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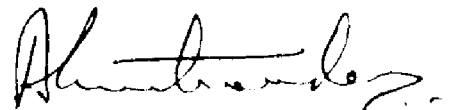
Noncyclic Transformations in English Syntax

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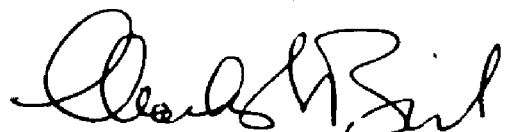
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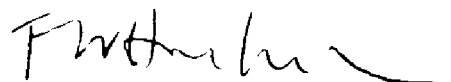
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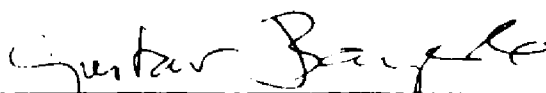
Andreas Koutsoudas,
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Charles S. Bird



Fred W. Householder



Gustav Bayerle

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Many women have done excellently,
but you surpass them all.

(Proverbs 31:29)

You have suffered through slow parts of this work without resorting to nagging or allowing discouragement, and you have hastened completion

by your steady confidence and insights into how best to go about this task. You have surpassed all, I would say, in living out the best sense of that old word 'helpmeet', for which I here express my pride and appreciation.

Table of Contents

I. Introduction	1
A. The development of multiple rule-types in transformational theory	7
1. Chomsky 1957	7
2. Lees 1960	8
3. Fillmore 1963	10
4. Chomsky 1965	16
5. Lakoff 1968a [1966]	18
6. Ross 1968 [1967]	24
7. Emonds 1970 [1969]	27
B. Definition of the rule-types	29
II. Arguments for transformations being noncyclic	36
A. Arguments for transformations being postcyclic	37
1. 'Preposition dangling' arguments	38
2. Particle Movement	51
3. Extraposition rules	71
a. EX-NP (Lakoff 1968b)	71
b. EX-NP (Borkin 1972)	78
c. EXTRA and EX-NP (Ross 1968 and McCawley 1970)	81
d. EXTRA (Higgins 1973)	86
e. EX-PP (Ross 1968)	95
f. EXTRA, EX-NP, EX-PP (Ross 1968)	103
4. Adverb Preposing	107
a. Ross 1968	108
b. Geis 1970	113

5. <u>All</u> Movement	125
6. Preposition Deletion	139
7. Coordination reductions	159
a. Conjunction Reduction	161
b. Gapping	167
8. Verb rules	182
a. Number Agreement	182
b. Subject Auxiliary Inversion	187
c. Subject Verbs Inversion	200
d. <u>Do</u> Support	201
e. Affix Hopping	208
f. Negative Contraction	211
g. <u>Do</u> Gobbling	218
B. Arguments for transformations being last-cyclic or root-cyclic	222
1. Topicalization	222
2. Coordination Reduction	228
3. Question and imperative rules	231
a. Subject Auxiliary Inversion in questions	232
b. <u>Whether</u> Deletion	247
c. Imperative rules	248
4. Emonds' root-cyclic rules	249
5. Appositive Formation	259
C. Arguments for transformations being precyclic or anywhere	271
1. Sentence Deletion	271
2. Gapping	283

D. Arguments for Pronominalization being noncyclic	285
1. Lakoff 1968b	286
2. Postal 1970b, 1971; Lakoff 1968b	288
3. Lakoff 1968b	291
4. Postal 1971	294
5. Bach 1969	298
6. Bach 1969	302
E. Summary of arguments for noncyclicity	308
III. Proposals for assigning rule-type distinctions nonidiosyncratically	310
A. Postal 1971	311
B. Emonds 1970	318
C. Kimball 1972b, 1973b	322
D. Perlmutter and Postal (unpublished work)	335
IV. Conclusions	337
A. Nonidiosyncratic assignment of rule-type features	339
B. Implications of some rules being noncyclic	353
C. On the necessity of the cycle	356
Appendix A: The <u>Aspects</u> Argument for the Transformational Cycle	360
Appendix B: Noncyclicity Arguments for Rules of Other Languages	367
Rule Abbreviations	369
Table of Noncyclicity Arguments	371
References	373
Vita	381

I. Introduction.

The theoretical framework presupposed here is that known broadly as 'transformational-generative grammar', one tracing its roots back to Noam Chomsky's (1957) volume, Syntactic Structures. Within this theory sentences of a language are analyzed in terms of a relation holding between their deep (or underlying)¹ structure and their surface structure, a relation which is defined and mediated by means of transformational rules. As these transformations apply in derivations, typically various kinds of interrelations occur among them whereby the application of one rule will create or destroy environments for the application of another. In some cases such interaction of transformations results in the generation of grammatical strings (as when one rule 'feeds' another); in other cases, the interrelation has just the wrong results (e.g., a 'bleeding' relation).² The theory thus must provide some means of governing the order of application of transformations in derivations.

The question of what devices are necessary for regulating the interrelationship of rules in derivations is one that has been vigorously discussed since the earliest days of transformational grammar. Specific proposals have included at least the following four mechanisms:

1. There will be no need in this discussion to take a position on the existence of 'deep structure', that is, to determine whether 'underlying structure' is simply the semantic representation of a sentence or whether it should be considered as a distinct syntactic level, in terms of which lexicalization and semantic interpretation are defined. I have not found that the answer to this question is in any way related to the matter of syntactic rule-types discussed below. (Cf. McCawley 1970:290: "The rejection of a dividing line between syntax and semantics appears not to require any modification of earlier conclusions as regards what transformations are and how they interact. In particular, the notions of 'cycle' and 'post-cyclic transformation' carry over unchanged to the newer concept of grammar.")

2. For a definition of 'feeding', 'bleeding', and the other various ways in which rules may be interrelated in their application in derivations see Koutsoudas et al. 1971:1-2.

1. extrinsic ordering - features assigned idiosyncratically to specific rules of specific grammars indicating the admissible relative order of application (argued as necessary in Chomsky 1957, 1964, Postal 1971, and in a great many other sources).

2. the cycle - a universal principle governing the domain of application of transformations and allowing certain violations of extrinsic order. (See especially Chomsky 1965:132-37 and Lakoff 1968a: 29-34.)

3. rule-type distinctions - features assigned idiosyncratically to each rule, effecting a division of transformations into several sets of rules (cyclic rules, postcyclic rules, anywhere rules, etc.), in essence violating the principle of the cycle; as these sets are defined, each one has a certain characteristic scope and relative order of application. (The single most extensive discussion of the necessity for these is Lakoff 1968a:34-53.)

4. global derivational constraints - conditions on specific rules allowing them to be governed by the structure of an input tree at some earlier stage of the derivation (e.g., Lakoff 1970c, 1972a).

In this study I am not concerned directly with the first two or last of these mechanisms. Many of the arguments to be considered in chapter II involve reliance on arguments involving extrinsic ordering, however, so to that extent I will deal with this ordering device. It will be found, however, that, except for the problematic rule Pronominalization (considered in section II.D below), the rules discussed in the respective rule-type arguments in sections II.A-C include not a single case where a set of rules must be extrinsically marked to guarantee a certain relative order of application. The subversion of the ordering arguments included in chapter II thus constitutes support for recent proposals

that a reliance on extrinsic ordering may be replaced by a set of universal principles for correctly sequencing transformations in derivations (cf., for example, Koutsoudas et al. 1971 and Iverson 1973; see Miner and Ringen n.d. for an extensive bibliography of works discussing rule ordering).

As for the transformational cycle, I will be assuming this throughout. This is not to imply full conviction that an Aspects-style cycle is necessary for the appropriate ordering of transformations in derivations; some in fact have argued recently (e.g., Kimball 1972b, Grinder 1972) for a 'linear grammar', wherein rules would not be allowed the amount of interaction possible with Chomsky's (1965) cycle. Rather, preferring here to hold as many variables constant as possible in order better to focus on the question of the role of rule-type distinctions in syntax (all of which have been proposed against the backdrop of the cycle), I will take the upward cycle of Aspects as given. Only in a final section (IV.C) will a direction of research be suggested that does not assume this.

