



On Coreferential Complement Subject Deletion

Author(s): Paul M. Postal

Source: *Linguistic Inquiry*, Vol. 1, No. 4 (Oct., 1970), pp. 439-500

Published by: [The MIT Press](#)

Stable URL: <http://www.jstor.org/stable/4177588>

Accessed: 22/04/2013 13:43

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at
<http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



The MIT Press is collaborating with JSTOR to digitize, preserve and extend access to *Linguistic Inquiry*.

<http://www.jstor.org>

On Coreferential Complement Subject Deletion

I. Brief Comments on Coreference

The present paper¹ is a highly fragmentary investigation of one grammatical manifestation of the fundamental linguistic property of *coreference* (identity of reference). This manifestation is the deletion of certain complement sentence subject nominals (NP). I assume familiarity with the general transformational approach to grammatical investigation and the paper will be most comprehensible to those who are cognizant of a number of recent works which impinge in one way or another on the domain under discussion here.²

Even restricting discussion to English, the phenomenon of coreference in human language is so vast, complicated, and obscure as to easily require several huge volumes even for an introduction to its mysteries. Any attempt to deal with it, even in part, in a relatively short paper of this sort is thus a poor insurance risk from the start. Moreover, coreference is a rather vague and unclear term. Nonetheless, let us emphasize that no definition will be offered. The linguistic study of coreference does not depend on an *a priori* understanding of reference. It depends rather on the ability to recognize clear instances of the manifestation and nonmanifestation of coreference in the sentences of some human language. This condition is met.

We are, I think, safe in distinguishing at first three different types of coreference manifestation in the sentences of human languages. I shall refer to these as:

- (1) *Presupposed*
- Asserted*³/*Assertive*
- Inferred*

This three-way distinction is illustrated respectively by the sentences:

- (2) a. *Harry analyzed himself.*
- b. *The one who analyzed Harry was Jack.*

¹ I am indebted to W. Plath for many helpful criticisms of the manuscript. This paper was written in October 1968.

² Cf. Chomsky (1965), Kiparsky and Kiparsky (1968), Lakoff (1965 to appear), Langacker (1969), Lees and Klma (1963), McCawley (1968), Perlmutter (1968), Postal (1968), Rosenbaum (1965, 1967), Ross (1967a, 1967b).

³ The terminological contrast *Presupposed-Asserted* is introduced in Lakoff (to appear), who discussed its relation to a significant class of grammatical facts.

- c. *The boy looked at his male parent's only son.*

In each of these examples it can rightly be claimed that the italicized NP are coreferents. However, there are, I claim, fundamental differences. The user of (2a)⁴ presupposes that the NP are coreferents and asserts a certain kind of relation between the tokens. In more logical terms, he asserts a proposition of the form:

- (3) (The *x* such that *x* named Harry analyzed *x*.)

In (2b) the user asserts an identity of reference between the NP, which are not presupposed to be coreferential. Logically, the statement has a form more like:

- (4) (The *x* such that *x* analyzed the *y* such that *y* named Harry is identical to the *z* such that *z* named Jack.)

An obvious contrast between Presupposed coreference and Assertive coreference is that the former involves *only one (possibly complex) description* of the entity putatively referred to, while the latter involves two. Hence the entity about which (2a) communicates is described only as having the name Harry. The entity in (2b) is described twice, once as being the individual who analyzed Harry, again as being an individual named Jack. Hence Assertive coreference really amounts to the statement that two different descriptions correspond to the same entity. A second difference correlated with this is that Presupposed coreference seems to involve special grammatical mechanisms for NP, namely, pronominalization, manifested in (2a) by the occurrence of the reflexive pronoun *himself*. In other words, Presupposed coreference involves processes which partially determine the grammatical form of NP themselves. Assertive coreference does not. The NP in (2b) are not marked in any way which indicates that they are coreferential. Compare:

- (5) *The one who analyzed Harry saw Jack.*

The italicized NP in (5) do not differ formally from those in (2b), yet no coreference is manifested in (5).

We have spoken so far of Presupposed and Assertive coreference. Each of these is a fundamental and basic feature of language, constantly used.⁵ Inferred coreference,

⁴ Notice that (2a) must be read with normal stress, that is, without contrastive stress on either of its two NP (cf. footnote 5).

⁵ Assertive coreference is much more ubiquitous than might be realized since it is in fact involved in most cases of contrastive stress. That is, in contrast to example (2a), the sentence:

(i) Hárry analyzed himself.

is an equivalent of:

(ii) The one who analyzed himself was Hárry.

which obviously involves Assertive coreference. I believe that contrastively stressed NP like that in (i) can be shown to be syntactically derived from structures like those in (ii) (cf. Postal 1968, chapter 19 for a (very) partial justification).

on the other hand, is much more restricted. Rather than a primary feature of language as such, it seems to be more an accidental consequence of other properties of language. It is typical of certain literary styles, certain jocular commentary, puns, jokes, etc., but is not one of the basic mechanisms by which language operates. Inferred coreference is simply a function of the logical possibility that distinct characterizations of an entity may coincide. And here there are two different types of coincidence. On the one hand, the coincidence of the descriptions may be a logical consequence of their meanings, as in (2c). On the other, the coincidence may be a consequence of nonlinguistic factual information, as in:

- (6) Dean Rusk looked at the Secretary of State in the looking glass.

when uttered between February 1960–February 1969.

I said earlier that no attempt would be made to characterize the notion of reference. I shall deviate from this in one regard. It is important to emphasize that whatever reference means in linguistic terms, it is not a concept which is definable in terms of relations between linguistic forms, or even their abstract structures, and the real world. This point is especially important for those who are familiar with philosophic writings on reference. In such literature, it would, for example, be common to say for instance that the italicized NP in the sentence:

- (7) *The unicorn* was trying to sit on *the square circle*.

have the same reference, since the reference of each is null, there being no unicorns or square circles in the world. While this sense of reference is relatively clear in many cases, and no doubt quite necessary for certain purposes, it does not correspond to the equally real property studied by linguists under the heading of coreference. The latter property is revealed by the English speaker's ability to distinguish such sentences as:

- (8) a. *The unicorn* was trying to scratch *the flying purple elephant*.
 b. *The unicorn* was trying to scratch *himself*.

There are in the world neither unicorns nor flying purple elephants. Yet one who knows English recognizes that the italicized NP in (8a) are not Presupposed co-referents, but that those in (8b) are. That is, he recognizes that a user of (8a) is talking about two distinct entities, which he claims are linked by relations of "trying to scratch", whereas the user of (8b) indicates that these relations are manifested reflexively, and only one entity is involved. In short, coreference as a linguistic property keeps track not of real world entity identities, but of identities according to speakers.⁶

⁶ Actually, this is inadequate. A more valid statement is that what is kept track of is entities according to speakers and according to entities mentioned by speakers, mentioned by entities mentioned by speakers, etc. For instance, one possible contrast between:

- (i) The new President thinks he is a Republican.
 (ii) The new President thinks the new President is a Republican.

is this. Sentence (i) is about an entity x who thinks x is a Republican, that is, who might think "I am a Republican". Sentence (ii) is about an entity x , who the speaker of (ii) claims has the property "the new President",

The linguistic property of coreference and the distinct property of correlation between linguistic form and actual real world entity are thus very different. Another way to say this is that coreference as a property of sentences is independent of existence.

Thus the philosopher is wont to say that in a sentence like:

- (9) *The present King of France* is shaving *himself*.

uttered now, the first NP does not refer, there being no present King of France. The linguist is wont to say that the italicized NP in (9) are coreferent, regardless of when (9) is uttered. What has to be understood is that these differing remarks are *not* inconsistent. Furthermore, they are in this case both correct. It is just the usage of the form *refer* which is not constant. No confusion need result.

Having briefly, and in fact inadequately, distinguished three modes of coreference, we can now turn to the central topic of discussion. Since this topic in fact concerns only Presupposed coreference, we shall have no further occasion to speak of any of the other types. Consequently, for convenience, in all further sections we shall speak only of coreference, meaning by this in all cases Presupposed coreference.

One final comment. We take no position here on how Presupposed coreference is to be represented formally in a grammar, a complicated and highly interesting question with many ramifications and important implications. However, some means is needed to represent this property in our examples. Consequently, we shall use the device of identical letter subscripts. Hence the italicized NP in:

- (10) a. *Harry_i* shaved *himself_i*.
 b. *Margery_j*, thinks *she_j*, is a witch.
 c. *The gorilla_i* tried to eat *the gorilla_i*'s tail.

are indications of structures which are Presupposed coreferents.

II. Introduction to Coreferential Complement Subject Deletion

A. Remarks

It has been assumed since the beginning of work on the transformational description of English that sentences like:

- (1) a. Harry wants ____ to marry a millionaire.
 b. Harry expects ____ to win the election.
 c. Harriet was unable ____ to keep quiet.
 d. Lucille is anxious ____ to become immortal.

but who believes (falsely according to the speaker of (ii)) that there is an entity *y* distinct from *x* such that *y* has the property "the new President". That is, (i) might have been used to describe Harry Truman on election night 1948 if he had begun to suffer delusions as to his party affiliation. (ii) might have been used to describe him on the same night at that point when the outcome of the election has been wrongly determined.

- e. ____ Finding out he had no liver didn't worry Flavnikoff.
- f. ____ Persuading Abe ____ to live in a cave was not easy for me.

involve some rule or rules to delete complement subject NP, that is, those NP which would otherwise have occurred in the Surface Structures at the points underlined in (1). It was argued by Rosenbaum (1965, 1967) that this process of deletion should be considered a single uniform rule. In the last few years, such a rule has generally been referred to as EQUI-NP DELETION (henceforth: EQUI), and implicitly or explicitly it has been assumed that this rule has properties which include the following:

- (2) a. EQUI operates either *forwards* (as in (1a-d)), or *backwards* (as in (1e, f));
- b. EQUI operates on NP if they are *coreferential*⁷ to some other NP in a "higher" sentence, in fact, the immediately "higher" one;
- c. The NP which determines the deletion of the complement subject (henceforth: *the controller* (NP)) must stand in a particular structural configuration with respect to the NP whose deletion it determines;
- d. The operation takes place to delete a particular complement subject NP_a before NP_a has undergone the rule, process, or whatever it is, of coreferential pronominalization;
- e. EQUI is cyclical.

I have never believed in the existence of a rule like that just described and would like to argue in this discussion that no rule with the properties of (2a-e) exists. This is not to say, however, that an adequate alternative account of the deletion processes in sentences like those of (1) (whose existence as such is not questioned but on the contrary insisted upon (cf. Section II.B)) can be offered. But I believe that certain necessary features of such an account emerge, and that these are in part incompatible with the full characterization of (2a-e). In the course of arguing against the version of EQUI described by (2), we shall be led to a principle hypothesized as governing all cases of nominal deletion controlled by coreference, a principle involving the conclusion that the process of pronominalization plays a fundamental and heretofore neglected role in processes of nominal deletion under coreference conditions.

B. Arguments that EQUI Exists

Given such sentences as:

- (1) a. Joan wants ____ to get married.
- b. The committee expects ____ to be respected.
- c. Few criminals like ____ being caught.

⁷ Instances of noncoreferential complement subject deletion are provided by:

- (i) Harry disapproves of gambling.
- (ii) Harry advocated invading every country in South America.

In these, the subject of *gambling* and *invading* is not perceived as *Harry*.

the claim that their derivation involves application of EQUI involves the assumption that such sentences have a more abstract structure in which the infinitival or gerundive complement has full sentential form. That is, such sentences can be represented more abstractly:

(2) NP Verb Sentence

Early transformational arguments for this conclusion, rather radical within the general context of linguistic description, would have been something like the following. In considering sentences like (1a) it is observed that there is a restriction between the subject of the main clause verb and the verbal forms occurring in the infinitive:

- (3) a. *Joan wants to elapse.
- b. *Joan wants to occur nightly.
- c. *Joan wants to disperse.
- d. *Joan wants to be proved.
- e. *Joan wants to fit well.

It is a fact, however, that these restrictions correspond exactly to restrictions occurring in sentences where the subject of the relevant verbal form is the same as the subject of *wants*. That is, the contrast between (1a) and (3) corresponds exactly to the contrast between:

- (4) a. Joan got married.
- b. *Joan elapsed.
- c. *Joan occurs nightly.
- d. *Joan dispersed.
- e. *Joan was proved.
- f. *Joan fits well.

Observe in particular such correlations as:

- (5) a. the crowd dispersed.
- b. the crowd wants to disperse.
- (6) a. *your father dispersed.
- b. *your father wants to disperse.

These facts will all follow automatically if sentences like (1a) have a more abstract structure like:

- (7) $\text{Joan}_i \text{ wants } \text{Joan}_i \text{ get married.}$

with the derivation proceeding by deletion of the complement subject under EQUI. The absence of wellformed examples like (3b) thus follows from the constraint in examples like:

- (8) **Joan_i* wants *Joan_i* occur nightly.

which must be stated independently for simple sentences like those in (4).

Supporting this argument is the fact that in general verbs like *want* actually occur in Surface Structures with complements that have essentially full sentential form, i.e. which contain subjects:

- (9) a. Joan wants Barbara to get married.
 b. Joan wants Lucille to visit Betty.

This means that independently of sentences with subjectless complements like (1), the rules of sentence formation must generate complements of full sentential form. In other words, the derivation of structures of the form (2), which is required by the assumption of the existence of EQUI, is not an ad hoc addition to the grammar but, on the contrary, is necessarily part of the grammar on independent grounds.

Moreover, there is an interesting set of gaps in the class of sentences like (9) where verbs like *want* take complements with subjects; namely,

- (10) a. **Joan_i* wants *Joan_i* to get married.
 b. **The man_i* wants *the man_i* to get married.
 c. **We* want *us* to get married.
 d. **You* want *you* to get married.

And this in spite of the fact that all of the NP occurring as complement subjects in (10) can occur in wellformed complement sentences:

- (11) a. Joan wants the man to get married.
 b. The man wants Joan to get married.
 c. We want you to get married.
 d. You want us to get married.

This shows that the rules of complement formation must permit all such NP to occur as complement subjects and must consequently block sentences like (10) in terms of restrictions between main clause and complement subjects. The point about sentences like (10) is, obviously, that the subject of the complement cannot be "identical to" the subject of the main clause verb where "identical to" means coreferential. Hence sentences like (10a, b) are illformed, or, at best, only interpretable in such a way that the italicized NP designate distinct beings. On the other hand, sentences like (10c, d) are clearly illformed, just because the reference of the pronominal forms is relatively fixed.

Consequently, if sentences like (1a) are derived from structures like (10a), the gaps in full sentence complements like (9) are explained, since structures like (10) are converted by EQUI into those like:

- (12) a. Joan wants to get married.
 b. The man wants to get married.

- c. We want to get married.
- d. You want to get married.

The idea that sentences with subjectless complements are derived by a deletion rule operating on NP somehow marked as being coreferential to main clause NP is thus most strongly supported. Such an analysis immediately explains the gaps in the set of complements with subjects. That is, it shows that these gaps, which involve coreference to an NP in a higher sentence, are exactly filled by the set of subjectless complements.

This analysis receives further additional support from examples like:

- (13) a. *Joan* wants *her* to get married.
- b. *The men* want *them* to leave early.

Here the italicized NP cannot be understood as designating the same entities. That is, they cannot be coreferents. This special constraint need not be stated in the grammar at all, however, if the rule EQUI exists. For under this approach, in just those cases where the subjects are coreferents, the complement subject is erased. Consequently, sentences like (13) cannot be derived from abstract complement subjects coreferential to the main clause subjects. Compare in particular the sentences:

- (14) a. *Harry* expects that *he* will go.
- b. *Harry* expects *him* to go.

In (14a) the italicized NP can be understood as coreferents; in (14b) they cannot. This correlates exactly with the existence of

- (15) Harry expects to go.

and the nonexistence of:

- (16) *Harry expects (that) will go.

In short, subject deletion under coreference explains the inability of the appropriate pronoun in complement subject position to manifest coreference to the main clause subject.

A final argument in favor of the existence of a complement subject deletion rule involves phenomena such as reflexivization. We find sentences like:

- (17) a. Bill's shaving himself annoyed me.
- b. *Shaving himself annoyed me.
- c. Shaving myself annoyed me.

That is, there is an apparent restriction between the reflexive form which can occur in the complement and the NP in the main clause. However, under the assumption that there is deletion of a complement subject in just the case where this is a coreferent of

the NP in the main clause, this restriction disappears. It is an automatic consequence of facts like:

- (18) a. *My shaving himself (annoyed me).
- b. My shaving myself (annoyed me).

That is, the apparent restriction becomes a consequence of the agreement between reflexive form and antecedent in simple clauses.

Moreover, notice that if there is no deleted subject in sentences like (17c), the grammar requires a whole special rule to introduce reflexives in such complement clauses. That is, typically reflexives are simply the manifestation of coreferents within the same clause. (17c) falls under this generalization if it is taken to have a deleted complement subject. Without this, we need an ad hoc rule which allows reflexives in just exactly those clauses which are subjectless and then, as (17b) shows, only under special ad hoc agreement conditions. All of these facts show that the deleted subject analysis is a necessity.

