the focus constituent in a pseudo-cleft construction.) This means that in (80), X = *I condescended* and Y = \emptyset . But W cannot be an NP dominating only *what*, since *condescend* only appears in the configuration (79); thus, **What I condescended was to visit my psychiatrist* is impossible. On the other hand, W may be the VP "to do *wh*-something," so as to yield *What I condescended to do was to visit my psychiatrist*.

A similar argument can be constructed if one assumes the pseudo-cleft is formed by moving a constituent out of a "headless relative" S subject into focus position, leaving behind a *wh* in an appropriate position. Whatever the analysis of the pseudo-cleft one adopts, the basic point about verbs whose S complements are not antecedents to a subject or object *it* (i.e., the verbs under consideration in this section) is that the lack of an object NP makes it impossible for *wh*-fronting to apply to produce the pseudo-cleft sentences of (76). These sentences are *not* excluded because of any limitation on the type of phrase nodes that may appear in focus position in the pseudo-cleft construction.

There remains one further improvement I believe can be made on Rosenbaum's analysis of complementation in terms of the concepts developed in this paper. Suppose we call the sentence and infinitive complements which are antecedents to a deep-structure *it* "antecedent complements" (these correspond to Rosenbaum's "noun phrase complements") and those which are not, "oblique complements" (these correspond to Rosenbaum's verb phrase complements). An interesting question is whether the S complements italicized in (81) are antecedent complements or oblique complements.

- (81) It seems to John *that we ought to leave*.
 It happens *that I am out of money*.
 It appeared to him *that the train had left*.

If these complements are antecedent to the subject *it*, as seems apparent on first glance, then we would expect that subject replacement could operate, as in (82), but it cannot.

- (82) *That we ought to leave seems to me.
 *That I am out of money happens.
 *That the train had left appeared to him.

We can account for this by assuming that in fact the verbs *seem*, *appear*, and *happen* (in one of its senses) do not take subjects, i.e. that the subject NP's of these verbs is empty in deep structure and that their S complements are oblique complements. (By contrast, the subject NP of predicates like *show*, *irritate*, *be necessary*, *be a lie*, etc. is a deep-structure *it* if they have a subject complement clause.) Since the subject replacement rule is formulated in terms of coreferential indices, it will not operate if a subject NP is empty.

The source of the *it* surface subject for *seem*, *appear*, and *happen* in (81) is then the same rule that provides the dummy subject to verbs like *rain*, *snow*, etc., in the cleft construction, and in *it's me*, *it's the Beatles*, etc.

Confirmation of the claim that the subject of *seem*, *appear*, and *happen* is empty in deep structure is given by the fact that, for the senses of these verbs in question, this subject cannot be questioned as shown in (83). This is behavior which is typical of nonreferring (dummy) subjects.

- (83) *What seems to John?
 *What happens?
 *What appeared to him?
 *What is raining?
 *What is John that he is talking to?
 *What was to the boy that I was speaking?
 *What's you?
 *What is the Beatles?
 Cf. Is it the Beatles?
 Who is it?
 *What seemed to John was that the food was stale.
 *What happens is that I don't have any money.
 *What appeared to him was that the train had left.

The predicates *seem* and *appear* should not be confused with the predicates *seem*-AP and *appear*-AP. The latter construction is derived from the former by means of the subject raising rule discussed in Rosenbaum (1967) and in section 2.4 of my dissertation, according to the following sequence of steps (Tense omitted):

- (84) Deep-structure string: empty NP - seem - that it_i be A that S_i .

Subject raising: it_i - seem - be A that S_i
be-deletion: it_i - seem - A that S_i .

According to this analysis, the derived predicates *seem*-(to be)-AP and *appear*-(to be)-AP have antecedent, not oblique, complements. That is, the complement S's at the end of the VP are coreferential in the derived predicates with the subject *it*. This is confirmed by the fact that such subjects can be questioned and removed by subject replacement:

- (85) What seems to you to be strange?
 What appeared interesting?
 What seems strange is that John has left.
 What appears to be obvious is that Mary is guilty.
 That John has already left seems strange.
 That we buy these books appears to be necessary.
 For us to understand this would seem to me to be important.
 To finish the assignment appeared useless at the time.

In summary, my antecedent complements correspond exactly to Rosenbaum's sentence and infinitive (not gerund) noun phrase complements. The only exception to this is that I analyze the sentence complements to *seem*, *appear*, and *happen* (in one of its senses) as oblique (i.e., "verb phrase") complements.

CONCLUSION

The main result of this paper is the conclusion that sentences introduced by *that* and infinitives are never noun phrases, but are always S (and perhaps VP) complements generated by the phrase structure rules at the end of VP's, AP's, and NP's. A phrase-structure rule NP - VP gives rise to gerunds, and not to *that* or *for-to* complements. The most important factor in the arguments for this position has been the realization that the inverse of Rosenbaum's extraposition rule has all the properties of a root transformation. Replacing extraposition with its inverse, "subject replacement," eliminates several irregularities and deficiencies in Rosenbaum's analysis of complementation. A secondary result of the paper is therefore the addition of subject replacement to the list of fronting root transformations compiled in chapter 1 of my dissertation, and given here again in section 1.5.