Finally, I discuss global derivational constraints only where these relate to a rule-type argument in some way; the single case of this is in considering an argument involving Lakoff's rule Sentence Deletion (see II.C.1 below). As with the cycle, it seemed simplest here to make the more conservative initial assumption, namely, that rules cannot refer to earlier stages of the derivation.

What this study will deal with is the rule ordering device of differential rule-type assignment, i.e., governing the relative order of application of transformations by assigning them to various sets of rules which in turn are defined as having a certain relative order of application. More specifically, and as a way to further restrict the

bounds of this investigation, I deal with the rule-type differentiation of English transformations only.³ This mechanism is very similar to extrinsic ordering, in that it has involved marking rules idiosyncratically with an ad hoc ordering feature (e.g., [+last-cyclic], [+anywhere]); it is dissimilar only in that where the extrinsic ordering feature presumably mentions directly some other rule (e.g., [+applies-before-Passive]), a rule-type ordering feature mentions one of the universally-defined rule-types only.

Unlike extrinsic ordering, however, this device of marking rules for membership in various sets of rules is one that has for some reason been accepted virtually without challenge; as far as I am aware, a footnote in Koutsoudas n.d. is the single place where the necessity of rule-type distinctions in syntax has been questioned. As Grinder (1972:82) has commented about the principle of the cycle, so it could be fairly said here that the plurality of rule-types "at present occupies such a privileged position in the area of syntax."

I became bothered by this privileged position when I noticed that certain oft-cited arguments for rules having to be segregated into different rule-types in fact were invalid; they simply offered no support for the necessity of dividing transformations up in this way. Yet linguistic (or any scientific) theory must be elaborated only on the basis of empirical evidence requiring the given elaboration, a point made perhaps most clearly in Postal 1972a. Examination of the

3. A restriction to considering English rules only does not seem to materially limit the scope of this study. First, the various rule-types have been defined wholly in terms of processes of English and have been illustrated almost exclusively with English rules. Second, noncyclic rules in other languages have sometimes been proposed primarily on the basis that such rules have been argued to exist for English (cf. Bach's (1970:16) argument for the noncyclicity of Amharic Verb-shift).

arguments for the necessity of rule-type distinctions in governing rule application is important for transformational-generative theory, for conventions for the application of transformations are examples of universal statements taken to reflect human linguistic capacity. When the theoretical model is interpreted in this light it is clear that "investigations into the nature of the conventions [under which rules are applied in derivations] will be of the greatest interest and importance...for in sketching [such] universal properties of grammar we are thereby characterizing properties innate in the mind's organization of perceptual experience" (Kimball 1972b:63). I was curious to see, then, whether any arguments could be found which correctly argued for the necessity of marking rules individually for membership into one of several different sets of rules, or whether this theoretical development was one which had been accepted largely on good faith by the linguistic community but which was lacking in empirical support.

The question investigated here, then, is what support there is for the necessity of assigning syntactic transformations of English to different sets. If there is no strong evidence for postulating a multiplicity of rule-types, then by Occam's razor these must not be postulated. If some support is found, then the question is one of whether membership in the various sets of transformations is determined idiosyncratically for each particular rule (i.e., whether individual rules must be complicated by being explicitly marked for membership in a given rule-type), or whether rules may be left extrinsically unmarked for rule-type and be so divided in terms of some algorithm that makes use only of aspects of rules that are otherwise required.

In chapter II are analyzed all the arguments known to me that attempt to show that transformations must be of a rule-type other than

cyclic.⁴ It will be shown that the largest majority of these in fact fail in their attempt to establish the necessity of marking rules as noncyclic.⁵ Of the several dozen arguments examined there, only seven seem to be valid - six for given rules being postcyclic, and one for a rule being an anywhere rule.

The third chapter considers specific attempts by Postal, Emonds, Kimball, and Perlmutter and Postal to provide an algorithm for non-extrinsic rule-type assignment. Given the results of chapter II, these attempts will be seen to be generally unsuccessful.

Chapter IV concludes with an effort to construct an algorithm for assigning the rules discussed in chapter II to the respective appropriate rule-type, and considers the significance of some rules requiring noncyclic application and of many rules not requiring cyclic application.

Following the text proper, Appendix A reviews the argument for the transformational cycle in Chomsky 1965. To my knowledge, no critique of this argument has appeared in print, yet there seem to be serious weaknesses here, where this is taken as an argument for the necessity of the upward cycle. Appendix B lists some of the arguments extant for transformations in languages other than English having to be noncyclic. Next, there is a list of the rules mentioned in this study, along with the abbreviations used. Finally, a summary table is presented listing all the noncyclicity arguments discussed here, arranged by rule and by author.

4. A few of the arguments examined here were discussed in a paper, "Arguments for the Noncyclicity of Transformations," presented at the Indiana University Conference on Rule Ordering, 6-7 April 1973.

5. Throughout this study, 'noncyclic' will be taken to describe any rule-type other than cyclic, i.e., other than that described in Aspects. In particular, 'cyclic' will not include 'last-cyclic' or 'root-cyclic' (see (12) below for definitions).

The remainder of this first chapter, then, provides a historical background to the discussion of the rule-types. Also, the terms to be used in subsequent chapters are defined.

I.A. The development of multiple rule-types in transformational theory.

I.A.1. Chomsky 1957.

The grammar of Syntactic Structures makes no explicit allowance for a transformational cycle, much less for a division of syntactic rules into various rule-types. The conditions on the application of transformations that Chomsky discusses in any detail here include only extrinsic ordering restrictions and a specification of (singular) transformations as either obligatory or optional. He does note in passing, however, that the application of transformational rules must be more complicated than simply: "run through the sequence of transformations T_1, \dots, T_j , applying each obligatory one and perhaps certain optional ones" (p. 46). In particular, the grammar must "allow transformations to reapply to transforms so that more and more complex sentences can be produced" (ibid.). While Chomsky (1957) does not suggest what conditions on reapplication might be necessary, it is possible to think of subsequent proposals of the cycle and rule-types as simply attempts to elaborate these restrictions on reapplication.⁶

6. Proposals of some kind of cycle to govern the reapplication of transformations to transforms will manifestly differ depending on whether the theory has only single-base transformations or whether, as in Chomsky 1957, Lees 1960, and Fillmore 1963, the theory has both single-base and double-base transformations. In the former case, 'cycle' has meant the sequence of application of the set of transformations to successively higher (i.e., less embedded) sentences. For theories with generalized transformations, 'cycle' meant the reapplication of the set of (both kinds of) transformations to P-markers, resulting particularly in structures with more and more embedding. For both kinds of theories, however, the question of the cycle was the question of what reapplication of rules (beyond simple iteration) was necessary to correctly generate complex sentences.

I.A.2. Lees 1960.

In this work the author somewhat more directly acknowledges the problem of governing the appropriate order of application of transformations, although as in Chomsky 1957 does not commit himself to any specific solution. Lees does go beyond Syntactic Structures in mentioning three specific alternatives; one is a proposal for the interrelation of the two subparts of a generalized transformation, and the two others are more comprehensive suggestions for ordering all rules (read "all transformations"?) in the grammar. It is the latter two that are of interest here and which are summarized below.

a. The metatheory supplies "some complex scheme for 'traffic laws' within a grammar, and each grammar has then a 'control unit' which directs the order of application of rules" (p. 55). Besides an order of application compatible with a strictly linear ordering, these traffic laws could also allow for iterative application of a rule, as well as "loops in which the path of derivation through the rules curves back on itself" (ibid.).

b. The rules are written in such a way that "no particular order of application need be assumed" (ibid.). A rule applies "if and when it can, and only one specification can apply at any one place" (p. 56).