The argument just given is even stronger than it appears because there are other forms, reflexive and not, which manifest properties essentially identical to those of simple reflexive forms. One of these is *own*. Typically, this can occur in an NP just in case that NP has a coreferent in the same clause:

- (19) a. I saved my own father.
- b. *Harry saved my own father.
- c. Harry saved his own father.
- d. *I saved Harry's own father.

However, *own* can occur in subjectless complement clauses:

- (20) a. Bill's insulting his own father annoyed me.
- b. *Insulting his own father annoyed me.
- c. Insulting my own father annoyed me.

Again, exactly as in the simple reflexive case, special ad hoc rules of *own* introduction will be required if these complements do not have subjects, and these will have to meet special agreement conditions, as shown by (20b).

An exactly parallel argument derives from reciprocals:

- (21) a. Their insulting each other annoyed me.
- b. *Insulting each other annoyed me.
- c. Insulting each other annoyed them.

Here special ad hoc rules of reciprocal introduction will be required.

Finally, a parallel argument derives from “picture noun” reflexives, which do not follow the same constraints as ordinary reflexives:

- (22) a. Their drawing pictures of themselves annoyed me.

- b. *Drawing pictures of themselves annoyed me.
- c. Drawing pictures of themselves annoyed them.

It is clear, then, that there is a complement subject deletion rule in English. This conclusion is, however, only the beginning of the problem of describing such a deletion rule. There remain a host of questions involved with how the rule should be stated, what kind of structures it operates on, what point the rule applies, what traffic rules govern its application, etc. A(2) above can, of course, be regarded as a partial answer to these questions. But some of this answer cannot, I wish to claim, be accepted.

III. The Argument that EQUI is Cyclical

In rejecting the existence of a rule characterized by all of II.A(2a–e), I do not wish to imply any real dispute with all of the proposed properties. II.A(2a–c) seem essentially sound, although the possibility that forwards and backwards deletion operations are to be effected by distinct rules cannot yet be discounted fully. Further, it remains quite unclear formally how to represent in a grammar the kind of coreference underlying the deletion operations. And finally, it is far from clear how the structural configuration mentioned in II.A(2c) should be specified precisely. The attempt of Rosenbaum (1965, 1967b) to do so in terms of a principle of “minimal distance” between NP nodes can be shown to be inadequate. I will return to this question very briefly in Section V.D after prolonged discussion of II.A(2d, e), which seem most inadequate. Let us take them in reverse order, beginning with the claim that the deletion must be carried out cyclically.

First, let us briefly describe what is meant by cyclical application of a set of rules. Given a set of partially ordered transformational rules, the claim that they apply cyclically is this. Application begins with the earliest rule in the ordering applied to the most deeply embedded sentence in a structure.⁸ The rules are then successively applied. When the last cyclical rule has been applied, one returns to the first rule and applies it to the structure defined by the next most deeply embedded sentence, etc. Consequently, the cycle is complete when the last cyclical rule has been applied to the most inclusive sentence, that is, to the one which is not embedded at all. The cyclical principle thus involves “bottom-to-top” application.

The argument for the cyclical character of EQUI is due essentially to G. Lakoff. It is based on the fact represented earlier as II.A(2c). In a sentence such as:

- (1) Johnny wants to get a Good Humor.

we understand the subject of *to get* as a coreferent of the subject of *wants*. This suggests that the complement subject deletion in this case must be by way of *coreference to the*

⁸ Of course, “most deeply embedded sentence” is a misnomer since there are often *independent* embedding structures, for example, if subject and object NP each have multicomplex relative clauses. The cycle then begins simultaneously with the most deeply embedded S in each such independent structure.

subject of the main clause. In other words, the controller in (1) is *Johnny*. This point is clarified when one considers expressions such as:

- (2) a. Johnny's father wants him to get a Good Humor.
b. Johnny's father wants to get a Good Humor.

In (2a) *him* is *not* interpretable as the main clause subject, but only as *Johnny* (or some distinct male individual); in (2b) one perceives coreference to the main clause subject. This shows that the operation of EQUI in such cases depends not only on:

- (3) a. the complement subject being coreferential with some other NP, NP_a
b. NP_a being in a "higher" sentence

but on the fact that NP_a is the subject of the main clause in which the relevant complement sentence is immediately embedded.

Taking this fact as basic, Lakoff infers the cyclicity of EQUI by way of the following essentially simple but in detail somewhat complex argument. There is, he assumes, a rule, here referred to as RAISING,⁹ which moves the subject NP of a complement sentence into position as the object of the main clause in which it is embedded (as part of the sentential object). This rule is at work in (4b) but not in (4a):

- (4) a. Lucy believes that Harry is a Greek.
b. Lucy believes Harry to be a Greek.

Evidence that the relevant NP in (4b) has in fact become a derived object of *believe* is provided by its subsequent passivizability in the main clause:

- (5) a. *Harry is believed by Lucy (that) is a Greek.
b. Harry is believed by Lucy to be a Greek.

Both the rules RAISING and PASSIVE are rather easily shown to be cyclical, on grounds I will sketch only briefly. First, RAISING only operates on complement subjects. But the elements raised include *derived* subjects, which only become such by way of previous applications of PASSIVE on the complement clause:

- (6) a. Lucy believes that Harry was betrayed by Greta.
b. Lucy believes Harry to have been betrayed by Greta.

However, once such NP have been raised, as in (6b), they may be passivized again with respect to the main clause verb:

- (7) Harry is believed by Lucy to have been betrayed by Greta.

This yields an order of rule *applications* in the derivation:

- (8) PASSIVE
RAISING
PASSIVE

⁹ This term is due to Kiparsky and Kiparsky (1968). The basic idea of a rule with this property is due to Rosenbaum (1967).

And, furthermore, the process is productive or recursive, since, if structures like (7) are embedded as complements of verbs which permit RAISING to apply, NP like *Harry* can be raised again, passivized again, etc. without limit:

- (9) a. Joan expects that Harry will be believed by Lucy to have been betrayed by Greta.
- b. Joan expects Harry to be believed by Lucy to have been betrayed by Greta.
- c. Harry is expected by Joan to be believed by Lucy to have been betrayed by Greta.

Consequently, (8) in fact expands to an unbounded sequence of successive applications of PASSIVE and RAISING. This naturally indicates that the underlying traffic principle for applying these rules is the cyclical one. The inference is strengthened when it is observed that in each case the applications of these two rules meet a special condition. Suppose one numbers sentences in cases of embeddings such that the most deeply embedded is "1", next most "2", etc. Then one finds in cases like those just discussed, where there are multiple applications of RAISING and PASSIVE, that in each case where the application of PASSIVE precedes that of RAISING, PASSIVE applies to sentences S_{i-1} and RAISING to the whole clause defined by S_i . Just so, when the application of RAISING precedes that of PASSIVE, the former applies to sentence S_j and PASSIVE also to S_j . But exactly these properties of derivations follow from having the *rule ordering*:

- (10) RAISING
PASSIVE

if these rules are governed by the principle of cyclical application.

These assumptions will mean that in the case of a structure like:

- (11) [Lucy believe [Greta betrayed Harry] _{$\bar{S}_1 \bar{S}_2$}]

which is an underlying structure of (6b), PASSIVE will apply on the embedded complement sentence cycle (that of S_1) first, since RAISING is not applicable to this clause. On the next cycle, RAISING will apply to S_2 before PASSIVE, yielding as the next step from (11):

- (12) Lucy believes Harry to have been betrayed by Greta.

This is identical to (6b). Only then can PASSIVE apply on the S_2 cycle, yielding (7), if this rule is in fact applied.

The argument for the cyclicity of EQUI then depends on the following empirical assumptions about English:

- (13) a. RAISING and PASSIVE are cyclical;
- b. Operation of EQUI depends in certain cases on the fact that the complement subject of S_i is coreferential to the subject of the main clause S_{i+1} .

We have just given the arguments for (13a). (13b) is, of course, just a special case of II.A(2c), illustrated already by examples like (1) and (2b) above. In addition to (13), the argument depends on the more general theoretical assumption that in a transformational grammar there are at most only three types of transformations from the point of view of the parameters in question, namely:

- (14) a. precyclical rules
- b. cyclical rules
- c. postcyclical rules.¹⁰

Given (14), to show EQUI is cyclical it is sufficient to show that:

- (15) a. EQUI cannot apply before all cyclical rules, that is, that EQUI is not a precyclical rule;
- b. EQUI cannot apply after all cyclical rules, that is, that EQUI is not a postcyclical rule.

To show that EQUI is cyclical, Lakoff argued from these bases that the rule has to apply after some cyclical rule applications but before others. And in fact it can be shown that this rule enters into potentially unlimited sequences of rule applications of the general form illustrated by (8) above.

Consider first sentences like:

- (16) Harry was believed by everyone to have wanted to seduce Lucille.

The key element here is the clause fragment *to seduce Lucille*, whose subject has been deleted, putatively by EQUI. Clearly, the subject of this clause fragment is understood as coreferential to the subject of the main clause in which it is embedded, that is, coreferential to the subject of the verb *wanted*. This subject has the superficial form *Harry*. In (16), however, the subject of *wanted* has been raised into the *next* highest main

¹⁰ An alternative conception is that there may exist, instead of or in addition to postcyclical rules, rules which are *last (final) cyclical*. These latter are rules which can only be applied on the last cycle of any derivation. The fundamental difference between rules of this type, and postcyclical rules, which are not applied until the last-cyclical rule has applied for the last time, is that last-cyclical rules may be ordered in such a way that on the last cycle such rules apply *before* cyclical rules, that is, before rules which may apply on any cycle if applicable. The notion of last-cyclical rule was suggested by Chomsky in the domain of phonological rules. The existence of such cannot be said to have been demonstrated in the area of syntax.

clause and then made the subject of that clause by PASSIVE. A relevant underlying structure of (16) is consequently:

- (17) [everyone believed [Harry_i wanted [Harry_i seduce Lucille]]]
 $\underline{s_3}$ $\underline{s_2}$ $\underline{s_1}$ $\underline{s_1s_2s_3}$

The crucial aspect of this structure is that the subject of *seduce* must be deleted because it is a coreferent of the subject of *wanted*. But this latter subject will undergo RAISING on the S_3 cycle and subsequent passivization on the same cycle. Therefore, for the “next highest subject coreference” condition to hold for EQUI in (17), the subject of *seduce* must be deleted *before* the subject of *wanted* undergoes RAISING and PASSIVE. Therefore, application of EQUI must precede application of these latter two rules in the derivation of (16). But this shows that (15b) is true. EQUI cannot apply in all cases after all cyclical rules have applied for the last time.

Consider next the sentence:

- (18) Joe wanted to be seen by Mary kissing Betty.

A more remote form of this would be:

- (19) [Joe wanted [Mary see [Joe kiss Betty]]]
 $\underline{s_3}$ $\underline{s_2}$ $\underline{s_1}$ $\underline{s_1s_2s_3}$

Here what must happen, obviously, is that the subject of *kiss* must be raised, then passivized, and then deleted by identity to the subject of *wanted*, after it has become subject of *to be seen* through the action of PASSIVE. Consequently, EQUI must apply *after* RAISING and PASSIVE. This shows the truth of (15a).

Finally, observe that there exist sentences like (20), which is, to be sure, unwieldy:

- (20) Joe was thought by everyone to want to be seen by Mary trying to kiss
 Lucille.

(20) must have a remote structure like:

- (21) Everyone thought [Joe_i wanted [Mary see [Joe_i try [Joe_i kiss
 Lucille]]]]
 $\underline{s_4}$ a $\underline{s_3}$ b $\underline{s_2}$ c $\underline{s_1}$

Here I have lettered the occurrences of *Joe_i* for ease of reference. What must happen here is evident. *c* must be elided before *b* is raised. Consequently, application of EQUI precedes that of RAISING. *b* must be raised and then passivized, before it will be a subject which will be subject to deletion by EQUI. And then *b* must be deleted before *a* is raised. Overall, then, there must be the sequence of rule applications:

- (22) EQUI-RAISING-PASSIVE-EQUI-RAISING-PASSIVE

And this is obviously extendable without limit, if one constructs more and more complex embeddings with verbs that permit application of RAISING. And in fact,

the grammar of English allows the production of just such complex embeddings without limit. Thus one seems to have shown, using Lakoff's argument, that EQUI is a cyclical rule, one which applies on cycle S_i to delete the subject of a complement sentence S_{i-1} .

IV. A Consequence of the Conclusion that EQUI is Cyclical

Let us assume then the validity of the proposition:

- (1) EQUI is cyclical

argued for in the previous section. I want to argue now that from (1) and certain other facts we can infer the independence of EQUI from the processes of coreferential pronominalization. We can do this by showing that if the process of coreferential pronominalization is governed by a rule PRONOMINALIZATION, this rule must be noncyclical.

The rule in question has been widely discussed, most interestingly recently by Langacker (to appear) and Ross (1967a, 1967b). These treatments are concerned specifically with the problem of forwards versus backwards pronominalization, and the conditions under which each is possible. In an attempt to characterize these conditions, Ross (1967b) argued on the basis of some brilliant observations that the rule PRONOMINALIZATION must be cyclical. However, despite the apparent plausibility of his analysis, the conclusion cannot stand. On the basis of entirely different facts¹¹ we can show that, if there is a rule PRONOMINALIZATION, it cannot possibly be a cyclical rule.

The argument will depend on a rule I shall refer to as WH Q MOVEMENT, that which accounts for the front positioning of *wh*-marked NP in normal question sentences:

- (2) a. You saw someone.
- b. Who did you see?
- (3) a. Charley thinks gorillas eat giraffes.
- b. What does Charley think gorillas eat?

The first point to be made is that the order of rules is:

- (4) WH Q MOVEMENT
PRONOMINALIZATION

This is shown by the constraints on backwards pronominalization, that situation where a pronoun precedes its coreferent "antecedent" NP. In a large class of cases, backwards pronominalization is possible just in case the pronoun is in a subordinate

¹¹ Lakoff (to appear) argues that even the facts discussed by Ross do not properly yield the cyclical conclusion.

clause not separated from the antecedent by any coordinate construction boundaries. Consequently:

- (5) a. *He_i thinks Mary hates Bill_i.
- b. The fact that he_i lost worried Bill_i.
- c. *He_i visited some of the men who liked Bill_i.
- d. Bill_i visited some of the men who liked him_i.

In each of the illformed cases, the pronoun is in the main clause. The key fact is, however, that for this condition on backwards pronominalization to govern constructions involving WH Q MOVEMENT correctly, it must be applied to structures which are the output of this rule. Thus:

- (6) a. Which of the men who liked him_i did Bill_i visit?
- b. Which of the men who liked Bill_i did he_i visit?

Here, backwards pronominalization is possible out of the complex NP which has been fronted by WH Q MOVEMENT, just because this complex NP contains a subordinate clause in which the pronoun occurs. This follows from the general condition, if PRONOMINALIZATION is defined to apply after WH Q MOVEMENT. With the reverse ordering, however, the facts in sentences like (6) become exceptional, since the general condition predicts the illformedness of backwards pronominalization in structures like:

- (7) Bill_i visited wh some of the men who liked Bill_i

Forwards pronominalization in (6b) is possible, because this is in general free. However, if the ordering of rules were reversed, the facts of sentences like (6) would become exceptional. Under the reverse ordering, (6b) would involve backwards pronominalization in (7), which would come to look like forwards pronominalization only after WH Q MOVEMENT has applied. That is, under this assumption, the remote structure of (6b) would be:

- (8) he_i visited wh some of the men who liked Bill_i

But this pronominalization is anomalous, since the backwards pronoun is not in a subordinate clause. Consequently, there are clear grounds for the ordering in (4).

This by itself immediately suggests that PRONOMINALIZATION is not a cyclical rule, since it is easy to show that WH Q MOVEMENT is not cyclical. This follows from what we can call the Preposition Orphan Argument. Observe that in general, a preposition may either accompany a *wh*-NP moved by WH Q MOVEMENT or remain behind in its original position:

- (9) a. To whom were you speaking?
- b. Who were you speaking to?

Given complex sentences like:

- (10) Who did you think Bill wanted Mary to talk to?

where the *wh*-form has moved across several higher clauses, the assumption of cyclical nature for WH Q MOVEMENT would mean that the trip to sentence initial position would have to be accomplished *in several jumps*, the *wh*-NP moving each time to the front of the next highest sentence. Under this assumption, however, there is no way to explain why the preposition cannot be left behind at any of these positions. In fact, of course, the preposition can occur in its original position, as in (9), or with the *wh*-form, as in:

- (11) To whom did you think Bill wanted Mary to talk?

but it can never occur as an orphan at the initial point of any sentence other than the largest:

- (12) a. *Who did you think Bill wanted to Mary to talk?
 b. *Who did you think to Bill wanted Mary to talk?
 c. *Who did to you think Bill wanted Mary to talk?