NOTES

Research on material in this paper was made possible by a fellowship at the Center for Advanced Study at the University of Illinois. I am indebted to Noam Chomsky, Morris Halle, and Michael Brame for careful readings, criticisms, and discussions of preliminary versions of this material.

¹See also the discussion of the "A over A principle" in Chomsky (1968).

²The universal principle involved may be more general, but it reduces down to the constraint proposed here for English as a special case.

³See chapters 2 and 4 of my dissertation (Emonds 1969).

⁴The arguments concerning *there*-insertion are straightforward; the claim is made and supported that this rule moves a deep-structure subject to the predicate nominative position. This in turn provides an argument that, say, the italicized construction in "There may be some children *playing in the garden*." is a constituent, a claim often advanced on other grounds.

⁵This does not mean that they cannot be part of an NP, as in *the fact that John came, the decision to leave town*, etc. I am not treating here embedded sentences introduced by *wh*-constituents rather than *that* (in particular, indirect questions). They are discussed in section 4.4 of my dissertation (Emonds 1969), where I point out that they share certain distributional characteristics of NP's that *that* clauses do not exhibit.

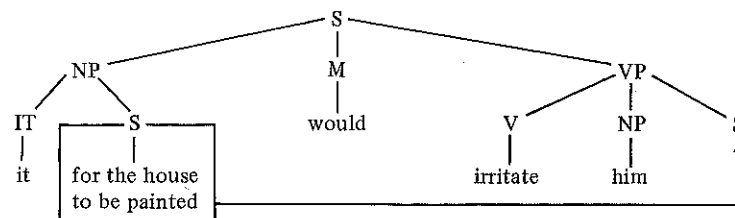
⁶Gerunds should be distinguished from participles, which will not be discussed here. Gerunds substitute for an NP, whereas participles modify NP's. Another difference is that participles never have an expressed subject apart from the NP they modify, whereas gerunds sometimes do have an expressed subject.

⁷Rosenbaum's extraposition rule, as he formulated it, need not be a counterexample to the structure-preserving constraint. If we assume his analysis of sentence and infinitive complements is correct, it is easy to see how the extraposition rule is structure-preserving.

Extraposition derives, for example, the second sentence of the following pair from the first:

For the house to be painted would irritate him.
It would irritate him for the house to be painted.

Since Rosenbaum's VP expansion rule generates an optional S in final position, extraposition (from subject position, in this case) has the following structure-preserving effect:



In fact, given the assumption that Rosenbaum's analysis is correct, confirmation that extraposition *must* be structure-preserving is given by the fact that if the S under VP is nonempty, a subject S may not be extraposed:

That John has blood on his hands proves (that) Mary is innocent.

*It proves (that) Mary is innocent that John has blood on his hands.

To see this movie is to relive the past.

*It is to relive the past to see this movie.

That John is late persuades me that the train is delayed.

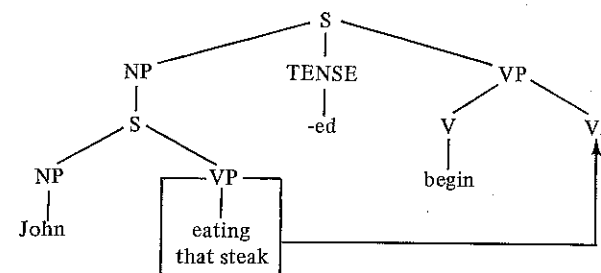
*It persuades me that the train was delayed that John is late.

Thus, Rosenbaum's analysis *supports* the structure-preserving constraint. On the other hand, the structure-preserving constraint leads to a reformulation of Rosenbaum's work which, as will be seen in the text, also accounts for the above sentences.

It should be remarked that I am assuming an S expansion rule $S \rightarrow \text{Comp} + \text{NP} + \text{TENSE} + (\text{M}) + \text{VP}$, where Comp is *that, than, as* or *for* and where Tense is *-s* (Present) or *-ed* (Past).

⁸If infinitives are ever generated directly in the base, instead of being derived from sentences, it may be that S in (18) and (19) should be replaced by $\left\{ \begin{array}{l} \text{VP} \\ \text{S} \end{array} \right\}$. I take no stand on this question here.

⁹The complements to verbs of temporal aspect (*begin, finish, continue, resume*, etc.) introduced by *V-ing* which were discussed above are irregular exactly in that they are exceptions to the correspondence between clauses which are NP's and clauses whose first verb is marked with an *-ing* suffix. One possible way to explain this irregularity would be to assume the analysis, often advanced on other grounds (cf. Newmeyer, forthcoming), that the VP complements to verbs of temporal aspect originate in the subject NP, and are postposed by a (structure-preserving) rule in the following way:



We could account for the presence of *-ing* rather than *to* in (11) by inserting *-ing* in gerunds before this postposing applies. However, this would mean either that *John began eating that steak* and *John began to eat that steak* have different deep structures or that *ing*-insertion is optionally ordered (with some verbs) before or after this postposing.