Lees mentions one example of a possible system of traffic laws (pp. 56-57). The transformations apply in their proper order T_1, \dots, T_n . Then to the output of this set of applications the rules again apply, presumably in the same order. Such a system⁷ represents perhaps the

7. Only the simplest version of Lees' proposal is considered here. In his brief discussion of this particular system of traffic laws the author suggests that the derivation may begin to cycle after a certain rule T_m , where T_m may not be the last rule in the list. Also, he allows the possibility of only certain of the transformations applying on the second pass through the rules.

simplest possible syntactic cycle - all rules apply consistent with their linear ordering but are entirely unrestricted in their domain of application. This suggestion for governing the order of application of rules clearly foreshadows later, more specific proposals involving the transformational cycle.

Alternative b above is one that, to my knowledge, received little or no consideration until recently.⁸ Starting with Chomsky 1957, with its ordered list of 16 transformations, and continuing with the ordered singular transformations, the cycle, and the postcycle of Fillmore 1963, the trend within generative grammar became one of complicating individual rules by adding special features indicating order and rule-type assignment, rather than complicating individual rules by making their structural descriptions more explicit. The particular direction of rule complication chosen, or, in other terms, why proposal a above became the model for subsequent research on the problem of rule application instead of proposal b, is apparently something which was never explicitly justified.

It was Lees' feeling that, whichever of these proposals would eventually be adopted, the rules of his study would not require substantial revision. He was thus not greatly concerned with arguing for either a or b. Development of his traffic laws suggestion was to come three years later. What is important here, however, is that Chomsky's (1957) passing reference to the problem of transformations having to reapply is considered in sufficient detail by Lees to allow him to make specific proposals as to how to approach a solution. We turn now

8. Recent work by Koutsoudas and others has been in the spirit, if not wholly within the letter, of alternative b. See, for example, the proposal for governing the order of rule applications outlined in Koutsoudas et al. 1971.

to the classic development of Lees' traffic laws suggestion.

I.A.3. Fillmore 1963.

Fillmore here proposes a general solution to the question of how transformations should be allowed to apply in derivations. The key to his treatment lies in "the construction of a new representational level, the level of pre-sentences, and in drawing a distinction between those generalized transformations which are linked with the constituent-structure rules and the preliminary simple transformations in a direct way from those which are not" (p. 224).

In outline form, Fillmore's proposal is that all transformations be grouped into one of four categories:

A. Singular, or simple transformations

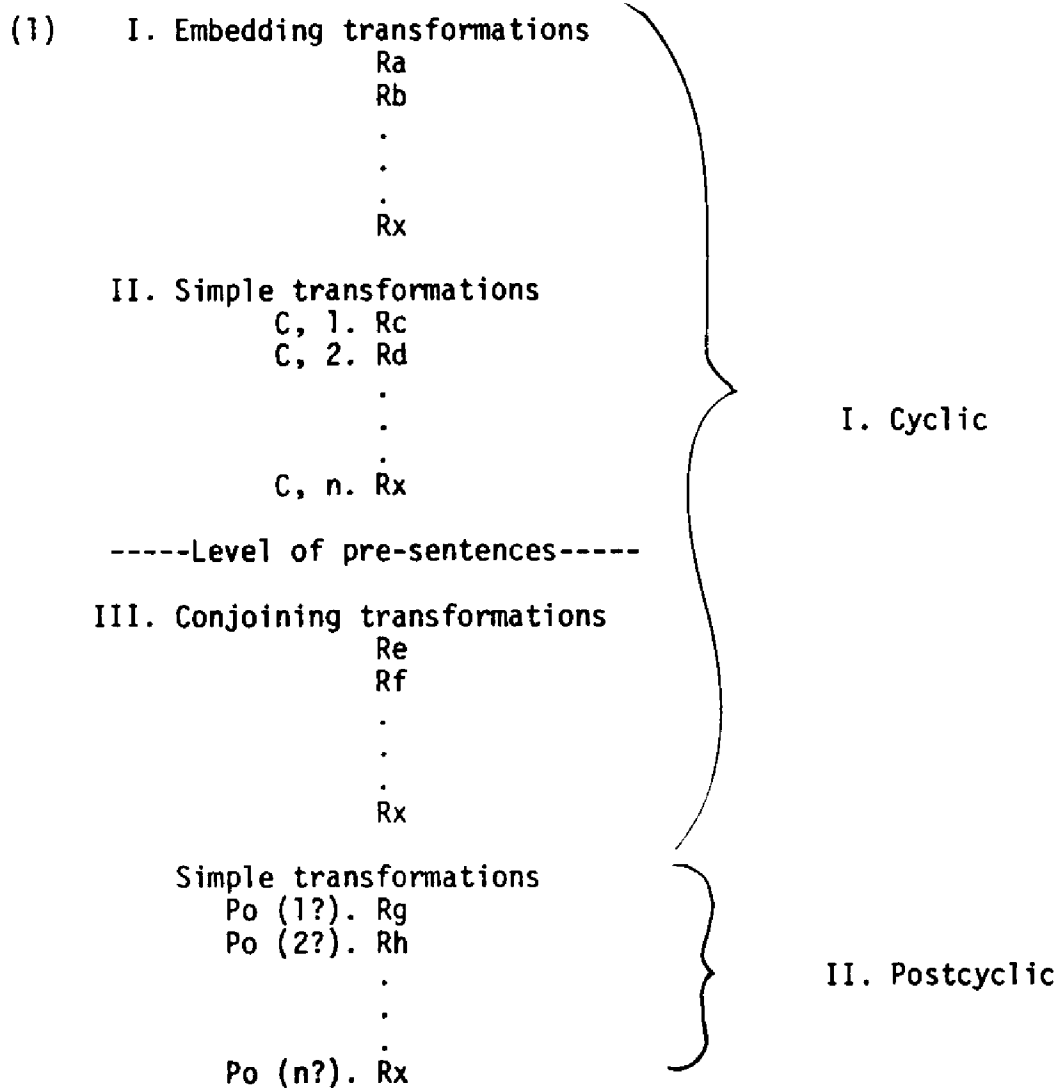
1. Preliminary simple transformations (a subset of the cyclic rules)
2. Final simple transformations (=postcyclic rules)

B. Double-base, or generalized transformations

1. Embedding transformations (those linked in a direct way with the phrase structure rules and the preliminary simple transformations)
2. Conjoining transformations (those not directly so linked).

The level of 'pre-sentences' is essentially the set of strings that have been operated on by all relevant "preliminary simple transformations" (i.e., the singular rules that are cyclic); also, in the structural description of all embedding transformations, the P-marker that is to become the embedded sentence is required to be a 'pre-sentence', that is, to have already undergone all applicable singular transformations.

In the derivation of sentences, three of these kinds of transformations are strictly ordered with respect to each other and, as a unit, may apply cyclically. Using Roman and Arabic numerals to indicate, respectively, strict ordering of rule-types and sets of rules within these, and strict ordering of particular rules Ra, Rb, etc., and using 'C' and 'Po' to indicate whether a given simple transformation is cyclic ('preliminary') or postcyclic ('final'), the internal arrangement of the transformational component of Fillmore's grammar is as in (1):



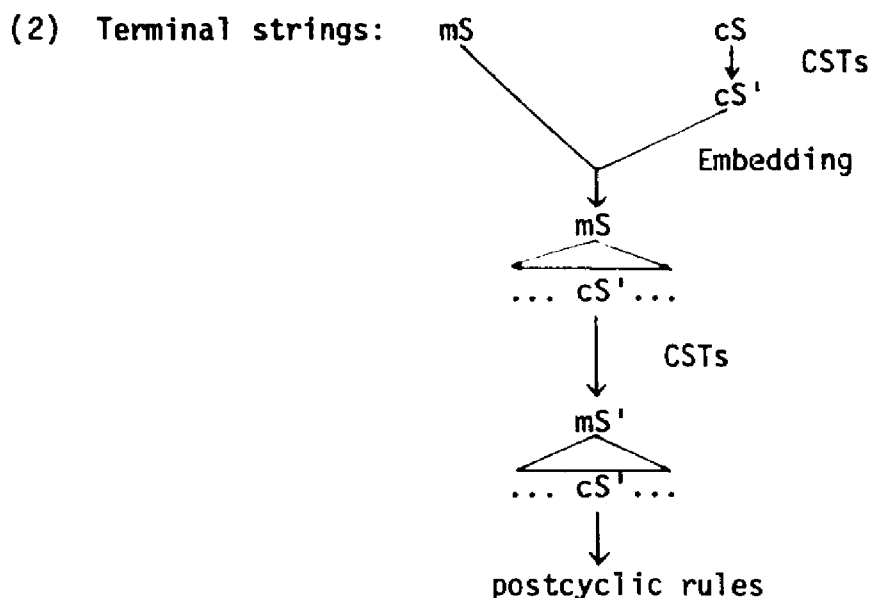
First the set of embedding transformations is given a chance to apply. These rules are not ordered with respect to each other (p. 226)