But these facts follow automatically from stating the rule as a movement of the *wh*-NP with optional accompaniment of the preposition, if the movement is carried out in a single swoop. But this can only be done if the rule is noncyclical. Since, therefore, PRONOMINALIZATION is preceded by a noncyclical rule, the assumption that it is cyclical is quite dubious. And indeed it would only be possible under most assumptions about the form of transformational grammar if WH Q MOVEMENT could be taken to be a final cyclical rule. If WH Q MOVEMENT is postcyclical, then PRONOMINALIZATION is thereby not cyclical.

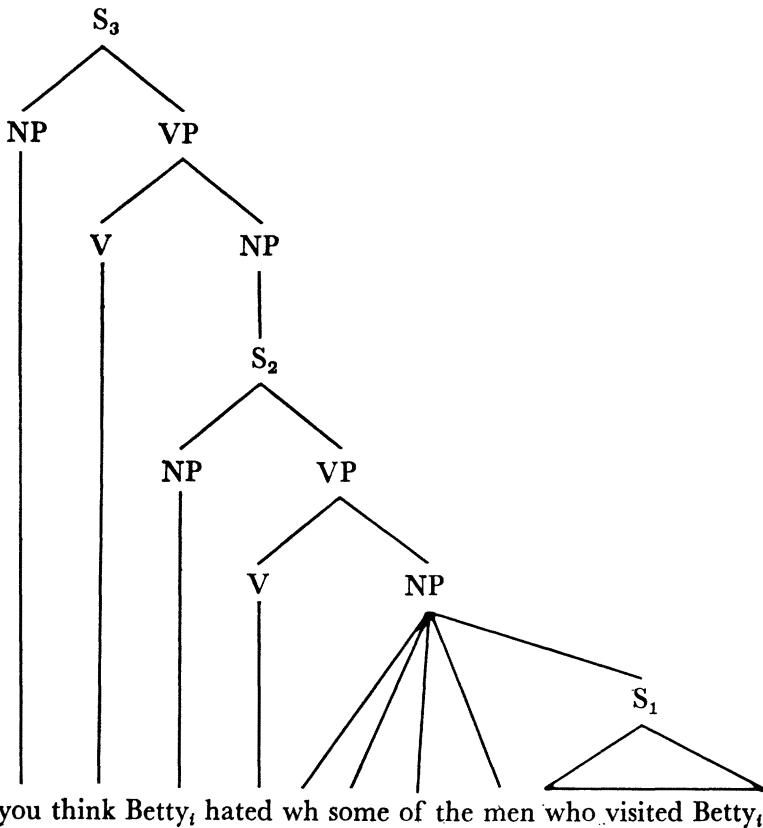
Independently of this matter, however, PRONOMINALIZATION can be shown to be noncyclical on quite different grounds. Consider sentences like:

- (13) a. Which of the men who wrote to Harry_i did he_i talk to?
 b. Which of the men who wrote to him_i did Harry_i talk to?

The underlying structure of these is one in which the option of backwards pronominalization is possible, and realized in (13b). This follows from the general condition on backwards pronominalization if the *wh*-NP in such examples has been moved forward before PRONOMINALIZATION applies. That is, it follows from the general condition, given the ordering of rules in (4). No difficulties arise in examples like (13), where there are only two cycles, and PRONOMINALIZATION, even if assumed to be cyclical, could only apply on the last.

Consider, however, what will happen under the assumption that PRONOMINALIZATION is cyclical, when rules are applied to a structure such as:

(14)



Nothing of interest will happen on the S_1 cycle. On S_2 , however, there are two occurrences of the coreferential $Betty_i$. However, the one on the left is not in a subordinate clause (with respect to the structure S_2). Consequently, according to the condition on backwards pronominalization, only forwards pronominalization is possible here, and must obligatorily be applied. WH Q MOVEMENT, even though earlier in the ordering of rules than PRONOMINALIZATION, cannot yet have applied, since it is either last-cyclical or postcyclical, and the last cycle has not yet been reached. Therefore, the object of *visited* is turned into an anaphoric pronominal, and when the *wh*-movement finally takes place, the grammar will derive from the structure (14) only the sentence:

(15) Which of the men who visited her_i do you think Betty_i hated?

This is a fine sentence. But the trouble is that (14) has an equally fine alternate realization, namely:

(16) Which of the men who visited Betty_i do you think she_i hated?

But this cannot be derived by the grammar with the ordering (4), under the assumption that PRONOMINALIZATION is cyclical.

To derive (16), it is necessary that PRONOMINALIZATION not apply on the S_2 cycle and then apply on S_3 , after WH Q MOVEMENT has applied as in examples like (13). But there is no way to prevent PRONOMINALIZATION from applying on S_2 under the cyclical assumption, since the meaning of the cyclical principle is exactly that a rule is applied on every applicable cycle in succession.

It follows, then, that PRONOMINALIZATION is *not* a cyclical rule. Some other explanation must be found for the data which first motivated Ross's claim of cyclical traffic rules for this operation.

We seem to have shown then that:

- (17) a. EQUI is cyclical
- b. PRONOMINALIZATION is not cyclical

From (17) we can infer that:

- (18) EQUI is independent of PRONOMINALIZATION

which we can interpret to mean that:

- (19) *In general*, EQUI applies between a main clause NP_a (the controller) and a subordinate clause NP_b , which is to be deleted at a point *before* either of NP_a or NP_b has undergone PRONOMINALIZATION

Given (17b), there are really two possibilities. Either PRONOMINALIZATION is a postcyclical rule or a last-cyclical rule. If the former, then we can replace "in general" in (19) by "always". If, however, PRONOMINALIZATION were last-cyclical, it could turn out that in some cases it could apply before EQUI, namely if PRONOMINALIZATION were ordered before EQUI and the latter were applicable to a certain structure only on the final cycle. (19) is, of course, simply a reformulation of the part of Section II.A(2) given as A(2d).

However, what I want to argue now is that (19) has consequences which are factually intolerable, because they are incompatible with several generalizations about the operation of EQUI. This will indicate that somewhere in the chain of argument leading to (19) there is a false assumption or inference. I will then try to point out where I believe this error lies.

V. The Dependence of EQUI on PRONOMINALIZATION

A. Interpretation

IV(18) claims that EQUI is independent of PRONOMINALIZATION. In this section I would like to discuss several pieces of evidence which seem to indicate that:

- (1) EQUI is dependent on PRONOMINALIZATION.

I interpret (1) to mean that:

- (2) Certain otherwise ad hoc restrictions on EQUI are predictable from independently necessary constraints on PRONOMINALIZATION, if EQUI applies to structures only when they have already undergone PRONOMINALIZATION.

We shall present a number of independent arguments to this effect. Each will have the same general logical structure. Observe that one can naturally think of deletion governed by coreference as equivalent to the existence of some general pronoun, call it *Doom*, which accidentally has the null phonological shape. Consequently, one could, if one wished, naturally represent a sentence like:

- (3) Falling off the building injured Harry.

with the Surface Structure:

- (4) *Doom_i*'s falling off the building injured Harry_i.

Here we take *Doom* to be a morpheme. And we assume the relation between the Surface Structure (4) and the more phonological representation (3) to be mediated by the lexical fact that the morpheme *Doom* has a null pronunciation. The general form of our arguments showing that EQUI is dependent on PRONOMINALIZATION is then essentially the demonstration that, in a number of significant cases, restrictions on the distribution of *Doom* follow from restrictions on the distribution of ordinary coreferential pronouns, *him*, *hers*, *you*, *they*, *it*, etc. In other words, we will attempt to reveal correlations like:

- (5) a. **Doom_i* . . . A . . . NP_i
- b. **his_i* . . . A . . . NP_i

B. The Indefinite Argument

The subordinate clause condition, roughly described in Section IV, predicts that backwards pronominalization is possible in a wide class of contexts. This condition ignores, however, restrictions of many sorts. Most crucially for present concerns, it says nothing about constraints having to do with the internal structure of NP which are putatively to undergo pronominalization operations. It was pointed out by S. Y. Kuroda several years ago in unpublished work that backwards pronominalization is blocked in a class of cases involving *indefinite* NP. Kuroda gave such examples as:

- (1) a. If the man_i calls, you shouldn't talk to him_i.
- b. If he_i calls, you shouldn't talk to the man_i.
- (2) a. If a (certain) man_i calls, you shouldn't talk to him_i.
- b. *If he_i calls, you shouldn't talk to a (certain) man_i.

However, while I believe Kuroda's insight that backwards pronominalization is blocked for indefinite NP is, when properly circumscribed and defined, perfectly valid,

sentences like (2) are poor justification for such a claim. In order to show that there is a constraint on pronominalization, it is necessary not only to find instances of ill-formed pronominalization, of which (2b) is certainly an example, but also to show that the illformedness does not follow from some independent grammatical constraint. Unfortunately, this latter condition is hard to meet in the case of nonsentences like (2b). This follows because examples like:

- (3) *If Harry calls, you shouldn't talk to a (certain) man.

do not seem any better than those like (2b). Consequently, one can argue that there is some general constraint (mysterious to be sure) on the distribution of indefinite NP having nothing to do with pronominalization which blocks (2b) type cases as a special case.

Be this as it may, we can nonetheless find many contexts in which backwards pronominalization for indefinites is blocked where no independent constraint forbids the occurrence of indefinite NP. Before giving such examples, let us make one attempt to specify partially the notion "indefinite". Whatever is meant here, it is crucial to distinguish cases where NP whose Surface form is indefinite have a *generic* interpretation. These include:

- (4) a. *Lions* have tails.
 b. Marriage is good for *a man*.
 c. Chicken soup pleases *most men* who are over forty.

In sentences like these, the italicized NP have indefinite form but generic force. Such NP are definitely to be excluded from our discussion. Insofar as indefinite NP participate in special constraints on backwards pronominalization, this is only the case for *nongeneric* indefinites, not a surprising fact, since semantically generic NP are not "indefinite". They refer definitely to the entire class, not to some unspecified subset. In *plural* indefinite NP the generic-nongeneric contrast has a fairly consistent surface manifestation. Namely, the weak, unstressed *some* indicates nongeneric, the null determiner generic interpretation. Contrast:

- (5) a. Harry understands gorillas.
 b. Harry understands some gorillas.

(5a) states that Harry knows about gorillas in general. (5b) only asserts that there is an unidentified nonnull set of gorillas whose nature is not totally puzzling to him. Note especially that the strong stressed, or "logical", *sóme* is not generic:

- (6) Harry understands sóme (but not all) gorillas.

This is also true of the forms derived by combinations of *some*, *somebody*, *something*, etc. With these provisos in mind, consider sentences like:

- (7) *The fact that he_i lost amused somebody_i in the crowd.

There is a clear failure of coreference here. The fact that this is a genuine pronominalization constraint, and not a theorem from some general nonpronominal restriction on the distribution of indefinite NP, is indicated by the wellformedness of sentences like:

- (8) The fact that Bill lost amused somebody in the crowd.

Consider too:

- (9) a. *The man who lost it, needs to find something._i
 b. The man who lost it, needs to find something._j
 c. The man who lost the camel needs to find something.

Also:

- (10) a. *It was their_i strength that made some gorillas_i famous.
 b. It was my strength that made some gorillas famous.
 c. It was their_i strength that made the gorillas_i famous.

Having ascertained that there is indeed a constraint on backwards pronominalization with true indefinites, we observe that just such forms block backwards application of EQUI:

- (11) a. *Finding out Greta was a vampire worried somebody.
 b. *Discovering that their_i daughters were pregnant worried some old ladies_i.
 c. *Kissing was fun for some kids.

These must be compared with:

- (12) a. Bill's finding out that Greta was a vampire worried somebody.
 b. My discovering that their_i daughters were pregnant worried some old ladies_i.
 c. Tony and Betty's kissing was fun for some kids.

which indicate that the constraint in (11) is not a special case of some nonpronominalization restriction on indefinites.

The facts become even more interesting if we switch examples from true complements to those involving *nominalizations*, where EQUI also operates to delete subjects, albeit in a much more restricted class of cases.¹²

¹² It has not, as far as I know, been previously observed that EQUI application in nominalizations is subject to very strong constraints. In my dialect, it can in fact only operate when the nominalized verbal is descriptive of some proposition which is necessarily mentally represented. Hence it works with nominalizations like *realization, discovery, belief, idea*, but not for examples with *claim, proof, attack*, etc. Consequently:

(i) The attack on Greta amused Harry.

does not refer to an attack by Harry. Just so:

(ii) The claim that Greta was pregnant amused Lucille.

- (13) a. His_i realization that you knew Greta disturbed Tony_i.
 b. The realization that you knew Greta disturbed Tony_i.

The evidential advantage of nominalizations is that EQUI is optional for them, as revealed by the contrast between examples like (13) and:

- (14) a. *His_i realizing that you knew Greta disturbed Tony_i.
 b. Realizing that you knew Greta disturbed Tony_i.

where, in my dialect, deletion is clearly obligatory.

Consider then:

- (15) a. *His_i realization that the Earth was exploding worried somebody_i.
 b. *The realization that the Earth was exploding worried somebody_i.

In such examples, there is an exact correlation of pronominalization constraints with those on EQUI. Further examples:

- (16) a. *Their_i discovery that Johnson was a puppet scared some congressmen_i.
 b. *The discovery that Johnson was a puppet scared some congressmen_i.

Notice that (16b) has a wellformed reading, but only one where the agents of discovery were not the congressmen, that is, only one derivable without application of EQUI. In short, if wellformed, (16b) does not have an occurrence of *Doom_i*.

- (17) a. *His_i realization that God was dead didn't worry anybody_i.
 b. *The realization that God was dead didn't worry anybody_i.

It is quickly determinable that these constraints are not a function of any simple blockages on the distribution of indefinite NP generally:

- (18) a. Bill's realization that the Earth was exploding worried somebody.
 b. My discovery that Johnson was a puppet scared some congressmen.
 c. Schwartz's realization that God was dead didn't worry anybody.

These examples confirm that we are dealing with pronominalization constraints.

Further evidence of this can be gathered by considering indefinites with generic interpretations. These do not partake of the backwards constraint:

- (19) a. If he_i has an ugly wife, a man_i should find a mistress.

does not refer to a claim by Lucille. Even more interesting, is that the semantic characterization even distinguishes instances of the same nominalization. Hence:

- (iii) a. The discovery of France interested Henry.
 b. The discovery that Barbara had a bikini interested Henry.

(iiib) is ambiguous, having a reading where Henry made the discovery and one where the maker is unspecified. (iiia), on the other hand, having only a meaning which blocks a notion of mental representation, has only the unspecified meaning.

- b. When they_i are angry, gorillas_i can be awfully mean.
- c. Men who hunt them_i will tell you that gnus_i are smelly beasts.

We therefore predict that for generic indefinite NP, EQUI should not be blocked in contexts parallel to those illustrating a blockage for nongeneric indefinite NP. And strikingly we find just this:

- (20) a. Having an ugly wife makes a man mean.
- b. Finding out they_i are being hunted angers lions_i.
- c. Eating gorilla meat makes hair grow on a snake's chest.

With nominalizations, the correlation is direct:

- (21) a. His_i realization that death is approaching normally worries a coward_i.
- b. The realization that death is approaching normally worries a coward.
- (22) a. Their_i recognition that life is a fountain is normally the beginning of wisdom for disciples_i of HogoFogo.
- b. The recognition that life is a fountain is normally the beginning of wisdom for disciples of HogoFogo.

Hence we find that those indefinites that partake of the backwards constraint, namely, the nongeneric ones, also cannot undergo backwards application of EQUI and those indefinites which partake of no backwards constraint on pronominalization, namely, those with generic interpretations, undergo EQUI normally as if they were definite NP. The correlation of EQUI application with pronominalization constraints for indefinite NP is thus quite striking.

The basis of this claim can be extended by considering a wider class of indefinites, namely, those containing quantifier elements, *each*, *all*, *every*, *any*. With such, in *nongeneric* cases, the constraint blocking backwards pronominalization is, if anything, clearer than in previous examples:

- (23) *The fact that {he_i} lost disturbed each candidate_i,

It is impossible to read (23) as a paraphrase of:

- (24) Each candidate_i was disturbed by the fact that he_i lost.

Just so:

- (25) a. *The woman who loved him_i impoverished every businessman_i.
- b. Every businessman_i was impoverished by the woman who loved him_i.

(25a) is totally unreadable as a variant of (25b). We now observe that just such forms do not occur in the typical positions where EQUI must apply backwards:

- (26) a. *Finding that out worried each businessman.
- b. *Discovering that God was dead upset every priest in the world.

- c. *Falling off the building killed someone.
- d. *Diving off the cliff didn't kill anyone on Thursday.¹³

As before in the case of nonquantifier indefinites, more direct evidence comes from nominalizations, where EQUI application is optional:

- (27) a. *His_i realization that you knew Greta disturbed each teacher_i.
- b. *The realization that you knew Greta disturbed each teacher_i.

The impossibility of the deletion correlates fully with the illformedness of the pronominal variant.