¹⁰This sentence is grammatical but cannot receive the interpretation required here, i.e., *Joe* understood as the subject of *eat out*.

¹¹That is, in Rosenbaum's framework extraposition from object position is always obligatory. Also, for a thorough justification of treating post-verbal particles as (intransitive) PP's see Emonds (1972).

¹²In the second example of (30), X = *John was doing*, Y = *to Bill*, and C = *kicking him in the shins*.

¹³When gerunds are not acceptable subjects in nonroot S's, they are not acceptable as subjects of root S's either: **John's going downtown was false*, etc.

¹⁴Michael Brame has pointed out to me the possibility that the condition that no two preposing root transformations may apply in the same S may be a principle of universal grammar, and hence not a formal problem in the grammar of English.

¹⁵The few exceptions to this, such as *it's fun talking to foreigners*, belong with the non-NP *ing*-complements to verbs of temporal aspect discussed earlier.

¹⁶I am treating adverbs like *before*, *inside*, *now*, *here*, etc. as intransitive prepositions, and subordinating conjunctions like *because*, *before*, *now that*, and *while* as prepositions with S rather than NP complements. This topic is discussed in detail in section 4.3 of my dissertation (Emonds 1969).

¹⁷One further point merits discussion here. As should be clear, I assume the deep-structure strings for the sentences of (48) to be the following:

It would cause embarrassment for John to arrive.
It shows the necessity of discipline that the children are always late.
It didn't help the situation that you spoke out of turn.
It would anger the bankers to suggest devaluation.
It was amusing John that the boys were dancing together.

Suppose now we form the passive construction *without* applying subject replacement:

*Embarrassment would be caused by it for John to arrive.
*The necessity of discipline is shown by it that the children are always late.
*The situation wasn't helped by it that you spoke out of turn.
*The bankers would be angered by it to suggest devaluation.
*John was being amused by it that the boys were dancing together

I must be able to explain this unexpected ungrammaticality in order to preserve the integrity of my analysis.

In section 2.1 of my dissertation (Emonds 1969), I argue that the passive *by*-phrase is present in deep structure, being distinguished from other deep-structure PP's only by the fact that its object NP is empty. If such a PP is not so present, agent postposing cannot apply, since this rule is structure-preserving.

Now there is a general prohibition against a great many (but not all) combinations of PP's and complement S's. I attribute the ungrammaticality of the above examples to the same prohibition.

*I agree with it that John walked out.
*We talked about it that the weather was warm.
*John spoke against it for Bill to receive the prize.
*We took a vote on it that John had a right to speak.
Cf. John saw to it that we had reservations.

If one objects that the above underlying strings are permitted, but are simply changed into gerunds transformationally (see examples following), the same reasoning can be applied to the combination *by* + NP + S. In either case, the *by*-phrase has the same status as a number of other PP's.

I agree with John's walking out.
John spoke against Bill's receiving the prize.
We talked about the weather's being warm.
We took a vote on John's having the right to speak.

Embarrassment would be caused by John's arriving.
The necessity of discipline is shown by the children's always being late.
The situation wasn't helped by your speaking out of turn.
The bankers would be angered by suggesting devaluation.
John was being amused by the boys' dancing together.

¹⁸Assuming, as I will throughout this section, that infinitives are reduced S's.

¹⁹An oblique S complement is one which is not coreferential with a subject or object *it*; such complements will be discussed in the next section. They correspond roughly to Rosenbaum's "verb phrase complements."

I am assuming that each verb V has a lexical semantic meaning M(V) which contains some combination of the symbols X ("subject position"), Y ("object position"), and Z ("oblique position"). Thus, M(V) ... X ... Y ... Z ... for a verb with three complements. The definitions of grammatical relations in terms of deep-structure trees specify the constituents whose meanings are to be placed in the X, Y, and Z positions of M(V) so as to obtain (at least part of) the meaning M(S) of the sentence of which V is the main verb.

²⁰The "positions" of the two embedded S's in (69) are assigned arbitrarily.

²¹In this section, I omit writing out deep-structure NP's deleted by equi-NP deletion.

²²There are, however, some verbs which appear in the structure (73) which alternatively take object NP's, such as *start*. These do of course appear in sentences with *wh*-fronted object NP's.

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Chapter 3

SOME EMPIRICAL ISSUES IN THE
THEORY OF TRANSFORMATIONAL GRAMMAR

Noam Chomsky

1.0

The most recent attempt to give a general synthetic view of the theory of transformational grammar was in the mid-sixties, in such books as Katz and Postal (1964) and Chomsky (1965), which summarized and extended much work of the early sixties. Since then, there has been a great proliferation of papers and dissertations, and a flood of underground literature that has kept the mimeograph machines humming. In this work, many new and original ideas have been developed and a great variety of phenomena have been studied, often with quite penetrating analyses. There is an appearance of a considerable diversity of points of view—and to some extent, the appearance is correct. However, I think that the dust is beginning to settle, and that it is now perhaps possible to identify a number of real, empirically significant theoretical questions that have been raised, if not settled, in this work. I also think much of the apparent controversy is notational and terminological—including many issues that appear to be