and, being formally distinguishable from the other variety of generalized transformations (i.e., conjoining rules), they require no special feature - no extrinsic marking - assigning them to this first subpart of the cyclic rules. When only a simple sentence is to be generated, then obviously none of these rules will apply. In deriving a complex (non-coordinate) structure, no embedding transformations will apply on the first pass through the rules. The string to be embedded will undergo the relevant simple transformations on this first pass, and then the cycle returns to the set of embedding rules. Now some embedding rule will subordinate this string that has undergone the simple transformations into another S, and then this complex string itself will be operated on by the second subset of the cyclic rules. These preliminary simple transformations are strictly ordered (p. 218), and presumably must be given a rule-type feature ('C') indicating that they belong in this set and not in the set of final simple transformations.⁹

As mentioned above, the set of strings which have passed through the preliminary simple transformations represents the level of 'pre-sentences', this level being significant primarily in Fillmore's formulation of the embedding rules. In each case this kind of generalized transformation is specified to apply to one pre-sentence and to one terminal string (i.e., an output of the phrase structure rules to which no transformations have had a chance to apply), embedding the pre-sentence into the terminal string. The process of embedding may be represented generally as in (2), a diagram also illustrating the cyclic application of rules in a derivation. For ease of interpretation,

9. Fillmore has very little to say about the postcyclic, or final simple transformations in this article. There is no suggestion, however, that these are in any way formally distinguishable from the cyclic preliminary simple transformations.

sentences are marked here as either matrix (mS) or constituent (cS), a distinction which Fillmore believed need not be indicated explicitly by the grammar;¹⁰ also, sentences marked with an apostrophe (S') are pre-sentences, i.e., outputs of the cyclic simple transformations (CSTs).



The process could be continued indefinitely, with mS' in turn being embedded as a complex pre-sentence into another mS, this more complex mS then undergoing Fillmore's preliminary simple transformations, thereby becoming eligible for embedding into another terminal string, etc. The restriction is simply that once the CSTs have applied to a sentence, no other sentence can be embedded into it.

Fillmore's motivation for formulating his embedding transformations in this manner and not in any of the three other ways possible (viz., embed a terminal string into a pre-sentence or into another

10. As Fillmore admits, "some pre-sentences, however - namely those underlying relative and question-word clauses - must actually be embedded into other sentences before the final group of rules can apply to them" (p. 223). In terms of (2), some pre-sentences must be guaranteed to be constituent sentences (cS'), that is, guaranteed to appear embedded in some higher string. Fillmore's belief was that this restriction could be handled in a non-ad hoc manner (ibid.).

terminal string, or embed a pre-sentence into another pre-sentence) rests on simplicity. He notes that his CST rules can be stated most simply if they are not required to apply to terminal strings already embedded in other sentences (p. 216); this is guaranteed in Fillmore's system by his writing all embedding rules to require constituent sentences to be pre-sentences (i.e., already having been operated on by the CSTs). There can be no need for CSTs to apply to embedded sentences, simply because there is formally no way in Fillmore 1963 for terminal strings as such to appear embedded. Further, the author observes that the embedding transformations are maximally simple only if the matrix sentence has had no CSTs apply to it (ibid.), i.e., only if it is a terminal string at the time of embedding. This simplicity is guaranteed by the ordering shown in (1), i.e.,

- | | |
|-------------------------------------|----------|
| I. Embedding transformations | } Cyclic |
| II. (Cyclic) simple transformations | |

Returning to the traffic laws diagram in (1), we note finally that the conjoining transformations and the final, or postcyclic simple transformations are given only very brief treatment by Fillmore. His single comment concerning the former is that they have as input two pre-sentences, converting these into a third pre-sentence. No example of a conjoining transformation is given in the article.

In Fillmore's own chart of his grammar (p. 209), the postcyclic rules are grouped together with morphophonemic rules. These are collectively described as "a final group of obligatory and stylistic rules" (p. 212). Of these rules Fillmore only mentions two - rules that later would be called Affix Hopping and Relative Object Deletion - and nowhere gives any arguments showing that these rules must be separated from the other simple transformations and placed in a distinct rule

component. For Affix Hopping, the argument presumably would be that the embedding transformations are easier to state if the affixes have not been moved into their correct position. Specifically, if Fillmore's embedding transformations #5 and 6 (BELIEVE¹¹ and Genitive ING Nominalization) applied to pre-sentences where the tense morpheme had already been permuted with the following verbal form, then these rules would have to be complicated. In the case of Relative Object Deletion, however, it is not clear to me why this should be isolated from the CSTs. It is very similar in function, and rather alike in form to Fillmore's preliminary simple transformation #9, Relative Clause Reduction, and apparently would cause no more problem for any later embedding rules than is caused by Relative Clause Reduction.

Fillmore's main interest in this article was in showing the cyclic interrelationship of the generalized transformations and his preliminary simple transformations. In explicating this the author had occasion to posit a level of pre-sentences, a level useful in his definition of embedding rules, and, in what is more relevant to the topic of this study, also serving to distinguish two classes of simple transformations. Pre-sentences were those strings which had undergone all the relevant preliminary simple transformations, but none of the final simple transformations. While the distinction between these two kinds of simple transformations was not one discussed in any detail in this article, yet this does represent the earliest suggestion that transformations be segregated into classes, each having its own manner (cyclic vs. strictly linear) and relative order (cyclic before postcyclic) of

11. This is the rule that derives the sentence The detective believes the butler to have been murdered from terminal string the detective believes C Nom and pre-sentence the butler Tns have been murdered.

application. Except for the complication of cyclic rules including both simple and double-base transformations, the scheme of application conventions in (1) is very similar to certain of the more complex proposals that appeared shortly after the publication of Chomsky's Aspects.

We very briefly review now the simplification of the transformation component proposed in Aspects, and outline the traffic laws solution there proposed by Chomsky.

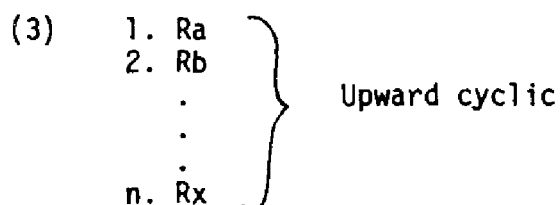
I.A.4. Chomsky 1965.

Perhaps the biggest innovation in the Aspects model is the proposal that the recursive power of the grammar be given to the base rules instead of to the transformation rule component. The initial symbol *S* is introduced by the phrase structure rules and there is thus no need for embedding transformations (or, presumably, for conjoining transformations). The generalized phrase-marker which is the output of the base rules is now the sole input to the semantic component; all syntactic transformations are singular (single-base, simple) and have no creative function. The reasoning underlying this change in the form of grammar is summarized on pp. 132-37, and in Chomsky 1966:59-67, and is perhaps familiar enough not to require discussion here. We note only that among transformational-generative grammarians this theoretical revision has been widely, if not universally adopted; it will be assumed in the remainder of this study.

While the Aspects model quickly captured the generativist market with respect to its proposal for eliminating generalized transformations, it was not as successful in selling its system of traffic laws for governing the application of transformations. Although the system in

Chomsky 1965 included cyclic application of rules, it differed from that in Fillmore 1963 in not postulating different rule-types. Shortly after Aspects appeared, however, various traffic laws proposals were made, some of which in effect reiterated (and expanded) Fillmore's basic system with its multiple rule-types. These post-Aspects elaborations of Fillmore's pre-Aspects proposal (1) became very widely accepted indeed. While some have denied recently that any transformations need to be cyclic (see, for example, Grinder 1972), virtually no one has (publicly) expressed doubt that transformations need to be divided into at least two different rule-types.