It might be claimed, incidentally, that what such examples really illustrate is not a constraint on pronominalization but rather some underlying constraint on the kinds of coreference relations into which quantifiers can enter. That is, it might be claimed that structures like (27a) violate formational principles constraining the interaction of coreference and quantifiers. This position cannot be maintained, however. While there are special constraints on quantifiers with respect to pronominal forms,¹⁴ examples like (27a) cannot be taken to indicate underlying or deep structure constraints. For observe that the passive versions of (27) are perfectly wellformed:

- (28) a. Each teacher_i was disturbed by his_i realization that you knew Greta.
- b. Each teacher_i was disturbed by the realization that you knew Greta.

However, the difference between (27) and (28) is only the application of the rule PASSIVE, which, since it far precedes PRONOMINALIZATION, permits the underlying structure to be realized in (28) as forwards pronominalization. Consequently, if one maintains anything reasonably close to a transformational analysis of passive sentences, one cannot block the deep structures of sentences like (27). Consequently, their illformedness must be treated in terms of constraints on pronominalization. And they seem to be simply a further illustration of the failure of nongeneric

¹³ These examples must be read such that there is *not* strong stress on the quantifier, nor contrastive stress on the noun. That is, they must be read with normal intonation, which gives prominence to the verbs. Why the contrastively stressed versions are better is a mystery I cannot go into here.

¹⁴ In particular, notice the unacceptability of examples like:

- (i) *The fact that every gorilla_i has a tail amuses {him_i, them_i}.
- (ii) *The girl who visited each state_i hated {them_i, it_i}.

In general, pronominalization between a quantifier NP antecedent and pronoun seems to be acceptable only if at least:

- (iii) a. the antecedent precedes the pronoun;
- b. the pronoun does not *command* (in Langacker's sense) the antecedent unless the antecedent also *commands* the pronoun;
- c. antecedent and pronoun are not separated by a true coordinate structure boundary.

indefinites to enter naturally into paradigms of backwards pronominalization. The chief point for us is that the illformedness of the EQUI cases follows the same pattern as that of the PRONOMINALIZATION cases.¹⁵

This parallelism is revealed even more strikingly by certain cases where, rather exceptionally, quantificational indefinites enter into backwards pronominalization. For instance, this seems quite acceptable with certain kinds of *modals*:

- (29) a. The fact that he_i is being sued should worry any businessman.
- b. The girl who he_i is going to marry can upset any bridegroom_i-to-be.

But in such cases, which notably seem to have a generic force, EQUI can apply as well:

- (30) Being sued should worry any businessman.

Notice that (30) is not only wellformed, but that it has the Surface Structure:

- (31) Doom_i's is being sued should worry any businessman_i.

that is, it is a paraphrase of:

- (32) Any businessman_i should be worried by (the fact that he's_i) being sued.

Similarly, it is significant that backwards pronominalization is acceptable for quantifier NP when the quantifier precedes a definite NP as in:

- (33) a. all of the men
- b. each of the purple gorillas
- c. any of those saints

Hence:

- (34) a. The fact that they_i didn't know French annoyed all of the men_i.
- b. The fact that they_i had tails convinced each of the purple gorillas_i that time was on their_i side.
- c. The devil's attack on them_i didn't worry any of those saints_i.

¹⁵ Sentences like:

(i) Dying worries everyone.

seem to be counterinstances to our claim since, according to our position, they would have to have underlying forms involving backwards pronominalization, typically blocked for quantifiers. It should be noted, however, that sentences like (i) are generic and the quantifiers in them possibly variants of the generic *one*. Notice that if we expand (i) to:

(ii) *Dying worries everyone else.

the result is illformed, correlating, I think, with the fact that *everyone else* excludes a generic interpretation.

But again, exactly these types of NP which permit backwards pronominalization permit backwards application of EQUI.¹⁶

- (35) a. Not knowing French annoyed all of the men.
- b. Having tails convinced each of the purple gorillas that time was on their side.
- c. Being attacked by the devil didn't worry any of those saints.

Hence, although I have no real idea how to represent these mysterious constraints on the participation of indefinite-quantifier NP in backwards pronominalization, it is clear that this property corresponds closely to the possibility of backwards application of EQUI. Consequently, all such facts strongly support the view that EQUI is dependent on the prior application of PRONOMINALIZATION. If this is the case, the constraints on PRONOMINALIZATION will automatically carry over to the cases of deletion under EQUI.

C. The Blocked Forwards Pronominalization Argument

The next argument to be given for the dependence of EQUI operation on PRONOMINALIZATION derives from facts presented in Ross (1967b). In fact, the argument is essentially given by him, although partially implicit. The facts involved are just those which led Ross to the conclusion, now seen to be incorrect, that PRONOMINALIZATION is a cyclical transformational rule.

Ross observed that, although forwards pronominalization is generally permitted in almost all contexts, it is blocked in environments like:

- (1) *Finding out that Bill_i was going to be fired didn't worry him_i.

In such a string of morphemes, *Bill* and *him* cannot be interpreted as coreferents. In order to construct a sentence where the NP inside of the complement and the object of *worry* are coreferents, one must apparently make use of backwards pronominalization:

- (2) Finding out that he_i was going to be fired didn't worry Bill_i.

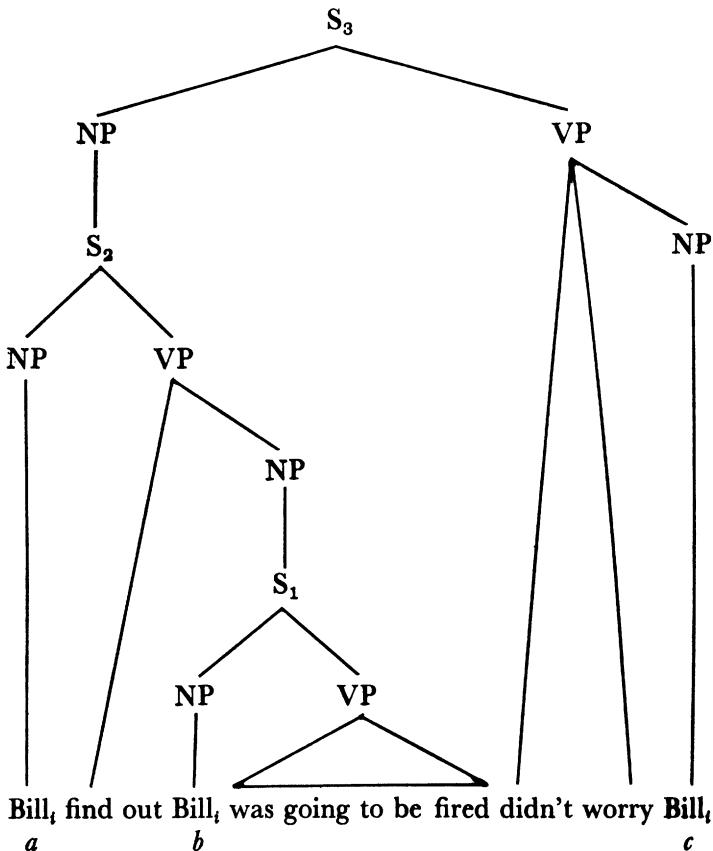
Ross proposed to explain this apparent anomaly about forwards pronominalization in terms of several assumptions. First, that the underlying structure for sentences like (2) is roughly of the form:

¹⁶ An apparent bad case for our claim is provided by the contrast between such pairs as:

(i) {^{*His_i}, ^{*Their_i}} realization Betty was dying worried each one of the men_i.
 (ii) The realization Betty was dying worried each one of the men_i.

There are various things which might be proposed here, for instance, that (i) is thrown out *not* by a constraint on PRONOMINALIZATION but by a Surface Structure Output Condition of the type described in (iiib) of footnote 14. But I have no serious proposal to make so that examples like (i)–(ii) remain serious problems for my analysis.

(3)



Second, that PRONOMINALIZATION is cyclical. Third, that PRONOMINALIZATION, when applying backwards, is governed by the subordinate clause condition sketched earlier. Finally, that EQUI is cyclical.

The key points are the constraints that PRONOMINALIZATION is cyclical and governed by the subordinate clause condition. Given this condition, PRONOMINALIZATION cannot apply backwards between the *b* and *a* occurrences of *Bill_i* on the S₂ cycle, since the left occurrence is not in a subordinate clause, with respect to the right occurrence. That is, backwards pronominalization in S₂ is bad for the same reason that:

(4) *He_i found out that Bill_i was going to be fired.

is bad. Consequently, on the S₂ cycle, PRONOMINALIZATION must, Ross observed, apply forwards. Therefore, from a structure like (3), no structure like (1)

could be derived, since (1) requires that after the S_2 cycle the subject of *was going* . . . remain nonpronominal, despite its coreference to the subject of *finding out*. Given the assumptions made by Ross, the only structures derivable from (3) are (2), in which PRONOMINALIZATION applied forwards on the S_2 cycle, and then backwards on the S_3 cycle, or else:

- (5) Bill_i's finding out he_i was going to be fired didn't worry him_i.

in which PRONOMINALIZATION has applied forwards on both the S_2 and S_3 cycles.

We know that Ross's assumption that PRONOMINALIZATION is cyclical cannot be correct. However, this is irrelevant from the point of view of the present discussion. For the cyclical assumption in Ross's argument was intended to *explain* the constraint on PRONOMINALIZATION illustrated in (1). However, our interest is not in this. We are interested not in explaining such restrictions but only in showing that restrictions on EQUI correlate with restrictions on PRONOMINALIZATION. And the fact of the matter is that just such a correlation is revealed by examples like (1). We have spoken of such so far as illustrating an apparently anomalous blockage of forwards pronominalization. Equally correct, however, they can be regarded as illustrating a blockage of EQUI. That is, it is a fact that there are no instances where EQUI operates to delete a subject NP, NP_a, where the complement sentence of the verb of which NP_a is the subject contains a coreferent of NP_a, NP_b, and NP_b is not in pronominal form.

However, this constraint follows automatically with no addition to EQUI if EQUI operates on the output of PRONOMINALIZATION, for of course backwards pronominalization is blocked in just these contexts. We can show this directly with examples like:

- (6) *His, finding out Bill_i was going to be fired didn't worry him_i.

in those dialects where EQUI is optional in such contexts, that is, in those dialects where sentences like:

- (7) His, finding that out didn't worry Bill_i.

are wellformed. For those dialects where EQUI is obligatory in such contexts, examples like (6) prove little, since their illformedness follows directly from the obligatoriness, i.e. from the same constraint which blocks (7) in these dialects. For these obligatory dialects, the argument that backwards pronominalization is blocked in contexts like (6) must be supported theoretically.¹⁷ This is easily done, since such pronominalization violates the general theoretical condition determining backwards

¹⁷ However, even in my dialect, the deletion is not obligatory in cleft sentences:

(i) It was his, finding that out that worried Bill_i.

pronominalization, namely, that the pronoun must be in a clause subordinate to its nonpronominal antecedent.

Moreover, for all dialects, I believe, direct empirical evidence of the blockage of backwards pronominalization is possible if we consider nominalizations rather than true complements. This follows since EQUI is always optional in such nominalizations:

- (8) a. *The realization that Bill_i was going to be fired didn't worry him_i.
- b. The realization that he_i was going to be fired didn't worry Bill_i.
- (9) a. *His_i realization that Bill_i was going to be fired didn't worry him_i.
- b. His_i realization that he_i was going to be fired didn't worry Bill_i.

These sentences and nonsentences reveal directly that the possibility of applying EQUI correlates directly with the possibilities of applying PRONOMINALIZATION. This fact is automatically explained if EQUI operates on the output of PRONOMINALIZATION by deleting only pronominal NP. Notice that the correlation of EQUI operation with PRONOMINALIZATION possibilities is independent of the theoretical and/or descriptive bases for the particular restrictions on PRONOMINALIZATION revealed in the discussion. We have seen that Ross's cyclical explanation cannot be correct. This has no bearing on the fact that the restrictions on the PRONOMINALIZATION rule explain those on EQUI if the latter is a rule deleting coreferential *pronominal* NP. The dependence between these two rules does not depend on any particular formulation of the restrictions on PRONOMINALIZATION.

D. Modal Constraint Arguments

i. The Ought Modal Constraint. It is a fact that the complement subject deleted by EQUI must always be coreferential to an NP in a "higher" sentence and always the "immediately higher" one if this is defined at the appropriate point in derivations. There are, however, many cases where there is more than one NP in the relevant "immediately higher" sentence. The question thus arises in general as to which of these NP determines the deletion of the complement subject. Let us call this *The Control Problem*. Just this problem underlay Rosenbaum's (1965, 1967) proposal of a "minimal distance principle". The function of this was to determine uniquely for a particular sentence the appropriate controller NP in the higher sentence in terms of the relative lengths of paths between potential controllers and the complement subject to be deleted.

We can briefly illustrate with examples like:

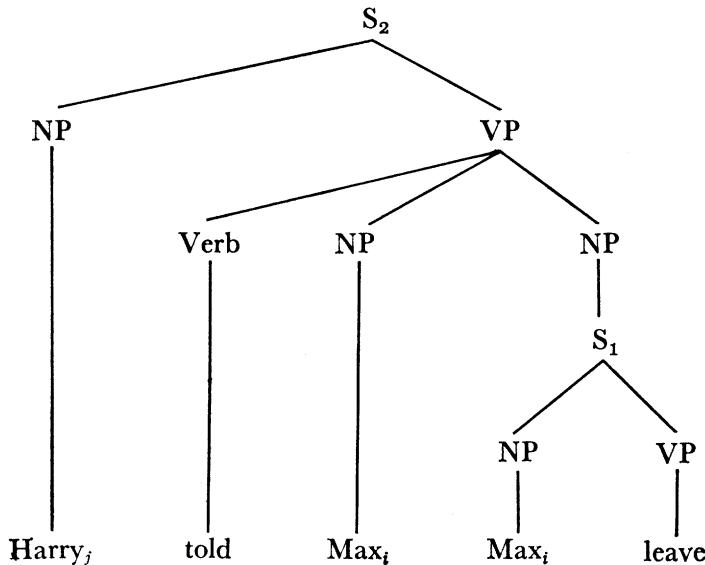
- (i) a. Harry told Max to leave.
- b. Harry wanted to leave.

Hence in cleft sentences, examples like:

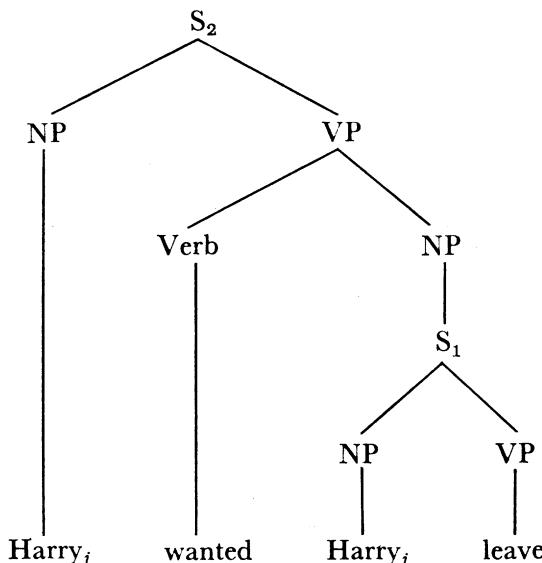
- (ii) *It was his_i, finding out that Bill_i was dead that worried him_i.
- cannot be due to simple EQUI obligatoriness, and can count as more direct evidence for our claims.

In (1a) the subject of *leave* is perceived as a coreferent of *Max*, not of *Harry*. In (1b) the subject is of course understood as a coreferent of *Harry*. An explanation in terms of distance has some initial plausibility, given structures for (1a, b) like, respectively:

(2) a.



b.



Given such structures, the shortest path between complement subject NP and an NP in the next highest sentence yields *Max_i* as the controller in (1a) and *Harry_j* as the controller in (1b). Rosenbaum's approach to this problem has an implicit underlying assumption. Namely, that in cases where the next higher sentence contains two or more NP, the deleted complement subject is always perceived as a coreferent of one or the other but not ambiguously of either. Given this uniqueness assumption, some principle with a function like The Minimal Distance Principle is indeed required.

But in fact the uniqueness assumption cannot be maintained in general. Hence:

- (3) a. Harry talked to Bill about kissing Greta.
- b. Harry wrote to Bill about not voting for Humphrey.

In (3a, b) the erased subject of *kissing* can be understood as either *Harry* or *Bill*. Consequently, the uniqueness assumption cannot stand in general. Even worse for any notion of distance, observe that the sentences in (3) also have readings where the deleted subject is a coreferent of *Harry* and *Bill* jointly. It is clear then that some other principles beside distance are at work here.

However, as examples like (1a) show, it is not always the case that ambiguous deletion under EQUI is possible. My suggestion is, however, that the ambiguity assumption is correct and that cases like (1a), where the deletion is defined uniquely in terms of one particular NP out of several in the higher sentence, are always a function of independent pronominalization constraints. I cannot in all cases demonstrate that this is true. But a surprisingly large number of examples like (1a) can be shown to reduce to one or another independently required constraint on pronominalization processes.

Observe that in sentences like:

- (4) Harry told Max that he was sick.

he may be a coreferent of either *Harry* or *Max*. Consider, however:

- (5) Harry told Max that he ought to visit Greta.

Here *he* may be a coreferent only of *Max*. The same restriction shows up with *should*:¹⁸

- (6) a. Harry told Max that he should visit Greta.
- b. *I told Max that I should visit Greta.

I propose to refer to this restriction as The *Ought* Modal Constraint. This is a restriction on the ability of pronouns to refer to immediately higher sentence subjects when these pronouns are subjects of complement clauses containing {*ought*_{*should*}} and the complements are embedded with certain verbs like *tell* (but not *believe*).

¹⁸ I was rather surprised to find, in a talk given in Cambridge, in September 1968, that many otherwise reasonable individuals claimed that *he* and *Harry* could be coreferents in sentences like (5). I discuss this matter briefly in the Appendix, arguing that, despite appearances, it probably has no bearing on the present discussion.

If, then, it were the case that infinitival complements like:

- (7) Harry told Max to enlist in the army.

were derived from underlying clauses like:

- (8) Harry told Max that he $\left\{ \begin{array}{l} \text{should} \\ \text{ought to} \end{array} \right\}$ enlist in the army.

the fact that the subject of *enlist* in (7) is understood to refer to *Max* and not *Harry* follows automatically from The *Ought* Modal Constraint, if EQUI is dependent on prior application of PRONOMINALIZATION. And there are good reasons why infinitivals like those in (7) must have a derivation from *ought* modal clauses like those in (8). First, this seems to yield the correct semantic interpretations for the modal clauses. Secondly, the restrictions between *ought* modals and following verbal elements predict restrictions in (7) type infinitivals:

- (9) a. *Harry should intend to go. = *I told Harry to intend to go.
- b. *Harry ought to hope for rain. = *I told Harry to hope for rain.
- c. *Harry ought to strike Tom as stupid. = *I told Harry to strike Tom as stupid.
- d. *Harry ought to be popular in France. = *I told Harry to be popular in France.
- e. *Harry ought to feel happy.¹⁹ = *I told Harry to feel happy.

Consequently, the constraints in sentences like (7) dealing with verbs like *tell*, which appear to indicate that EQUI operates subject to identity to some particular NP in the higher sentence, are in fact simply a function of The *Ought* Modal Constraint.

Other instances of constraints on EQUI which are explained by The *Ought* Modal Constraint if EQUI is dependent on PRONOMINALIZATION are illustrated by verbs like *scream*, *yell*, *shout*, *moan*, *groan*, etc. It has often been observed that such verbs illustrate an apparent nonidentity constraint:

- (10) a. Harry screamed for Greta to run.
- b. *Harry screamed to run.
- (11) a. Lucille shouted for the thief to stop.
- b. *Lucille shouted to stop.

That is, apparently these verbs do not permit EQUI. More pertinently, they appear not even to permit constructions of the type that would underlie EQUI:

- (12) a. *Lucille shouted for her_i to stop.
- b. *I shouted for me to stop.

¹⁹ Notice that the illformedness here depends on the “moral” interpretation of *ought/should*. With “come to pass” readings, these may be all right.

However, when the same verbs occur with expressed indirect objects, EQUI is applicable:

- (13) a. I shouted to Bill to stop.
- b. I moaned to Mary to help me.

Consequently, what we see is that there is no noncoreference constraint on such verbs at all with respect to EQUI.²⁰ There is simply the constraint that EQUI, if applied, operates with the indirect object as controller. But this restriction follows from The *Ought* Modal Constraint, under the justified assumption that the infinitivals with such verbs derive from full clauses containing *ought* or *should*. For we find:

- (14) a. Harry screamed that Greta should run.
- b. *Harry_i screamed that he_i should run.
- (15) a. Lucille shouted that the thief should stop.
- b. *Lucille_i shouted that she_i should stop.

Hence, under our assumptions, the failure of pronominalization in such sentences necessarily blocks application of EQUI. Just so, the fact that pronominalization is possible in sentences like:

- (16) a. I shouted to Bill_i that he_i should stop.
- b. I moaned to Mary_i that she_i should help me.

accounts for the possible derivation of sentences like (13). Hence The *Ought* Modal Constraint on PRONOMINALIZATION explains about these linguistic verbs that:

- (17) a. EQUI is not applicable if they contain no expressed indirect object;
- b. EQUI is applicable if there is an indirect object;
- c. when EQUI applies in cases like b the coreference must be to the indirect object and not the subject.

²⁰ Perlmutter (1968) takes the inability of verbs like *scream* to occur in sentences like:

(i) *I screamed to go.
 (ii) *I screamed for me to go.

as an instance of a Deep Structure Constraint preventing verbs like *scream* from occurring with complement sentences whose subjects are coreferents of the main clause subject. He calls this the *Unlike Subject Constraint*. We see, however, that the constraint here is rather different. A closer statement of the requirement seems to be that the subject of the complement be a coreferent of the indirect object. Under this approach, however, sentences like:

(iii) I screamed for the thief to stop.

must be taken to have a coreferent of *the thief* as indirect object, which is deleted by a special rule. This rule is not a happy consequence, so a great deal about the description of these complement cases should be regarded as open. It is particularly important though, in stressing the incorrectness of an *Unlike Subject Constraint*, to consider examples like:

(iv) I screamed to myself to stop.

which seem fine to me, certainly infinitely better than those like (i) or (ii).

The *Ought* Modal Constraint plays an essentially identical role in certain complements beginning with *wh*-forms, i.e. those like:

- (18) a. I showed Bill how to eat.
- b. Harry told Mary when to leave.
- c. Jack taught Louise where to pet gorillas.

Here again the deletion involves coreference to the indirect object, not the subject. But this will follow from The *Ought* Modal Constraint if these infinitival complements are derived from full clauses containing *should* or *ought*.

- (19) a. Harry showed Bill how he ought to eat.
- b. Lucille told Mary when she should leave.
- c. Judy taught Louise where she ought to pet gorillas.

In all such sentences, the complement subject can only be a coreferent of the indirect object, not of the subject. Consequently, the apparent constraint on EQUI again reduces to a fact about pronominalization.

2. Other Modal Constraints. Consider sentences like:

- (20) a. George asked Bill to help Mary.
- b. George usually asks Bill to help Mary.

Here again EQUI operation is such that the controller is the indirect object. However, we cannot invoke The *Ought* Modal Constraint here since a remote structure for sentences such as (20) like:

- (21) George asked Bill [Bill should help Mary].

is hardly plausible. One can observe, however, that in sentences like:

- (22) a. George asked Bill if he would help Mary.
- b. George usually asks Bill if he will help Mary.

the pronoun *he* can only be interpreted as a coreferent of the indirect object, not of the subject. Consequently, if sentences like (20) were derived from ancestral forms like (22), the application of EQUI would again follow from a pronominalization constraint, namely, that in (22). Let us refer to this as The *Will-Would* Modal Constraint. But structures like (22), under the interpretation where they are *requests*, rather than *interrogatives*, do appear to provide reasonable remote structures for sentences like (20). That is, they are reasonable remote structures on the reading where they are respectively paraphrases of sentences like:

- (23) a. Will you (please) help Mary, George asked Bill.
- b. ?Will you (please) help Mary, George usually asks Bill.

It is interesting to consider, in terms of modal constraints, such contrasts as:

- (24) a. Bill asked Tom to fire the cannon.
- b. Bill asked Tom when to fire the cannon.

Such examples are among the clearest counterexamples to Rosenbaum's Minimal Distance Principle since this must predict in each case that the deleted subject is a coreferent of the indirect object *Tom*. In fact, however, this is the case only in (24a). In our terms, (24a) is explained by The *Will-Would* Modal Constraint just discussed since:

- (25) a. Bill_i asked Tom_j if he_j would fire the cannon. = Will you please fire the cannon, Tom, asked Bill.
- b. *Bill_i asked Tom_j if he_i would fire the cannon.²¹

(24b), however, has not yet been dealt with. It seems to be related to more remote structures like:

- (26) a. *Bill_i asked Tom_j when he_j should fire the cannon.
- b. Bill_i asked Tom_j when he_i should fire the cannon.

Given these clauses and their interpretation, one thinks immediately of The *Ought* Modal Constraint. However, recall that this constraint blocks coreference between the subject pronoun and the subject, allowing coreference with the indirect object. In sentences like (24b), the very opposite situation obtains. One possible approach to reducing this *ask* constraint to The *Ought* Modal Constraint lies in a suggestion, often made, for example by McCawley (1968), that sentences like (27a) have more remote structures like (27b):

- (27) a. Bill asked Tom when to go.
- b. Bill_i asked Tom_j to tell him_i (the answer to the question)

$$\left\{ \begin{array}{l} \text{when he}_i \text{ should go.} \\ \text{when to go.} \\ \text{*when he}_j \text{ should go.} \end{array} \right\}$$

By assuming an extra layer of embedding including a verb like *tell*, the *should* constraint with *ask* does reduce to The *Ought* Modal Constraint, operating in terms of the *tell* embedding. I suspect that something along these lines is correct, so that only one constraint of the *ought* type exists here.

One suspects, of course, that The *Ought* Modal Constraint is operative in cases like:

- (28) a. John begged Bill to go.
- b. John beseeched Bill to go.
- c. John implored Bill to go.

²¹ These must, of course, not be confused with the interrogative or question sentences, with identical Surface forms.

It is however not so easy here to find direct evidence since these verbs, unlike *tell*, do not occur with object *that*-clauses. If, however, we consider the illformed structures which result from putting *that* clauses with these verbs:

- (29) a. John begged Bill that he should go.
- b. John beseeched Bill that he should go.
- c. John implored Bill that he should go.

we find, I think, that the *he* is interpretable only as the indirect object where the *should* is interpreted as the “ought” *should*. Consequently, the real difference between these verbs and *tell* would appear to lie in obligatoriness of conversion from *that* to infinitival form for the object nominal.

Another interesting type of case has to do with the verb *promise*, and with nominalizations which, I think, obligatorily derive from verbs like *promise*. These also are among the clear counterexamples to The Minimal Distance Principle:

- (30) a. I promised Bill to visit him in Sing Sing.
- b. I made an oath to Bill to visit him in Sing Sing.
- c. I vowed to Zeus to find the thief.

In each case, the complement subject is interpreted, contrary to prediction from The Minimal Distance Principle, as a coreferent of the main clause subject. The contrast between sentences like:

- (31) a. I vowed to Zeus to find the thief.
- b. I told Zeus to find the thief.

is striking. However, I suspect that again what is inexplicable in terms of distance considerations does follow from modal constraints under the assumption that EQUI is dependent on PRONOMINALIZATION. Observe that we find both:

- (32) a. Harry_i promised Bill_j that he_i would visit Greta.
- b. Harry_i promised Bill_j that he_j would visit Greta.

With the modal *would* the complement subject pronoun can be coreferential to either the subject or indirect object of the main clause. This apparently provides no basis for the nonambiguous interpretation when EQUI has applied, as in (30a). Close scrutiny of (32) reveals, however, that the meanings of *would* are not identical in the two examples. In (32a), the *would* indicates the intention of its subject, *he_i*. That in (32b) has only an “it will come to pass” interpretation. In other words, (32a) is a report about an actual *promise* made by Harry. (32b) is a report about a *prediction*. Consequently, (32a) has the rough paraphrase:

- (33) Harry_i promised Bill_j that he_i had the intention of visiting Greta and would actualize said intention.

No such paraphrase is available for (32b), which, on the other hand, has the rough equivalent:

- (34) Harry_i predicted to Bill_j that it would come to pass that he_j would visit Greta.

If this differentiation is correct, it is right to isolate a modal *would* of intention. And if sentences like (30a) have modal clauses underlying their infinitival clauses, these must be clauses of intention since that is their interpretation. However, given a sentence like:

- (35) Harry promised Bill that he would visit Greta.

the pronoun *he* can only be a coreferent of Harry if we read (35) as containing a *would* of intention. Consequently, it is likely that the real constraint illustrated by sentences like (30a) is that with a *would* of intention the complement subject must be a coreferent of the next higher subject, not of the indirect object.

There is intuitively something suspiciously similar about all of the modal constraints we have mentioned that is not captured by our atomistic listing and discussion. This matter is briefly discussed in the Appendix, where it is suggested that all such constraints probably reduce to a single principle having to do with verbs descriptive of linguistic performance.

E. Arguments from Plural Coordinate Constraints

Consider the example:

- (1) Harriet and Betty spoke to you about kissing Ralph.

Here the deleted subject of *kissing* can be interpreted as either *you* or as *Harriet* and *Betty* jointly. Under the latter reading, the sentence means that Harriet spoke about Harriet's kissing Ralph, Betty about Betty's kissing Ralph. These possibilities correlate, as is predicted by the claim that EQUI operates on structures already specified as to PRONOMINALIZATION constraints, with:

- (2) a. Harriet_i and Betty_j spoke to you about your kissing Ralph.
 b. Harriet_i and Betty_j spoke to you about their_{i,j} kissing Ralph.

The incompatibility of such facts with any distance principle is clear. More importantly, however, observe that it is quite impossible to interpret (1) in such a way that the subject of *kissing* is read as either *Harriet* or *Betty* singly. But this fact follows directly, under the dependence assumption, from:

- (3) a. *Harriet_i and Betty_j spoke to you about her_i kissing Ralph.
 b. *Harriet_i and Betty_j spoke to you about her_j kissing Ralph.

That is, a sentence of the form:

- (4) Harriet and Betty spoke to you about her kissing Ralph.

must be interpreted such that *her* designates an individual distinct from either Harriet or Betty. This is then striking support for the claim that constraints on PRO-NOMINALIZATION predict otherwise ad hoc constraints on EQUI.

It is important to observe such parallelisms as:

- (5) a. Harriet_i and Betty_j argued about visiting you.
- b. Harriet_i argued with Betty_j about visiting you.

and:

- (6) a. Harriet_i and Betty_j argued about their_{i,j} visiting you.
- b. *Harriet_i and Betty_j argued about her_i visiting you.
- c. *Harriet_i and Betty_j argued about her_j visiting you.
- (7) a. Harriet_i argued with Betty_i about her_i visiting you.
- b. Harriet_i argued with Betty_j about her_j visiting you.
- c. Harriet_i argued with Betty_j about their_{i,j} visiting you.

That is, the fact that (5a) is interpretable only as referring to a joint visit, correlates with the fact in (6) that only a joint referential pronoun is possible. Conversely, the fact that (5b) is interpretable as referring to either a joint visit or to a single visit by either lady correlates with the possibility of all of the pronouns in (7).

Rather similar arguments can be constructed from facts having to do with what Ross and Lakoff have referred to as *split antecedents*, in cases where one antecedent of a pronoun precedes it and another follows. In examples like (7c) we see split (i.e. not coordinated) antecedents, but where both precede the appropriate pronoun. Consider then:

- (8) a. Mary_i and John_j argued about their_{i,j} getting married in a church.
- b. Mary_i argued with John_i about their_{i,j} getting married in a church.
- c. *Mary_i argued about their_{i,j} getting married in a church with John_j.

A sentence like:

- (9) Mary argued about their getting married in a church with John.

can only be interpreted in such a way that *their* does not refer to *Mary* and *John*. This indicates some kind of pronominalization constraint barring “surrounding” split antecedents, i.e. where one precedes and the other follows the plural pronoun. But notice:

- (10) a. Mary and John argued about getting married in a church.
- b. Mary argued with John about getting married in a church.
- c. Mary argued about getting married in a church with John.

Both (10a, b) can be interpreted such that the subject of *getting married* is coreferential to *Mary* and *John* jointly. But this is impossible for (10c). This sentence can be inter-

preted such that the subject is *Mary* alone or such that it is an unspecified NP. Further examples:

- (11) a. John and I argued about shaving ourselves.
- b. John argued with me about shaving ourselves.
- c. *John argued about shaving ourselves with me.

These restrictions correlate directly with:

- (12) a. John and I argued about our shaving ourselves.
- b. John argued with me about our shaving ourselves.
- c. *John argued about our shaving ourselves with me.

Hence again the distributional possibilities for EQUI follow peculiar and ad hoc constraints on PRONOMINALIZATION in a definite way. Just as plural pronouns cannot have "surrounding" split antecedents in these *about* cases, the pronoun Doom cannot have such antecedents.

F. Some Pieces of Noncounterevidence

We have been arguing for the fact that operation of EQUI is dependent on its taking as input structures in which pronominalization constraints are already stated. There are two similar appearing but actually quite distinct classes of cases which might be taken to indicate the opposite situation. These are illustrated respectively by (1) and (2):

- (1) a. Going there was fun.
- b. Kissing Betty is difficult.
- c. Hitting Jack over the head was unwise.
- (2) a. Going there was considered.
- b. Kissing Betty in public was condemned.
- c. Invading China was proposed yesterday.

In all of these sentences we have main clauses without occurrences of Surface NP and subjectless complement clauses. And on the face of it the sentences in (1) do not differ in any significant way from those in (2). I would like to argue, however, that those in (1) are in fact a function of EQUI, and support or at least are consistent with the claim that this rule is dependent on PRONOMINALIZATION. Those in (2), on the other hand, do not, I claim, involve EQUI at all. Let us consider the sentences in (2) first.