The traffic laws system of Aspects, then, can be represented as in (3):



The individual rules are linearly ordered (p. 133). The domain of rule application is an S node, the rules applying in order first to the most deeply embedded S(s) in the generalized phrase-marker, then to the next higher S node(s), etc. The argument for the cycle being upward, and not downward (or some other, more complex variety), comes from Fillmore 1963. Chomsky relies on Fillmore's simplicity arguments and his formulation of embedding transformations.¹² Specifically, these latter rules applied to constituent sentence material that had already undergone the singular transformations, and to matrix sentence material that had not already undergone any singular transformations, thereby applying in

12. Having decided upon a model where all transformations are singular, it seems strange for Chomsky here to base his argument for the direction of his cycle on embedding transformations. See Appendix A for a more thorough critique of Chomsky's argument for the cycle.

what was in effect an upward cyclic manner (see the schema in (2)).

When account is taken of the difference between the grammar of Chomsky 1965 and Fillmore 1963 with respect to the handling of embedding, then the traffic laws systems shown in (1) and in (3) differ on one point only. While Fillmore postulated a division of singular transformations into two rule-types, Chomsky in Aspects in effect claims that a simpler system suffices, namely one where no basic separation is made of the transformations.¹³

As pointed out above, modifications of the simple system of (3) were not long in coming. We consider now three of the works following the appearance of Aspects which proposed complications of (3).

I.A.5. Lakoff 1968a [1966].

In his paper "Deep and Surface Grammar," first circulated in 1966, Lakoff refers to Fillmore 1963 and how his observations on the relative ordering of embedding and singular transformations led to the transformational cycle in the sense of (3), and as well gives some arguments of his own purporting to show that a cyclic application of rules is indeed necessary (pp. 29-34). He then discusses certain logically possible complications of the transformation component, and gives arguments that some of these complications must be adopted into the theory.

In the course of his consideration of possible elaborations of (3), Lakoff mentions altogether four kinds of rules other than cyclic

13. Since there is no mention in Chomsky 1965 of Fillmore's post-cycle, and specifically, no explicit statement to the effect that it is unnecessary to postulate postcyclic rules, it is possible to read the relevant portions of Aspects as not making any necessarily strong claims against a plurality of rule-types such as proposed by Fillmore. This view has been taken by Postal (1971:17). P. Matthews (1970:117), on the other hand, sees the plan of (3) as an explicit assumption on Chomsky's part that all transformations can be cyclic.

transformations, and characterizes them as follows:¹⁴

1. Precyclic rules. "...rules that apply to the entire deep phrase marker before the application of any cyclical rules" (p. 34).

2. Postcyclic rules. In a given derivation, "apply only after all of the cyclical rules have applied" (ibid.). (Throughout Lakoff 1968a, no mention is made of this kind of rule as having been first proposed by Fillmore.)

3. Last-cyclic ["final-cyclic"] rules. For Lakoff, these are marked to apply only on the highest S of the tree and, in their ordering, are "interspersed with cyclical rules. That is, final-cycle rules [are] ordered before cyclical rules, though they [do] not apply on any cycle but the last" (ibid.). Lakoff credits Chomsky with suggesting this possibility.

4. Anywhere ["unordered"] rules. A rule of this type is one that "applies at any point in the derivation when it becomes possible for it to apply; that is, one which is not ordered with respect to the other rules of the grammar" (p. 73).

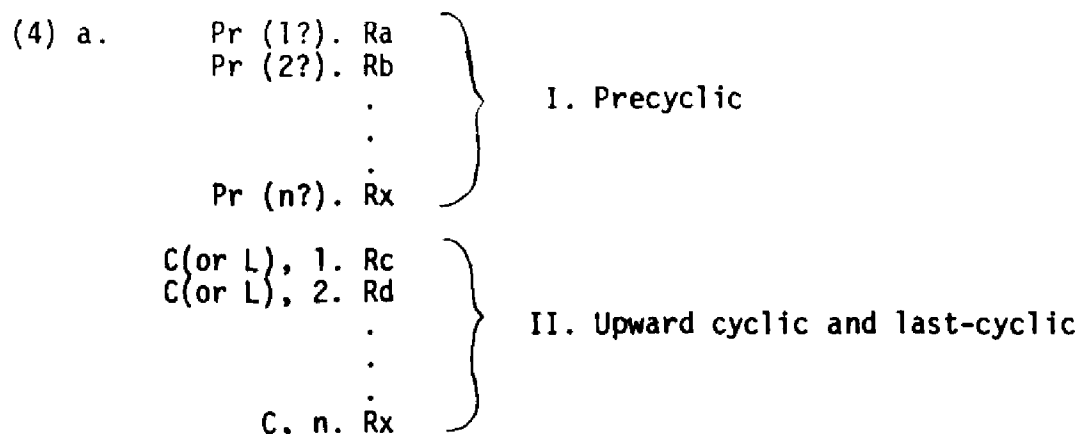
In "Deep and Surface Grammar," Lakoff finds two rules of English that he argues must be noncyclic. Appositive Formation he claims must be last-cyclic, this for the reasons that it must be restricted to applying on the highest S and must be ordered before Pronominalization, which Lakoff here argues to be cyclic. Sentence Deletion is argued to be anywhere, or at least precyclic. It is precyclic in that it has to apply to a certain type of matrix S (i.e., an S that is not most deeply embedded) before other rules apply to S's which are embedded

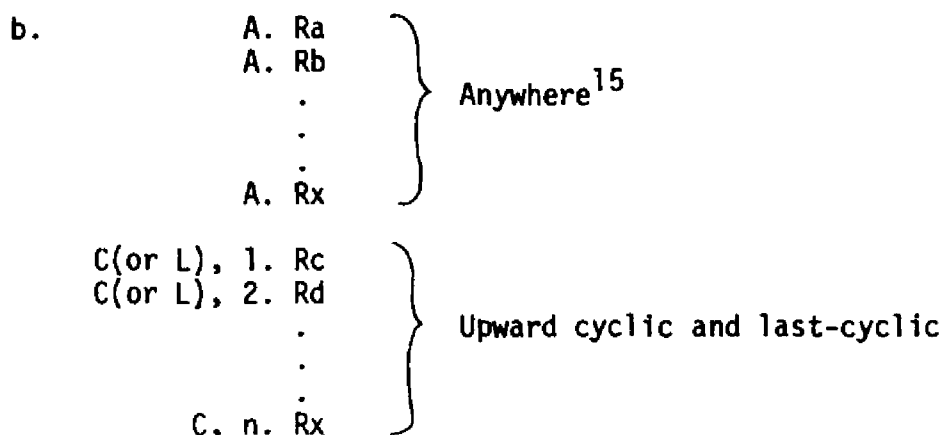
14. The definitions of the various kinds of noncyclic rules as these will be discussed in this study are given below in section I.B. Note in particular that I differ from Lakoff (and others) in distinguishing postcyclic and last-cyclic in terms of domains of application and not simply in terms of ordering before some cyclic rule(s).

in this matrix S. It is furthermore an anywhere rule insofar as in other cases it must also apply to a matrix S only after other rules have applied to its constituent sentences.

What these various kinds of noncyclic rules have in common is that they are not limited in their domain of application. As defined here by Lakoff, all can apply to the entire phrase marker, and are not at any point restricted to applying to a given subpart, as (non-topmost S) cyclic rules are. Also, with the exception of anywhere rules, the ordering of these kinds of rules is defined strictly in relation to cyclic rules - precyclic and postcyclic rules applying respectively before and after cyclic rules as a set, and last-cyclic rules applying (or at least appearing in an ordered list) before at least one cyclic rule.

Lakoff in this work does not find arguments for adopting all of the above rule-types. He does feel, however, that the simple system of (3) with its single rule-type must be expanded to include last-cyclic rules, as well as either precyclic or anywhere rules. The traffic laws system of Lakoff 1968a, then, may be diagrammed as in (4a) or (4b). Here 'Pr, A, C, L' represent the marking on each rule whereby its placement in the appropriate rule-type is guaranteed. As in (1), numerals indicate strict ordering of rule-types and/or rules.





As implied above, there has been some uncertainty as to whether Lakoff in this paper intended to argue for a precyclic or an anywhere rule-type. Bach (1971a:5) and Grinder and Postal (1971:110), for example, have read Lakoff 1968a as arguing for precyclic rules; Ross (1970a:845), on the other hand, has seen the argument as concluding that anywhere rules are necessary. The problem revolves around Lakoff's discussion of a rule S-Deletion, formalized on p. 66 as:

(5) S-Deletion: X S Y NP[it S] Z

1	2	3	4	5	6	⇒
1	2	3	4	∅	6	

condition: 2 = 5

In one part of his paper (pp. 35-36) Lakoff shows that S-Deletion must be allowed to apply before Passive, which he argues to be cyclic; he concludes there that the restriction on rule application indicates that the rule must be precyclic. Later (pp. 66-74), however, he shows that either S-Deletion or VP-Deletion, a rule highly similar to S-Deletion, must be allowed to apply after Equi-NP-Deletion, another

15. Given the definition of an anywhere rule as one that applies to any phrase-marker which meets its structural description, it must be the case that the rules of this rule-type may apply not only before or after the other rule-types as units, but also before or after any given rule of any other rule-type.

rule that is argued to be cyclic. Lakoff formulates this second rule on p. 74 as:

$$\begin{array}{rcl}
 (6) \text{ VP-Deletion:} & X & VP & Y & NP[it & S[\left\{ \begin{smallmatrix} \text{for} \\ \text{POSS} \end{smallmatrix} \right\} & VP]] & Z \\
 & 1 & 2 & 3 & 4 & 5 & 6 & 7 \implies \\
 & 1 & 2 & 3 & 4 & \emptyset & \emptyset & 7 \\
 & \text{condition:} & 2 = 6 & & & & &
 \end{array}$$

If the same rule (i.e., S-Deletion) must apply in both cases then, Lakoff maintains, this argues for it being an anywhere rule. It is possible, though, to consider the rules to be different ones, in which case it would be sufficient to consider S-Deletion as precyclic. At the end of the paper (p. 74) Lakoff rather clearly indicates his preference for considering S-Deletion to be the rule involved in both cases, and therefore his preference for an anywhere and not a precyclic rule-type. He does admit, though, that he lacks the hard empirical evidence that would substantiate this preference, and thus, in a sense, leaves the question open.

If the grammar contains precyclic rules, then, they all apply prior to the point where the cyclic rules begin their bottom-to-top course up the P-marker. Any rules of an anywhere status will be able to apply during the derivation to all phrase markers that satisfy their structural descriptions. The cyclic rules apply in an upward fashion as in (3) and (4). Mixed in the ordering with cyclic rules are transformations of the last-cyclic rule-type, or ones that are specially marked to apply only on a topmost S.¹⁶ These last-cyclic rules are distinguished from the logically possible but, for Lakoff 1968a at least, actually nonoccurring

16. Although Lakoff's definitions as represented above specify only that last-cyclic rules must apply on a topmost S, in fact he implicitly also requires that last-cyclic rules must make essential reference to elements of the highest S and must not refer wholly to items contained in lower sentences. This is explained more fully in section 1.8 below.

postcyclic rules by the fact that some cyclic rule follows all of them in the ordering of upward cyclic and last-cyclic rules.

Particular arguments for the existence of noncyclic rules presented in Lakoff 1968a, as well as in all other sources that I am acquainted with will be discussed in detail in chapter II of this study. For the present it is sufficient to have noted the specific proposal Lakoff makes here for expanding the Aspects traffic laws scheme, as well as the additional rule-types he defines but does not actually incorporate into his grammar. In an important way this proposal parallels the one made by Fillmore for the organization of transformations in that in both cases it is suggested that the rules be divided into those that apply cyclically in a derivation and those that do not. Fillmore's noncyclic transformations applied in a block after what, in effect, was his cycle. Lakoff, now, goes beyond the scheme of (1) in arguing that different varieties of noncyclic rules need to be distinguished, each with its own particular applicational relation to the cyclic rules.¹⁷ While later writers have disagreed on exactly how many rule-types other than cyclic need to be distinguished in the grammar and how these should apply in relation to cyclic rules, yet there is quite widespread feeling that some such cyclic-noncyclic division is necessary.¹⁸

17. Anywhere rules, it might be said, are distinguished in their application by having no relation to the cyclic rules (or to any others), applying strictly in terms of their own structural description and the P-markers that appear in a derivation.

18. Recently there has been some discussion of 'linear grammars' (see Kimball 1972b and Grinder 1972), or grammars where the rules apply iteratively but not cyclically from bottom to top. Evaluation of this proposal lies outside the scope of this study, but it may be noted that linear grammars do not differ from cyclic grammars such as (4) with respect to the postulation of noncyclic rule-types.

1.A.6. Ross 1968 [1967].

In his dissertation, completed in 1967, Ross nowhere directly discusses the overall question of what the traffic rules should be for the transformational component of a generative grammar. In the course of discussing the concept 'bounding', however, he presents several arguments for rules being 'last-cyclic'; although Ross (p. 204) cites Lakoff 1968a for showing that last-cyclic rules are necessary, most of the eight arguments for 'last'-cyclicity that he presents are rather for rules being postcyclic in the sense described in the previous section. That is, arguments are given of the form (7), where there is no account taken of the fact that last-cyclic rules (for Lakoff 1968a, at least, which is what Ross explicitly is following) are ordered before at least one cyclic rule.

- (7) 1. Rules Ra and Rb must be marked so as to apply in that order.
2. Ra is last-cyclic.
3. Therefore Rb must be last-cyclic.

Under Lakoff's definitions, step 3 is invalid; the missing premise is that Rb is not cyclic. I take it, then, that since Ross's arguments are so frequently invalid in this way, that he really is concerned with the rule-type of postcyclic rules, a valid argument form for which is (8):

- (8) 1. Rules Ra and Rb must be marked so as to apply in that order.
2. Ra is postcyclic.
3. Therefore Rb must be postcyclic.

Ross thus is tacitly proposing that one of the rule-types defined in Lakoff 1968a but not actually incorporated into that grammar in fact should appear in the traffic rules.

Completing the picture of his scheme for governing the applicational order of transformations, we note that beside having cyclic, last-cyclic

and postcyclic rules, Ross implicitly accepts the necessity of anywhere and/or precyclic rules. This is seen from the inclusion of the rule S-Deletion in his grammar (p. 199), and his reference (p. 207) to Lakoff's (1968a) discussion of this.

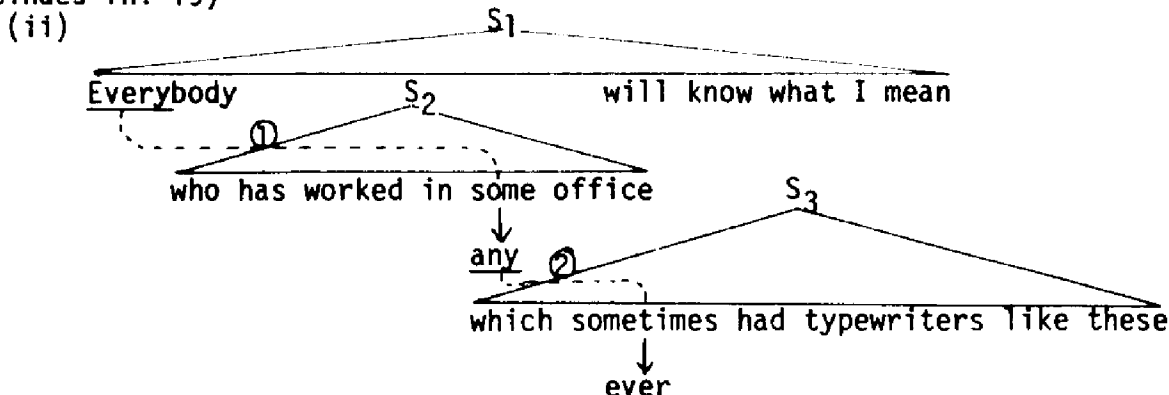
The chart of Ross's (1968) traffic laws in (9), then, is similar to that based on Lakoff 1968a, differing only in that it includes some of the possible rule-types not utilized in (4). It is included in this section I.A not so much because it represents some new direction or some important addition to earlier thought on the problem, but more because it in effect summarizes the development of Fillmore's idea that the rules of the transformational component be segregated into cyclic and noncyclic rules. As far as I can tell, (9) represents the most elaborate proposal for the subdividing of noncyclic rules. While many other rule-types are logically possible within the current theory, I am not aware of any actually having been proposed that are essentially different from the five shown here.¹⁹