These are in fact short passives. Each of the verbal forms is of the type which occurs in long passives, that is, those with explicit *by* phrase:

- (3) a. Going there was considered by the students.
- b. Kissing Betty in public was condemned by the Right-Sex Committee.
- c. Invading China was proposed by the dwarf general.

It is natural then to derive short passives from ordinary passives by a rule which deletes the “unspecified”²² NP filling the agent function. However, we observe that there is an interesting constraint on these “unspecified” NP. They cannot enter into pronominalization relations. Compare:

- (4) a. Betty was ravished by a madman_i but they caught him_i an hour later.
- b. *Betty was ravished (by “unspecified”) but they caught him (unspecified) an hour later.
- (5) a. Being ravished by Herman_i amused Betty even though he_i was uneducated.
- b. *Being ravished amused Betty even though he was uneducated.

The pronouns *him/he* in (4b) and (5b) cannot refer to the unspecified ravisher of Betty.

Consequently, if sentences like (2) were instances of EQUI application, they would be serious counterexamples to the claim that EQUI operates on pronominal forms since there are no pronominal forms which are such as to yield underlying structures for a sentence like (2b) of the form:

- (6) Unspecified pro_i’s kissing Betty in public was condemned by unspecified pro_i.

Moreover, notice that not only is there no basis for postulating the existence of structures like (6), they would in any event predict the wrong interpretation for sentences like (2b). (6) would predict that the interpretation of (2b) is that the unspecified being(s) doing the condemning were the same as those doing the kissing. But (2b) does not imply this at all.

This suggests, of course, that EQUI, which requires just the kind of coreference indicated in (6) but not perceived in (2b), is *not* applied in the derivation of sentences like (2b). And, in fact, there is syntactic ground for claiming that the deleted unspecified subjects in sentences like (2) are a function of a rule of complement subject deletion which is *not* subject to coreference constraints.

Consider verbs like *like*, *approve of*, etc. which clearly involve just such a non-coreferential erasure:

- (7) a. I like smoking.
- b. Harry disapproves of moonlighting.
- c. Harry discussed diving.

(7a) has an interpretation that the subject of *smoking* is a coreferent of the subject of *like*, but it also has one where the subject of *smoking* is unspecified. (7b) has, for me, only the latter interpretation. (7c) is ambiguous like (7a). We note that in the un-

²² Of course, exactly how unspecified NP are to be represented precisely is open, as are many questions about their semantic interpretation.

specified subject cases, there is a constraint on the type of verbal element which can form the complement sentence:

- (8) a. *Harry disapproves of being fat.
- b. *Lucille disapproves of knowing French.

It seems that this verbal element must be active or nonstative, a condition failed by most adjectives and verbs like *know*. Significantly then, we observe that just this restriction is manifested by sentence types like (2):

- (9) a. *Knowing French was considered.
- b. Learning French was considered.
- (10) *Being fat was condemned.
- (11) a. *Being amusing to Harry was proposed yesterday.
- b. Amusing Harry was proposed yesterday.

There is thus good reason to conclude that the sentences in (2) do not involve EQUI, but rather the rule which deletes *unspecified* subject complements in sentences like (7). Consequently, the pronominalization illustrated by (4) and (5) has no bearing on the dependence of EQUI on pronominalization constraints.

Consider now the sentence types in (1). I will argue that these do involve EQUI, albeit with respect to a particular pronoun. First, observe that they do not manifest the nonstative constraint of sentences like (2):

- (12) a. Knowing French was fun.
- b. Being fat was difficult.
- c. Looking stupid was unwise.

They do, however, as observed by Lees and Klima (1963, 21), manifest a crucial constraint on reflexives; namely, the complement can contain only one reflexive form, *oneself*:²³

- (13) a. Shaving oneself is no fun.
- b. *Shaving themselves was no fun.
- (14) a. Criticizing oneself fairly is difficult.
- b. *Criticizing herself fairly is difficult.
- (15) a. Voting for oneself was unwise.
- b. *Voting for herself was unwise.

This constraint, together with what is known independently about reflexive forms, suggests that these complements involve subjects with the pronoun *one*. It is striking then that the main clause predicates are of just the type which can in fact contain *one*:

- (16) a. Going there was fun for one.
- b. Kissing Betty is difficult for one.
- c. Hitting Jack over the head was unwise of one.

²³ Or two, if one includes the colloquial variant of *oneself*, *yourself*.

These seem at worst rather clumsy and stilted, but their interpretative identity to the sentences of (1) is clear. Notice further that *one* is a human or personal NP and that predicates like *fun*, *difficult* take freely the class of such NP. Consequently, the facts of sentences like (1) are reduced to perfectly normal operation of EQUI, if they are given structures like:

- (17) One's going there was fun for one.

Such an analysis automatically explains the reflexive constraint, is consistent with the fact that predicates like *fun* take personal NP freely, and requires no more addition to the grammar than a *one* deletion rule.

Notice that the analysis (17) of sentences like (1a) is consistent with their interpretation in just the way the analysis (6) was not consistent with the interpretation of sentences like (2b). That is, (1a) is understood such that the beings who went are the beings who had fun.

As a final contrast between sentences like (1) and (2), observe that, whereas the former are restricted to *one* reflexives, the latter permit no reflexives at all:

- (18) a. *Shaving oneself was considered.
 b. *Shaving myself was considered.
 c. *Shaving yourself was considered.
 d. *Shaving themselves was considered.

This confirms the contrast between “unspecified” NP and *one*. In general, the possibility of *oneself* reflexives in complements is the best test for deleted *one*.

It turns out, I think, that an amazingly large class of forms in English are derived by way of the *one* deletion rule. These probably include:

- (19) a. Adjectives like *clever*, *wise*, *foolish*, etc. in sentences like:
 (i) Going there was foolish, wise, etc.
 b. Adjectives like *tough*, *easy*, *difficult*, *hard*, nouns like *bitch* in sentences like:
 (ii) Going there was tough, a bitch, etc.
 c. Adjectives like *amusing*, *boring*, *disgusting*, etc. in sentences like:
 (iii) Going there was amusing, boring, etc.
 d. Adjectives like *obvious*, *clear* in sentences like:
 (iv) That is obvious, clear.
 e. Adjectives like *important*, *significant*, *relevant*, etc. in sentences like:
 (v) Shaving oneself is important, irrelevant, etc.

In addition I think *one* is the deleted element in contexts like:

- (20) a. the right thing ____ to do
 b. Harry is too tough ____ to beat.
 c. It is nice ____ to shave {*himself} ____ {oneself}.
 d. It is impolite ____ to burp in public.

As a function of the wide distribution of this underlying *one*, which deletes by way of the *one* erasure rule, the significance of EQUI is much greater than would appear at first glance. The operation of the *one* erasure rule disguises an enormous mass of cases in which EQUI operates.

VI. The Noncyclical Character of Complement Subject Deletion

In earlier sections we seemed to have shown that:

- (1) EQUI is cyclical
- (2) PRONOMINALIZATION is not cyclical

However, in Section V we presented a wide body of facts which show clearly that application of the rule EQUI is dependent on prior application of the rule PRONOMINALIZATION. Only this assumption can eliminate the necessity of having to state as part of EQUI a sizable set of peculiar and ad hoc restrictions which must in any event govern PRONOMINALIZATION. This dependency is, however, incompatible with the joint assertion of (1) and (2). If EQUI were truly cyclical, its application could not possibly be dependent on a noncyclical rule of PRONOMINALIZATION. If PRONOMINALIZATION is a postcyclical rule, this conclusion is self-evident.

But suppose, clutching at straws, one were to try to make PRONOMINALIZATION a last-cyclical rule ordered before EQUI. That is, suppose one were to suggest the grammar:

- (3) PRONOMINALIZATION (last-cyclical)
EQUI (cyclical)

This avails almost nothing. For observe that in most cases a cyclical EQUI must apply before the last cycle. For example:

- (4) *[you think [finding that out] disturbed each man]]

 \underline{s}_3
 $\underline{s}_2 \underline{s}_1$
 \underline{s}_1
 $\underline{s}_2 \underline{s}_3$

Consequently, restrictions like those illustrated by (4), which are a function of PRONOMINALIZATION, would have to be added to EQUI, which must apply in the derivation of strings like (4) before the last cycle, while given (3) PRONOMINALIZATION could apply only on the final run through the rules. Consequently, a grammar structure like (3) does not help eliminate the incompatibility between (1) and (2) on the one hand, and the dependence of EQUI on PRONOMINALIZATION on the other.

There is in fact only one way to eliminate this inconsistency as far as I can see. And that is to recognize that EQUI is not a cyclical rule, or rather to state things somewhat more naturally, that there is no cyclical *deletion* rule for complement subjects. In view of the apparently convincing argument for the cyclicity of EQUI given in

Section III, this may seem like an intolerable conclusion. Before indicating why it is not, let us give one further strong argument showing that EQUI cannot be a cyclical deletion rule.

There are a number of restrictions on the distribution of *wh*-marked NP in both question and relative clause constructions in cases where these NP enter into pro-nominalization relations. For instance, we find sentences like:

- (5) a. Who_i claimed Mary kissed him_i?
- b. The one_i who_i claimed Mary kissed him_i was Harry.
- (6) a. Who_i criticized a woman who kissed him_i?
- b. The one_i who_i criticized a woman who kissed him_i was Harry.

but none like:

- (7) a. *Who_i did he_i claim Mary kissed?
- b. *The one_i who_i he_i claimed Mary kissed was Harry.
- (8) a. *Who_i was a woman who kissed him_i criticized by?
- b. *The one_i who_i a woman who kissed him_i was criticized by was Harry.

I have argued at great length (Postal 1968) that the proper formulation of these restrictions involves a principle which blocks derivations in which a transformational rule crosses one NP over another with which it is a coreferent under particular complex conditions for different rule and NP types. The difference between such sentences as:

- (9) a. Who_i claimed Mary kissed him_i?
- b. *Who_i did he_i claim Mary kissed?

is thus exactly that (9a) is derived in such a way that the *wh*-NP does not cross its coreferent while (9b), where the *wh*-NP comes from the object of *kissed*, does involve such crossing.

Let us consider, therefore, some cases where such crossing restrictions involve NP of the type which can or must undergo EQUI, that is, where they are subjects of complement sentences or complementlike nominalizations subject to EQUI. Observe that there are sentences like:

- (10) Who did Bill's punching Harry annoy the most?

Such forms are a bit clumsy but clearly wellformed. In them, EQUI has not applied since the complement subject, *Bill's*, and main clause NP, *who*, are not coreferents. What in fact are the question analogues of sentences like (10) where this coreference is manifested? There are sentences like:

- (11) Punching Harry annoyed me the most.

What then are the analogues of (11) where the object of *annoy* is questioned? Given known rules, such sentences would have to have a form like:

- (12) *Who did punching Harry annoy the most?

But such sentences are clearly illformed. Moreover, the parallel relative clauses, either restrictive or appositive, are equally bad:

- (13) a. *the one_i who_i punching Harry annoyed the most
- b. *the man_i, who_i punching Harry annoyed the most

Most significantly, the analogue sentences involving nominalizations rather than pure complements are also bad:

- (14) a. *Who_i did the realization that God was dead disturb the most.
- b. *The one_i who_i the realization that God was dead disturbed the most
 was Jack.
- c. *The man_i, who_i the realization that God was dead disturbed the most
 was Jack.

The question arises how these restrictions are to be formulated. Given the existence of EQUI plus the crossing restrictions illustrated in (5)–(9) there is of course only one answer. The violations in (12)–(14) are a function of the same coreferent crossing restrictions illustrated in (5)–(9). That is, the restrictions in (12)–(14) are themselves crossing restrictions.

But consider this conclusion. A crossing restriction is a restriction on crossing one NP over another with which it is coreferential. In order for (12)–(14) to illustrate crossing restrictions, it must be the case that the rule which does the crossing applies in such cases *before* the rule which deletes the complement subjects, that is, before EQUI. The rules involved in (12)–(14) are WH Q MOVEMENT and WH REL MOVEMENT. But these are easily shown to have to be either last-cyclical or post-cyclical rules, and each can easily be shown to have to precede PRONOMINALIZATION (cf. Section IV above). This being the case, however, restrictions like those in (12)–(14) cannot be explained as crossing restrictions if EQUI is a cyclical *deletion* rule. To see this we need only consider examples like:

- (15) *Who did you think discovering that Bill was dead annoyed the most?

This is illformed because the *wh*-form *who* has crossed its coreferent, the subject of *discovering*, under the operation of WH Q MOVEMENT. That is, it is illformed for the same reasons as are:

- (16) a. *Who_i did you think his_i discovery that Bill was dead annoyed the most?
- b. *Who_i did you think the Doom_i discovery that Bill was dead annoyed
 the most?

However, in order for the restrictions in (15) and (16b) to be crossing restrictions, the rule WH Q MOVEMENT must apply before EQUI. But the former is a last-cyclical or postcyclical rule. Consequently, regardless of how this rule is ordered with respect to EQUI, the latter must, if it is cyclical, apply first to the underlying forms of examples like (15). This follows since such an underlying structure would be:

- (17) [you think [his_i discovering [that Bill was dead]_i] annoyed who_i the most]]
 $\frac{\text{S}_3}{\text{S}_2}$ $\frac{\text{S}_2}{\text{S}_3}$

Here the last cycle is defined by S₃. A cyclical EQUI must necessarily apply to delete his_i on the S₂ cycle. But WH Q MOVEMENT cannot apply until the S₃ cycle. Consequently, if EQUI is cyclical, WH Q MOVEMENT must apply to structures like (17) in such a way that coreferents are not crossed. Therefore the assumption that EQUI is a cyclical *deletion* rule leaves the crossing restrictions manifested by sentences like (15) and (16) completely unexplained. That is, it fails to explicate at all the fact that such restrictions follow directly from those of the type illustrated in (5)–(9) and (16a). We conclude that the rule of complement subject deletion in cases like (15) cannot be a cyclical deletion rule.²⁴

VII. Towards a Resolution of the Inconsistency

We are now faced with the logical incompatibility of the conclusion of Section IV that EQUI is a cyclical *deletion* rule and the conclusions of Section V that EQUI cannot be cyclical. Since I believe the conclusion of Section V is unavoidable, it must be that the argument of Section III is either fallacious or based on at least partially false premises.

Let us recall briefly the Lakovian argument that EQUI operates cyclically. The essence of the demonstration is the apparent fact that clearly cyclical rules like RAISING and PASSIVE distort phrase structures in such a way that the defining configurations for the correct application of EQUI will not be met after these cyclical

²⁴ The argument given in the text is, as far as I know, completely valid for my dialect. Since writing this section, however, I have become aware that the factual domain under discussion is differentiated in an amazingly complex way by dialectal contrasts. In fact, I have discovered at least four different dialects with respect to the phenomena just discussed. Let us refer to these as A, B, C, D. The differentia of these dialects are of two sorts. One involves the fact that a whole class of crossing restrictions for unbounded movement rules like the *wh* reorderings are not present in some dialects. In particular, while all dialects seem to have violations when such rules cross one coreferent C_a over another C_b, in cases where the immobile C_b commands (in Langacker's sense) the moving C_a (that is, no one I have found accepts sentences like VI (6), (8b)), some dialects do not have violations when C_a commands the immobile C_b. That is, dialects divide on accepting sentences like VI (7).

Given this contrast, the four dialects A, B, C, D are defined as follows. A, the dialect of the present writer, that described in the text, has full crossing restrictions, i.e. independent of command relations, and illformedness in cases where a crossed NP is deleted by EQUI. Dialect B also has full crossing restrictions, in all cases where the crossed pronoun remains in the Surface Structure. But, in cases where the crossed pronoun is deleted by EQUI, the resulting sentences become wellformed. Dialects C and D have only partial crossing restrictions, that is, they never have violations when a commanded NP is crossed. C differs from D in this. For C, when a crossed commanded pronoun, otherwise acceptable, is deleted by EQUI, the result becomes illformed. D is the dialect in which neither crossing of commanded pronouns nor deletion has any illformedness consequences. Dialect A is thus the most restrictive. Dialect D the most permissive. Dialects B and C are in between, with "opposite" paradigms with respect to whether or not deletion of crossed, commanded pronouns yield wellformed results from structures otherwise fated to be illformed or illformed ones from structures otherwise fated to be wellformed. Needless to say, an extensive and detailed study of these different dialects has not been made and these descriptions are highly tentative and fragmentary.

Overall then, only dialect A supports the argument of the text. The facts in dialect D are irrelevant to the claims. Those in both dialects B and C seem inconsistent with the argument since in these the operation of EQUI seems to "change" the grammaticality of the structures in crossing cases. At the moment, I have no explanation or account of these facts.

rules have applied. In short, these rules move the controller NP in such a way that it no longer stands in a generally specifiable relation to the NP whose deletion it determines. For instance, given a structure like:

- (1) [Harry_i want [Lucille see [Harry_i try [Harry_i kiss Betty]]]]
_{s₄} a _{s₃} _{s₂} b _{s₁} c _{s₁s₂s₃s₄}

which underlies the sentence

- (2) Harry wants to be seen by Lucille trying to kiss Betty.