19. Ross (1968:250) briefly discusses a rule that he finds applies 'anticyclically' - a rule we may call Relative Clause Indefinite Incorporation (RCII). This process "[eats] its way from higher sentences into lower ones, in sequence, so to speak, instead of the normal type of rules, which process embedded sentences first, and then the sentences that contain them." We may illustrate RCII with a simplified version of Ross's sentence (6.198). Sentence (i) is derived as shown in (ii), where RCII applies the first time (the circled 1) on S₁, being triggered by the every in the head NP of the relative clause, and the second time on S₂, triggered there by the any which results from the first application of the rule.

(i) Everybody who has worked in any office which ever had typewriters like these will know what I mean.

- (9) Pr (1?). Ra }
 Pr (2?). Rb } I. Precyclic
 .
 .
 Pr (n?). Rx }
- C(or L), 1. Rc }
 C(or L), 2. Rd } II. Cyclic and
 .
 .
 C(or L), n. Rx } Last-cyclic
- Po, 1. Re }
 Po, 2. Rf } III. Postcyclic
 .
 .
 Po, n. Rx }
- A. Rg }
 A. Rh } (unordered)
 .
 .
 A. Rx } Anywhere

(continues fn. 19)



Ross claims that RCII must be able to apply downwards in the tree. Presumably this is based on an example such as (iii), where the Complex NP Constraint would prevent RCII on the top cycle from making any changes in the relative clause the office which...summer.

- (iii) Everybody who has worked in the office which sometimes/*ever has to go without air conditioning in the summer will know what I mean.

Thus, since RCII must apply in lower clauses, but since it can only apply downwards one cycle at a time, some special condition is apparently required for the rule.

I will not here propose establishing an additional rule-type to handle RCII. In the first place, as described by Ross (1968) and Stockwell et al. (1968:269-71), there is no evidence that the first application of this rule must take place in a cyclic domain other than that defined by the upward movement of the transformational cycle. Said positively, the application of RCII is apparently entirely consistent with strict cyclicity. The unusual iteration required by this process could be handled by a condition added to the rule itself.

In the second place, it is not entirely clear that the grammar of

Now it is not altogether clear that Ross 1968 intends to have both anywhere and precyclic rules; perhaps a more accurate representation would be to have one or the other of these rule-types. They are both presented here, however, in illustration of the fullest traffic laws proposal possible,²⁰ given the suggestions for the different rule-types made in the past few years.

As in (4), the rule-types in (9) are ordered with respect to each other; also, aside from precyclic rules, too few of which have been postulated to raise questions of their ordering, and anywhere rules, which are by definition unordered, rules of the other rule-types are for Ross strictly ordered within their respective sets. Every transformation in Ross's grammar, then, is marked with at least one ordering feature, this indicating to which of the five rule-types it belongs. In addition, cyclic and last-cyclic, and postcyclic rules are marked with a second ordering feature, this one indicating their position in one of the two ordered lists of rules.

I.A.7. Emonds 1970 [1969].

The final proposal regarding the organization of syntactic transformations to be considered in this section is that contained in Emonds' 1969 dissertation. As in Ross 1968, so here Emonds does not explicitly discuss previous traffic laws solutions, nor does he give a full defense

(continues fn. 19) English should contain rules that relate some and any and similar pairs, as RCII and Klima's (1964) rule Indefinite Incorporation do. Robin Lakoff (1969a), for example, shows that in many environments both some and any are possible, and that they are systematically correlated with certain semantic differences. As such, it is not obvious that postulating a rule such as RCII is the most appropriate way to explain the surface distribution of sometimes, ever, some, any, etc.

20. In fact some have described a system where the anywhere and precyclic rule-types are explicitly distinguished (see, for example, Kimball 1973a:50).

of his own suggestions. His proposal is noteworthy primarily in that it has been informally adopted by recent works of the 'interpretivist' camp (e.g., Chomsky 1971, Jackendoff 1972).

Emonds' proposal with respect to rule-type distinctions is very similar to Chomsky's in Aspects, outlined above in (3). Where in Chomsky 1965 all transformations are cyclic, for Emonds, rules are divided into those that apply cyclically and those that can apply only on a 'root S'. Emonds' 'root S' is similar in spirit to 'topmost S' as this is used in defining Lakoff's "last-cyclic" rules: a root S is "either the highest S in a tree, an S immediately dominated by the highest S, or the reported S in direct discourse" (p. 6).

Unlike the proposals of Fillmore, Lakoff, and Ross, in Emonds' system there is no need to mark individual rules as to which rule-type they belong to; the division of transformations into those that apply only on a root S (= 'root-cyclic' rules) and those that can apply on any sentence is to be determined by certain properties of the rule itself and of the phrase structure rules of the base. (See chapter III for discussion of this claim.) Although questions of ordering are not much discussed in Emonds 1970, presumably the rules are ordered. The scheme proposed, then, is as in (10):

- | | | | |
|------|--|---|-------------------------------|
| (10) | 1. Ra
2. Rb
.
.
.
n. Rx | } | Upward cyclic and root-cyclic |
|------|--|---|-------------------------------|

Before looking at the particular arguments given for the elaboration of traffic laws plan (3) of Aspects into more complex schemes such as (4) or (9), or even (10), it will be helpful to review the definition of terms to be used in the following chapters.

I.B. Definition of the rule-types.

As I trust has been clear so far in this study, 'rule-types' refers to sets of transformational rules distinguished by domain of application (e.g., the rules of which may apply to any S (to a topmost S only, etc.) in a phrase-marker), and particularly by relative order of application (precyclic before cyclic, etc.). 'Rule-type assignment' has referred to the marking of individual transformations with special features indicating which of the various rule-types available in any given traffic laws scheme each one is to be assigned to. As for the definitions of the rule-types themselves, these have, for the most part, been rather straightforward. There has been some confusion surrounding the terms 'last-cyclic' and 'postcyclic', however, and it would be good here to clarify these.

In defining these two rule-types, I follow a distinction adumbrated in Lakoff 1968a and stated explicitly in Koutsoudas 1971:376,383. This distinction rests on an understanding of what is implied by a rule being cyclic. As is made clear in Chomsky 1965, and in all subsequent discussions of the Aspects-type transformational cycle, a cyclic rule is one restricted to applying on a given S, in particular a rule that may not apply to a domain more comprehensive or including (i.e., 'higher in the tree') than the domain which has been reached in the bottom-to-top passage through the cyclic nodes of a generalized phrase marker.

What is much less often made clear is that a cyclic rule is one that must be restricted in the other direction as well; that is, while such a rule cannot apply inappropriately high in the tree, neither can it apply only to a proper subdomain of the domain reached in the upward passage through the tree - that is, a cyclic rule cannot apply too low in the tree, either. This latter requirement cannot be considered as

an arbitrary rider to the definition of cyclic rules, but rather something which guarantees that the upward cycle of (3), (4), (9), (10), and similar systems in fact operates that way. If cyclic rules could apply wholly within some S after the cycle had already passed that S , then this would effectively allow the rules to apply in a downward cyclic manner. Such a possibility is illustrated in (11), where R_a and R_b , two optional rules not triggered by elements in some higher sentence, apply cyclically but downward in the tree where there is no restriction on the lower domain of application of rules.