Here the *c* occurrence of *Harry_i* must be deleted under EQUI by identity to the *b* occurrence. Yet this latter will undergo RAISING and PASSIVE on the *S₃* cycle. After this, the *b* occurrence is no longer in position to determine the deletion of the *c* occurrence. This naturally leads to the suggestion that EQUI apply in this case on the *S₂* cycle, before the *b* occurrence of *Harry_i* is raised and passivized on the *S₃* cycle. Since, moreover, EQUI must apply again, deleting the *b* occurrence in terms of the *a* occurrence, which can only happen after the *b* occurrence has become a derived subject, the argument for cyclical application of EQUI becomes apparently overwhelming.

However, despite the extreme plausibility of this argument, there is a way of getting around it. The general logic of the argument is that a particular complement subject has to be deleted on a cycle *S_j*, because on *S_{j+1}* cyclical rules will radically alter the position of the controller NP in the next highest sentence, which determines the deletion of the complement subject. However, close scrutiny of such an argument reveals that what it entails at the best is not that the *deletion* must be carried out cyclically but rather only that those NP which are ultimately to be deleted *must be marked for this fact cyclically*. That is, suppose in (1) on the *S₂* cycle the *c* occurrence of *Harry_i* is marked with some feature, let us call it [+Doom], a feature assigned by a rule to a particular NP, *NP_a*, just in case:

- (3) a. *NP_a* is the subject NP of a complement sentence *S_i*;
 b. there is a coreferent of *NP_a* in the immediately higher sentence *S_{i+1}*.

Given a cyclical rule of DOOM MARKING, there is no argument whatever in the facts treated by the Lakovian cyclic analysis which requires that the actual erasure of [+Doom]-marked NP be carried out cyclically. The argument only shows that after all cyclical rules have applied the configurations which specify the correct relations between the controller NP and complement subject no longer obtain. But this can be gotten around by marking the NP to be deleted by a cyclical marking rule like DOOM MARKING.

Consequently, the right approach to the inconsistency of the cyclical demonstration of Section III and the noncyclical demonstration of Section VI seems to involve the fragmentation of EQUI into at least two separate operations: one a cyclical rule of feature assignment like DOOM MARKING, the other a last-cyclical or postcyclical rule which actually erases complement subjects containing the feature

specification [+Doom] together with those features which indicate that they have undergone PRONOMINALIZATION.

Notice now that, unlike the approach where EQUI is a single rule, the fragmentation approach is not inconsistent with all those facts of Section V which show that EQUI is dependent on prior application of PRONOMINALIZATION, nor is it inconsistent with the argument from crossing restrictions of Section VI showing that the deletion of complement subjects must follow application of last-cyclical or post-cyclical rules like WH Q MOVEMENT and WH REL MOVEMENT. All of these facts are made consistent by a grammar with the properties:

- (4) DOOM MARKING (cyclical)
 - WH Q MOVEMENT, WH REL MOVEMENT (last- or postcyclical)
 - PRONOMINALIZATION (last- or postcyclical)
 - DOOM ERASURE

where DOOM ERASURE is the rule that actually removes those complement subject NP that are deleted. Such a grammar is, as far as I know, consistent with all of the facts that have been discussed as pertinent to complement subject deletion under co-reference.

Of particular interest is the consistency of the grammar (4) with some further data. The Lakovian argument that EQUI was cyclical depended on the controller NP being moved away from its original position by cyclical rules like RAISING and PASSIVE. Observe, however, that a similar movement is performed by rules like WH Q MOVEMENT.

- (5) a. Who do you think wanted to become a vampire?
- b. the man who Tom claimed you saw trying to rob the bank

In (5a), it is the NP *who*, ancestral subject of *wanted*, which determines the deletion of the subject of *become*. In (5b), it is the NP *who*, ancestral subject of *trying*, which determines the deletion of the subject of *rob*. However, as we showed earlier, particularly with the crossing restriction argument of Section VI, the movement rules involved in these cases must apply before the complement subjects are erased. Consequently, the controller NP cannot be in the appropriate places to determine deletion when the NP are actually erased. This causes no difficulty for the grammar (4), however. Given (4), a remote structure like:

- (6) [_{s₃} you think [_{s₂} who_i wanted [_{s₁} he_i become a vampire]]]] _{s₁s₂s₃}

is turned into a structure:

- (7) you think who_i wanted [[he_i [+Doom]]] become a vampire

by cyclically applying DOOM MARKING at a point where the subject of *wanted* is still in the immediately higher sentence above [he_t become a vampire]. Then only postcyclically or final-cyclically is the subject of *wanted* yanked away by WH Q MOVEMENT, and only after this can DOOM ERASURE apply to the subject of *become*,²⁵ triggered by the much earlier, cyclically assigned feature [+Doom].

VIII. Some Implications

A. Possible Principled Nature of the Result

We were able to construct the skeleton of a consistent grammar for complement subject deletion by fragmenting the previously proposed cyclical rule EQUI into at

²⁵ Let no one imagine, however, that this description either has, or is thought by me to have, solved all of the problems involved in complement subject deletion. There are vast difficulties remaining and a clear account of how to formulate either DOOM MARKING or DOOM ERASURE is far away. Indeed, it is far from obvious that there is just one rule of DOOM MARKING. It is quite possible, even likely, that several rules mark complement subjects as having to be deleted.

Observe in particular that we have said nothing which indicates how deletion is related to the contrast of *that*-clauses versus infinitival and gerundive clauses. Deletion is never possible in *that*-clauses:

- (i) I expect that I will win; Harry_t expects that he_t will win.
- (ii) *I expect that (will) win; *Harry expects that (will) win.
- (iii) I expect to win; Harry expects to win.

We have said nothing, however, about how to prevent deletion in *that*-clauses. One approach, that suggested in Kiparsky and Kiparsky (to appear), is that whenever erasure occurs, conversion to infinitival/gerundive form is obligatory. Since there are infinitival and gerundive clauses which contain subjects, this involves multiple rules of infinitival/gerundive marking. Another approach is to define the erasure rule in terms of a *that*-clause/non-*that*-clause contrast.

The issue is even more complicated than it appears because of various differences in *that*-clause/non-*that*-clause forms with respect to optionality and obligatoriness of deletion. For example, as (i) and (ii) suggest, the deletion and concomitant shift from *that*-form is optional with a verb like *expect*. A verb like *desire*, on the other hand, provides a paradigm like:

- (iv) I desire that you come.
- (v) I desire you to come.
- (vi) *I desire that I come.
- (vii) I desire to come.

Here then conversion to infinitival form with concomitant deletion is *required* when the complement subject is a coreferent of the main clause subject, but *allowed* even if this condition is *not* met. A still different paradigm is manifested by verbs like *demand*:

- (viii) I demand that you go.
- (ix) *I demand you to go.
- (x) *I demand that I go.
- (xi) I demand to go.

Here coreference requires deletion/infinitival form, but, unlike *desire*, infinitival form is not permitted in those cases where deletion would not occur. Moreover, there are dialect differences. Everyone has:

- (xii) I hope to go. = I hope that I will go.

but dialects differ on permitting:

- (xiii) I hope for Bill to go. = I hope that Bill will go.

The present writer, for example, does not have (xiii) in his dialect. Questions raised by facts in this footnote remain almost entirely open as far as I can see.

least two distinct operations, one the cyclical feature marking DOOM MARKING, the other the post- or last-cyclical DOOM ERASURE. This may not seem like much of an alteration. But it has some significant consequences and implications beyond the obvious. First of all, by establishing the order of rules:

(1) PRONOMINALIZATION
DOOM ERASURE

we may be said to have correctly *described* certain facts, namely, those showing the dependence of complement subject deletion on previous application of PRONOMINALIZATION. However, we have not really *explained* these facts, or, rather, we have explained them only to a limited degree. A higher degree of explanatory power could be achieved if it were possible to show that the ordering in (1) is not simply an accidental property of English but rather a consequence of some principle of grammar common to all languages. I strongly suspect that this is the case and the principle which is relevant is, in an informal form at least, fairly obvious.

The ordering in (1) means that DOOM ERASURE, a rule which deletes one of a pair of coreferent NP, can only apply after these NP have undergone PRONOMINALIZATION. The natural generalization is the principle that any deletion of NP subject to conditions of coreference must be such as to delete only pronominal NP. Slightly more precisely, but still quite informally:

(2) Universal Deletion Constraint

If a transformation T deletes an NP_a subject to the existence of a co-referent NP_b , NP_b , in the same structure, then at the point where T applies, NP_a must be pronominal.

This principle is quite vague since, among other things, we have not specified how coreference is to be represented precisely, and we have not given any precise account of the notion "pronominal". Moreover, (2) may or may not be an independent principle of grammar. Conceivably, it might just be a consequence of some other principles. For example, (2) could well be a theorem following from principles which guaranteed that erasure rules in general, or at least those relevant to NP, must necessarily apply at or very near the ends of grammars.

The empirical content of (2) at the moment is the claim that given any process of NP deletion under coreference, like complement subject deletion in English, it will be possible to find evidence, of the type presented for this rule in English in Section V, that the relevant erasure rule is dependent on PRONOMINALIZATION. In particular, there are clearly several other rules in English which delete NP subject to coreference. The claim is that grounds can be found for making these subject to previous application of PRONOMINALIZATION. One such rule is that which

deletes the subject of the second of a pair of binary conjoined sentences subject to co-reference to the subject of the first sentence of the pair:

- (3) a. Harry smiled at Betty and left the room.²⁶
- b. The gorilla ate Louise and then looked hungrily at Lucille.

In this case, I do not at the present know of any evidence which would support (2).

A second relevant rule is that involved in the derivation of sentences such as (4a) from structures similar to sentences like (4b):

- (4) a. Having no boat, Harry was forced to swim.
- b. Since he_i had no boat, Harry_i was forced to swim.

In the case of this deletion rule, let us call it SINCE SUBJECT ERASURE, evidence pertinent to (2) can be found. For instance, the analogue of the Indefinite Argument given for EQUI in Section V.B holds here:

- (5) a. *Having no boats, everyone had to swim.
- b. *Since $\{he_i\}$ had no boats, everyone had to swim.
- (6) a. *Having no sense of decency, each senator defended the invasion.
- b. *Since $\{they_i\}$ had no sense of decency, each senator_i defended the invasion.

but:

- (7) a. Having no sense of decency, each one of the senators defended the invasion.
- b. Since $they_i$ had no sense of decency, each one of the senators_i defended the invasion.

Just so a dependence argument can be constructed from facts like:

- (8) a. *Discovering Bill_i was sick, he_i decided to call the doctor.
- b. *Since he_i discovered Bill_i was sick, he_i decided to call the doctor.
- (9) a. Discovering he_i was sick, Bill_i decided to call the doctor.
- b. Since he_i discovered he_i was sick, Bill_i decided to call the doctor.

We thus see that for SINCE SUBJECT ERASURE dependence on PRO-NOMINALIZATION arguments can be constructed, quite like those for EQUI. To this extent, additional support for the Universal Deletion Constraint (2) is provided

²⁶ These manifest, of course, an ambiguity. On one term, not that of interest, they manifest conjoined verb phrases, i.e. a bracketing structure:

(i) Harry [_{VP} [_{VP}]] [_{VP} [_{VP}]]

On the term of relevance, they manifest, on the contrary, conjoined S, with the bracketing:

(ii) [[Harry . . .] []] []

and the general notion that coreferential deletion is governed by such a constraint becomes more than simply an *a priori* possibility.

Other rules in English requiring study from the point of view of the validity of (2) include that involved in the deletion of the relative pronoun in pairs like:

- (10) a. the reptile which Harry carries around
- b. the reptile Harry carries around

Another relative deletion rule is that involved in pairs like:

- (11) a. the oldest man who ever batted 350
- b. the oldest man ever to bat 350

Similarly, there is a deletion rule involved in the relations of such pairs as:

- (12) a. John is so ugly that Mary won't kiss him.
- b. John is too ugly for Mary to kiss.

This rule seems particularly relevant since observe that in a sentence like:

- (13) John's father is too nasty for us to elect.

the object of *elect* must be *father*. But in a sentence like:

- (14) John's father is so nasty that we can't elect him_i.

it is very difficult to interpret *him_i* as a coreferent of *John's*. What is peculiar here is that this pronominal blockage is not nearly so sharp as the nonambiguity of sentences like (13). An erasure rule quite similar to that involved in intensive *too* constructions operates in such pairs as:

- (15) a. the man who it is right for us to send
- b. the right man for us to send

There are deletions involved in constructions like:

- (16) I visited France in order to assassinate DeGaulle.

Finally, there is the rule involved in such constructions as:

- (17) John annoyed Harry by pinching Lucille.

Here the subject of *pinching* is understood as *John* and not *Harry*. Observe, however, that in a structure like:

- (18) John annoyed Harry by his pinching Lucille.

his can be interpreted as a coreferent only of *John*. This fact is independent of whether or not one finds (18) wellformed or not, a question of the obligatoriness of the deletion. For this operation, then, there appears to be the by now familiar correlation of pronominalization constraint with deletion constraint.

Overall, then, even restricting attention to English, there is a significant body of deletion rules linked to coreference which can be studied to determine the validity of (2).

B. *The Place of PRONOMINALIZATION in the Grammar*

We have proceeded throughout under the assumption that PRONOMINALIZATION is an unchallenged transformational rule of English, that rule which somehow involves statement of all the varied pronominalization constraints we have considered. At one time this would have been a conservative, challenge-free assumption. Recently, however, it has been suggested that there is no such rule (Lakoff, to appear) and that constraints on pronominalization should be stated in the form of Surface Structure Constraints or Output Conditions.²⁷ That is, it has been suggested that (almost?) all constraints on pronominalization can be treated as filters which throw out incorrect combinations. The particular claim is that no truly transformational operations of the grammar can be shown to have to follow the statement of pronominalization restrictions.

From this point of view, the demonstration that the operation of DOOM ERASURE is dependent on application to structures in which pronominalization constraints are already specified takes on additional significance. It means that the claim pronominalization constraints are *in toto* Output Conditions cannot be maintained. This subject is a highly complex and poorly understood one, so I will say little more about it here.²⁸ Suffice it to say that the advocate of a purely Output approach to pronominalization constraints must face the question of how the grammar is to represent the correlation between restrictions on pronominalization and restrictions on

²⁷ This notion was introduced in Ross (1967a) and greatly developed by Perlmutter (1968), who provides overwhelming evidence that such apparatus must be countenanced by linguistic theory.

²⁸ I do feel, however, that there is much evidence independent of that presented in this paper to indicate that pronominalization constraints cannot be fully stated after all transformational rules have applied.

²⁹ One fairly desperate move which advocates of the Output Condition approach might be led to here would be what can be called a phonological approach to deletion. Suppose it is claimed that rather than being a syntactic rule, deletion is phonological. That is, the syntax itself would not delete NP marked with the feature [+Doom]. Rather, the phonology would state that such NP have a null pronunciation. Under this conception, the Surface Structure of sentence like:

(i) Going there alone bothered Tony_i.
would be:

(ii) [Doom's
[+Doom]] going there alone bothered Tony_i.
[+Pro]

Consequently, certain Output Conditions that applied to Surface Structures like:

(iii) His_i going there alone bothered Tony_i.

could automatically cover (ii). This amounts to taking our earlier Doom pronoun notation seriously as a proposal about syntactic structure. While such an approach cannot be ruled out a priori, it seems highly implausible. Its attractiveness will dissolve to the extent that independent evidence of the type referred to in footnote 28 can be provided showing that *nondeletional* transformational operations must follow the statement of pronominalization constraints.

complement subject deletion.²⁹ One final word. Note that the fact, if it is a fact, that *not all* pronominalization constraints can be represented as Output Conditions does not mean that *no* pronominalization constraints can (must) be so stated. Since Lakoff has provided cases where stress level and nominal length are involved in acceptability, it is hard to imagine stating all pronominalization constraints without Output Conditions. Moreover, there are other cases of a similar sort not treated by Lakoff. For instance, in my dialect, the acceptability of the following sentences is inversely related:

- (1) a. His mother visited Tony.
- b. His friend's mother visited Tony.
- c. His friend's cousin's mother visited Tony.
- (2) a. Tony's mother visited him.
- b. Tony's friend's mother visited him.
- c. Tony's friend's cousin's mother visited him.

That is, the acceptability of taking *his* and *Tony* as coreferents increases from somewhat dubious in (1a), to fine in (1c), but decreases from fine in (2a) to somewhat dubious in (2c). It is hard to imagine stating such facts in any other way than with filters taking into account surface variables like depth of (nominal) embedding and dimensions like forwards versus backwards.

Appendix: Unification and Explication of the Modal Constraints

In Section V.D a number of constraints on pronominalization relations were discussed which were apparently linked to the occurrence of certain modal elements in *that-* or *if-* clause complements. For example, it was observed that in sentences like:

- (1) Harry asked Bill if he would (please) help Martha.

the *he* can only be a coreferent of *Bill*. We isolated a number of apparently distinct restrictions of this sort, observing their correlation with the operation of EQUI in "corresponding" infinitival complements. While intuitively there is some relation between the different modal constraints discussed, no unifying principle was presented. Here I would like to suggest that such a principle can be found.

Note first that every verb involved in modal constraints is one which is *descriptive of linguistic performances*. These include:

- (2) *promise, tell, warn, vow, ask, shout, moan, groan*

Call this Fact A. Fact B is this. If one considers such verbs in cases where they involve infinitival complements, that is, in cases where EQUI must apply, in each case the type of linguistic performance described is *nondeclarative*. For example:

- (3) a. I will tell Bill to go.
- b. You promised me to marry Greta.

- c. Harry pleaded with John to stay.
- d. Louise asked Mary where to put the garbage.

The complement in (3a) describes an *imperative*, that in (3b) a *promise*, that in (3c) an instance of *pleading-begging*, that in (3d) an instance of *questioning*.³⁰

None of these cases involve complements which describe the linguistic performance of declaring (that such and such a proposition is the case). Such performances can, with some of the relevant verbs, be described by a complement sentence, but only with a *that-clause* type. For instance:

- (4) a. Harry told Betty that she was five feet tall.
- b. Harry groaned to Betty that he was sick.

And, significantly, such *that*-clauses have no infinitival, EQUI-reduced, equivalents.

I now wish to state a fact, call it Fact C, which is, I think, the fundamental unifying link in all of the modal constraint cases, and in all of the infinitival complement structures to which they are related. Observe that all of the sentences used so far are of the type that would be traditionally labelled *Indirect Discourse*. Many of the verbs of type (2) also can occur in *Direct Discourse* constructions. For instance:

- (5) a. Leave, Harry ordered Betty.
- b. The world is coming to an end, moaned Harry to Greta.
- c. Please help me, pleaded Lucille.
- d. What should we do, Gerry asked.

There are many fascinating properties which Direct Discourse complements reveal. But the chief one for present concerns is this. In such complements, first and second person forms refer not to the addressor and addressee of the sentence respectively, but rather to the agent and indirect object of the main clause linguistic verb. Thus if Harry Lust says to Betty Kraft:

- (6) Will you marry me, Tony whispered to Greta.

me does not refer to Harry but to Tony and *you* does not refer to Betty but to Greta.

³⁰ Actually, it is rather important to observe that all of those sentences which are relevant to the present discussion which seem to be descriptive of question or interrogative performances involve a special property. Namely, "questions" like *where should Harry put the garbage*, *where should I park the car*, etc. are actually not requests for answers in the sense of statements of fact. Rather, they are requests for commands, orders, etc. This may be partially obscured by the common but quite mistaken idea that a command must necessarily have a second person (deep) subject. This is, I believe, just wrong. I can express a command even though the one to whom the command is relevant is not the addressee of my utterance. Hence if the Captain says to the Sergeant: *the corporal should move the mortar to the hill* he has expressed an imperative to no less a degree than if he had said either: *you should move the mortar to the hill* or *move the mortar to the hill*. The view that imperatives involve second person subjects is a function, I think, of the fact that many European languages have special grammatical features to mark a subclass of imperatives in which the subject of the command is a coreferent of the addressee of the command; cf., for example, the English rule to delete such subjects which yields the typical subjectless command or imperative sentence. It is notable in this regard that many American Indian languages have an imperative inflection which is totally unrestricted with respect to subject person. Iroquoian languages manifest this property.

We still have not stated Fact C. To do this, let us recall the problem which Rosenbaum's Principle of Minimal Distance was designed to explain. Given a sentence like:

- (7) I warned Betty not to kiss Harry.

we understand the EQUI-deleted subject of *kiss* to be coreferent to *Betty* and not to *I*. Fact C is this. Given a Direct Discourse linguistic sentence like (7), call it S_{DD} , in which EQUI has applied, the following principle describes whether EQUI deletes an NP which is a coreferent of the subject or of the indirect object.

- (8) Take the Direct Discourse "version" of S_{ID} , call it S_{DD} . Then:
- If the subject of the complement sentence in S_{DD} is FIRST PERSON, EQUI operation in S_{ID} deletes an NP which is a coreferent of the main clause subject.
 - If the subject of the complement sentence in S_{DD} is SECOND PERSON, then EQUI operation in S_{ID} deletes an NP which is a coreferent of the main clause indirect object.³¹

Let us illustrate this. Consider the class of Indirect Discourse cases:

- (9) a. Harry_i told Betty to marry him_i.
 b. Harry_i asked Betty to marry him_i.
 c. Harry asked Betty when to leave.
 d. Harry promised Betty to leave.
 e. Harry shouted to Betty to leave.
 f. Harry warned Betty not to leave.
 g. Harry ordered Betty to leave.

What are the Direct Discourse versions of these? For (9a) we would have:

- (10) (You) marry me, Harry told Betty.

The subject of *marry* in the Direct Discourse is *you*. Consequently, Fact C predicts that (9a) will be understood such that *Betty* is the subject of *marry*. For (9b) we have:

- (11) Will you (please) marry me, (Betty), Harry asked Betty.

³¹ Actually, (8) is a little too general and requires a further condition. This is illustrated by the contrast between:

- (i) a. John begged Bill to go.
 b. John begged (Bill?) to be allowed to go.

The Direct Discourse versions of these would probably be respectively:

- (ii) a. Please go, Bill, John begged.
 b. Please allow me to go, Bill, John begged.

The pair (ib)–(iib) is an apparent violation of (8b) since the subject of (iib) is second person and yet the deleted NP in (ib) is understood as a coreferent of the main clause subject. Clearly what is wrong here is that (8) makes no provision for the fact that rules of NP inversion may apply in the Indirect Discourse sentence. In (ib) the PASSIVE rule has applied. Consequently, a fuller version of (8) would have to insist that the constituent order of the Indirect Discourse sentence be the base order.

The same prediction. For (9c) we have:

- (12) When should I leave, Harry asked Betty.

Here the complement subject is *I*, consequently Fact C claims the subject of *leave* in (9c) must be *Harry*. For (9d) we have:

- (13) I will leave, Harry $\left\{ \begin{smallmatrix} \text{said to} \\ \text{promised} \end{smallmatrix} \right\}$ Betty.

Again Fact C predicts that the subject of *leave* in (9d) must be *Harry*. For (9e):

- (14) (You) leave, Harry shouted to Betty.

Here we predict deletion of a coreferent of the indirect object. For (9f):

- (15) Don't (you) leave, Harry warned Betty.

Here again deletion of a coreferent of the indirect object is claimed. Finally, for (9g) there is:

- (16) (You) leave, Harry ordered Betty.

and again indirect object coreference predicted.

In each case, Fact C predicts EQUI operation by coreference to either subject or indirect object, and in each case the prediction is correct. Clearly this is no accident, but must be a manifestation of certain underlying principles of grammar. To clarify these further, one requires some account of the relation between Direct and Indirect Discourse sentences. If Fact C, which represents a *correlation* between properties of "corresponding" Direct and Indirect Discourse sentences, is to provide an explanation for the operation of EQUI in Indirect Discourse sentences, it must be the case that underlying structures of such Indirect Discourse sentences manifest properties somehow linked to the surface properties of the relevant Direct Discourse sentences.

So far, the reader may be bewildered since we have said nothing of modal constraints. What, for example, has Fact C to do with modal constraints? The obvious suggestion is this. Indirect Discourse sentences of the type manifesting modal constraints are simply the Indirect Discourse "versions" of Direct Discourse sentences like (10)–(16). It is the modality marker in the *that*- or *if*-clauses of the former which indicate that the linguistic performance described was of the nondeclarative type. This immediately provides an explanation for why there is so much ambiguity in sentences of the type manifesting modal constraints. For, of course, modals can occur in declarative sentences. Consequently, a sentence like:

- (17) George told me that I should get the hell out of his cave.

can be a report of either the declarative performance (18a), or the command (18b):

- (18) a. You should get the hell out of my cave (if you know what's good for you).
 b. Get the hell out of my cave.

Consider then the hypothesis that Indirect Discourse structures with linguistic verbs like *tell*, *promise*, *ask*, etc. are “versions” of Direct Discourse sentences. What this notion of “version” means at the least is that the underlying structures of the two differ only in a restricted class of properties. Most crucially, we observe that the Direct Discourse sentences involve *a special kind of pronominalization*, that which generates first and second person forms. In Direct Discourse, a structure of the form:

- (19) $\text{NP}_x \text{ linguistic verb to } \text{NP}_y : [\dots \text{NP}_x \dots \text{NP}_y \dots]_S$

must be operated on in such a way that the embedded occurrences of NP_x and NP_y are marked with first and second person features respectively.³² I would argue that this pronominalization occurs also in the Indirect Discourse cases. Consequently, since in the latter the forms do *not* show up as *I/you*, we must take it that these shapes are determined not just by the linguistic verb pronominalization features but by these *plus those properties which indicate that the relevant NP lie within a Direct Discourse type complement*.

With these assumptions, a sentence like:

- (20) George_i asked Mary_j if she_j would (please) help him_i.

would have a more ancestral structure like:

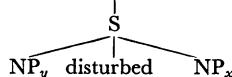
- (21) George_i asked Mary_j if $\left[\begin{array}{l} \text{Mary}_j \\ [+ \text{Second Person}] \end{array} \right]$ would (please) help
 $\left[\begin{array}{l} \text{George}_i \\ [+ \text{First Person}] \end{array} \right]$.

³² I am confident that ultimately this rule of pronominalization will be shown to underlie ordinary first and second person pronominals, that is, those in sentences like:

- (i) I am sick.
 (ii) You disturbed me.

which are not normally taken to be instances of Direct Discourse complements. The path to such an analysis lies in the assumption that all sentences have a performative verb as their main verb. For discussion of one aspect of such an analysis cf. Ross (to appear). The claim is then that underlying a sentence like (ii) is a structure rather like:

- (iii) $\text{NP}_x \text{ Performative Verb to } \text{NP}_y \quad \text{NP}$



Only such an analysis can bring the ordinary occurrences of *I* and *you* under the same generative and interpretive principles as those which function for Direct Discourse occurrences of these pronominal forms. Such an analysis thus reduces the notions first and second person to the deeper notions Agent of performative linguistic verb, Indirect Object of performative linguistic verb, by way of linkages of coreference, marked by special pronominalization operations.

We have seen that Fact C provides a correlation such that EQUI operation in Indirect Discourse cases works by coreference to the subject if the Direct Discourse complement subject is first person, by coreference to the indirect object if the complement subject is second person. By our assumptions, however, we have now built these markings into *that*-clauses of certain modal types. Does this then serve to provide a sufficient basis for stating EQUI correctly, that is, for stating it in such a way as to predict rightly in infinitival cases whether the deleted element is a coreferent of main clause subject or indirect object? The answer is clearly negative. Notice that there is no way to state the rule on the basis of assumptions so far which would have these effects. We cannot say delete only second person subjects, or delete only first person ones. What would have to be said is: delete second person ones with certain verbs, first person ones with others, and this is no improvement over what would have been possible before Fact C was brought up. Then we could have stated it disjunctively in terms of coreference to either subject or indirect object. All that Fact C appears to have done is to have permitted a recoding of this in terms of first and second person markings.

What is clearly missing is some principle which forces it to be the case in the appropriate examples that the complement subject is restricted to either first or second person. That is, some principle is required that insists that, for example, with the request *ask* of:

- (22) George_i asked Mary to (please) help him_i.

the underlying subject necessarily be a coreferent of the indirect object, that is, be second person. This brings us directly to the modal constraints where we find, for example, in modal *if*-clauses:

- (23) a. George_i asked Mary, if she_j would (please) help him_i.
 b. *George_i asked Mary, if she_{k ≠ j} would (please) help him_i.

In short, just this kind of restriction shows up with the modal *would* here. Moreover, looking, as Fact C suggests, at the Direct Discourse versions we find:

- (24) a. Will you please help me, George asked Mary.
 b. *Will Harry please help me, George asked Mary.
 c. *Will I please help me (myself), George asked Mary.
 d. *Will they please help me, George asked Mary.

We observe, in other words, that just as in the modal clause of the Indirect Discourse sentence, there is a special constraint in the Direct Discourse version. In the former, the constraint is that the complement subject must be an anaphoric pronoun which is a coreferent of the indirect object. In the latter, it is that the subject of the complement be second person. Under our assumptions about second person marking for NP in the complements of linguistic verbs and manifestation of these markings as *you* only under Direct Discourse conditions, both of these constraints reduce to the same requirement that the complement subject be a coreferent of the main clause indirect object.

What I am suggesting then is really this. The contrast in EQUI operation as to coreference to either main clause subject or indirect object is completely a function of special constraints which exist between NP in the main clause of certain nondeclarative linguistic verbs and the subject NP of their complements. For instance, the fact that the linguistic verb *ask* of request requires EQUI to delete an NP which is a coreferent of its indirect object is a function of the deeper fact that this verb requires its complement subject to be a coreferent of its indirect object, a fact illustrated by the required *you* in the Direct Discourse examples of (24) and by the modal constraint of (23).

I do not wish to give even the slightest suggestion that this account is either adequate or anything like complete. There are many problems and apparently inconsistent facts. In particular, the correlation of modal constraints with Direct Discourse constraints of the type illustrated by (24) is not complete, for reasons I do not understand. This is, for example, illustrated by the point made in footnote 18 that some people do not find it impossible for *he* to be a coreferent of *Harry* in sentences like:

- (25) Harry told Bill that he $\left\{ \begin{array}{l} \text{ought} \\ \text{should} \end{array} \right\}$ to drop out of school.

That is, these people can interpret (25) as a paraphrase not only of the Direct Discourse version:

- (26) $\left\{ \begin{array}{l} \text{You should drop out of school,} \\ \text{Drop out of school,} \end{array} \right\}$ Harry told Bill.

but also as a paraphrase of:

- (27) I ought to drop out of school, Harry told Bill.

For these individuals then, there is apparently no modal constraint to predict that the sentence:

- (28) Harry told Bill to drop out of school.

has a deleted coreferent of *Bill*, and not *Harry*. I think that this is not a real problem, however, but rather one of homonymous modals. Clearly, on the reading where (25) is the Indirect Discourse version of (26) the modal is functioning as the indicator of an imperative performance. For those who find (25) a version of (27), however, the modal is functioning simply as the modal in the declarative performance which originally contained it. The modal constraint which predicts the properties of (27) is a constraint on the imperative *should*. This amounts, however, to the claim that the complement clauses in (26) and (27) are not equivalent, a point which some will certainly find strained. This seems to me the position one is driven to by the overall structure of facts in the domain of modal constraints and Direct Discourse versions of

Indirect Discourse sentences of the type involving EQUI, or their *that*-clause paraphrases. At any rate, it is my last word on the subject for the present.

References

- Chomsky, Noam (1965) *Aspects of the Theory of Syntax*, MIT Press, Cambridge, Mass.
- Kiparsky, Paul and Carol Kiparsky (to appear) "Fact," in M. Bierwisch and K. Heidolph, eds., *Recent Advances in Linguistics*, Mouton and Co., The Hague.
- Lakoff, George (1965) *On the Nature of Syntactic Irregularity*, in *Mathematical Linguistics and Automatic Translation, Report NSF-16*, the Computation Laboratory of Harvard University, Cambridge, Mass.
- Lakoff, George (to appear) *Pronouns and Reference*.
- Langacker, Ronald (1969) "On Pronominalization and the Chain of Command," in S. Schane and D. Reibel, eds., *Modern Studies in English*, Prentice-Hall, Inc., Englewood Cliffs, N.J.
- Lees, Robert and Edward Klima (1963) "Rules for English Pronominalization," *Language* 39, 17-29.
- McCawley, James (1968) "Lexical Insertion in a Transformational Grammar without Deep Structure," *Papers from the Fourth Regional Meeting Chicago Linguistic Society*, Department of Linguistics, University of Chicago, Chicago, Illinois.
- Perlmutter, David (1968) *Deep and Surface Structure Constraints in Syntax*, unpublished Doctoral dissertation, MIT.
- Postal, Paul (1968) *Cross-Over Phenomena: A Study in the Grammar of Coreference*, Thomas J. Watson Research Center, IBM Corporation, Yorktown Heights, N.Y.
- Rosenbaum, Peter (1965) "A Principle Governing Deletion in English Sentential Complementation," *RC 1519*, Thomas J. Watson Research Center, IBM Corporation, Yorktown Heights, N.Y.
- Rosenbaum, Peter (1967) *The Grammar of English Predicate Complement Constructions*, MIT Press, Cambridge, Mass.
- Ross, John (1967a) *Constraints on Variables in Syntax*, unpublished Doctoral dissertation, MIT.
- Ross, John (1967b) "On the Cyclic Nature of English Pronominalization," in *To Honor Roman Jakobson*, Mouton and Co., The Hague.
- Ross, John (to appear) "On Declarative Sentences," in R. Jacobs and P. Rosenbaum, eds., *Readings in Transformational Grammar*, Blaisdell-Ginn, Boston.

Thomas J. Watson Research Center
IBM
Box 218
Yorktown Heights, New York 10598