(11) A possible 'upward cyclic' application:

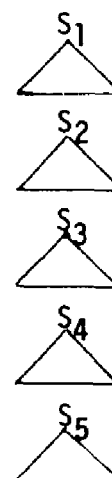
S_5 cycle: no rules apply

S_4 cycle: no rules apply

S_3 cycle: R_a applies in S_3

S_2 cycle: R_b applies in S_4

S_1 cycle: R_a applies in S_5



Formal means of ensuring that rules in the cycle do not apply too high or too low in the tree will not be discussed in this study. Jackendoff (1972:374), for example, postulates an "analyzability convention" which requires that when a rule applies, "the main clause (relative to the present cycle) must play an essential part in its application"; Chomsky (1971:13) suggests a similar condition: "No rule can apply to a domain dominated by a cyclic node A in such a way as to affect solely a proper subdomain of A dominated by a node B which is also a cyclic node."²¹ There seem to be few other specific proposals

21. While Chomsky (1971) would relax this constraint in the case of at least certain minor rules (1971:63), Jackendoff (1972) apparently

for ensuring that the upward cycle functions as it should. For present purposes it will not matter how the correct operation of the cycle is governed, but only that it in fact does actually move consistently from more deeply embedded to less deeply embedded sentences.

Having stated the restrictions on application of a rule classified as cyclic, we return to the differentiation of last-cyclic and postcyclic rules. While Lakoff (1968a) argues that the grammar must include last-cyclic rules, in particular that the grammar of English must mark the rule Appositive Formation (APPOS) as being last-cyclic, he does not explicitly indicate whether he intends this kind of rule to be cyclic in the sense of the preceding paragraphs. That is, from the brief discussion of the various rule-types on his page 34, it is not clear whether last-cyclic rules should be allowed to apply only within some embedded S or whether they should be required to make some reference to the S which is the matrix S (i.e., the topmost S) at the time of application. Said differently, no answer is given here as to whether last-cyclic rules should be considered 'in the cycle' or 'out of the cycle'.

Judging from Lakoff's (1968a:36-53) discussion of APPOS, however, it appears that his last-cyclic rules must be essentially cyclic, and not unconstrained with respect to domain of application. Thus Lakoff takes pains to argue that appositives and nonrestrictive relatives derive only from sentences conjoined at the topmost S, that the rule must not be allowed to apply to embedded conjunctions. The details of this argument will be considered in the next chapter, but for now it is only to be noted that Lakoff builds these applicational restrictions into APPOS simply by marking this rule as last-cyclic. This is

(continues fn. 21) intends this to govern the application of all transformations and thus would, in terms of my definition in (12), exclude all rules that are 'out of the cycle'.

sufficient only if a last-cyclic rule is constrained in the way cyclic rules are with respect to not applying wholly within some lower S. In the present study, last-cyclic rules will be considered to be constrained in this way.

In Lakoff 1968a no example is found of a postcyclic rule. There such a rule is described (p. 34) only as one that applies (a) to the entire phrase-marker and (b) "after all of the cyclical rules have applied." As with his discussion of last-cyclicity, so in Lakoff's consideration of the postcycle there is no mention of the matter of appropriate domain of application. From Ross 1968, however, and from other works that propose the necessity of postcyclic rules, it is clear that these are not at all restricted as to what S in the tree they must apply to. That is, from the various examples of rules claimed to be postcyclic there is no sense in which they can be characterized as applying to the topmost or highest S. They thus share none of the restrictions of either cyclic or last-cyclic rules; in this study they will be defined simply as the set of rules which must apply only after all rules that are restricted to applying cyclically have applied, i.e., after the set of all cyclic and last-cyclic rules.

The difference between last- and postcyclic rules, then, will be more than just a matter of order of application with respect to cyclic rules. It is true that the postcycle will consist of "rules which can only apply after the last cyclical rule has applied for the last time" (Postal 1971:74), but that a last-cyclic rule is one that may apply before some cyclic rules. This difference, however, instead of representing the basis of division between last-cyclic and postcyclic rules, will instead be a trivial consequence of (a) their differentiation in terms of whether or not they observe the cyclic principle, and (b)

the universal ordering of the rule-types.

Rules of the transformational component have thus been divided into the following six rule-types. The first division is between those rules that apply on a given S (i.e., that apply no higher and no lower in the tree than on the given S) and those that are not restricted as to their domain of application. In both parts of this major division, then, several varieties of rules have been distinguished.²²

(12) A given transformation is either:

- A. 'in the cycle' - application restricted to the S to which the cycle is applying in its upward path through the tree; cannot refer "only to constituents of an S once the cycle has already applied to that S" (Koutsoudas 1971:376)
 - 1. cyclic - can apply on any S,
 - 2. last-cyclic - is restricted to applying on the topmost S only,
 - 3. root-cyclic - is restricted to applying on a root S only (i.e., on the topmost S, on an S immediately dominated by the topmost S, or in the reported S of direct discourse);
- B. 'out of the cycle' - application not restricted to any given S
 - 4. anywhere - can apply whenever any phrase marker satisfies its structural description,

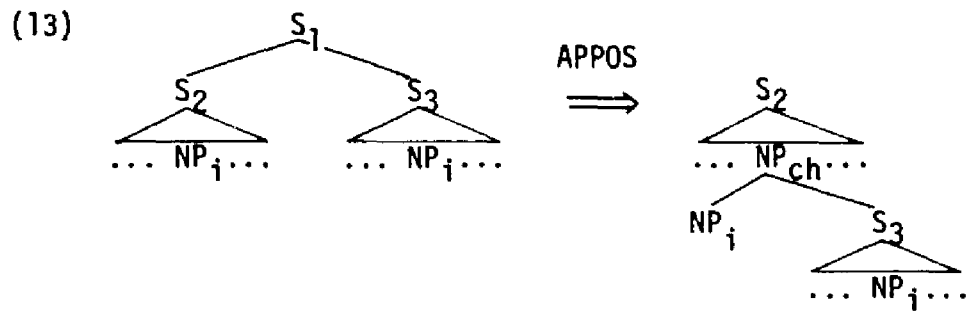
22. The number of rule-types elaborated is, in terms of the current theory, apparently more a matter of historical accident than of logical possibility. That is, it is not clear how it might be explained that a grammar may utilize rules belonging to these specific rule-types, but not, say, first-cyclic, odd-numbered-cyclic, or midcyclic rules, or any one of a great number of other logically possible but highly implausible rule-types. This explanatory deficiency seems to inhere in any theory that allows a multiplicity of syntactic rule-types.

5. precyclic - applies before any rule that is 'in the cycle' has a chance to apply,
6. postcyclic - applies after all rules that are 'in the cycle' have had a chance to apply.

Before going on it might be helpful to mention one deficiency in the terminology adopted here. This is that 'last-cyclic' does not seem to be the best term for the class of rules that have been restricted to applying on the topmost S only. 'Last-cyclic', or for that matter 'final-cyclic', implies that it is to the last cycle in the derivation that such a rule is restricted to applying, that after that cycle is ended, there are no other cycles on which cyclic or last-cyclic rules may apply. Understood in this way, Lakoff's (1968a) 'last-cyclic' rule APPOS is not necessarily last- or final-cyclic, although it is top-cyclic (topmost-S-cyclic).

Notice how the rules apply that are involved in forming non-restrictive relatives. Applying on a topmost S (following Lakoff's argument), APPOS Chomsky-adjoins a lower sentence to an NP in another S, as in (13).²³

23. Throughout this study a node created by Chomsky-adjunction will generally be given a ch subscript. This is simply to indicate more clearly the operation of transformations, and is not meant to suggest that a node formed in this way functions in any way different from nodes present from the underlying structure, either with respect to the application of other rules, or with respect to the operation of the transformational cycle.



The original topmost S (S_1) prunes, now leaving S_2 as the topmost S. It is in this new topmost S that, for example, NP_i in S_3 is marked with the feature [+wh], and then fronted by Relativization. In order to claim that APPOS was properly last-cyclic, it would have to be demonstrated that all the rules that applied after APPOS in the derivation of appositives and nonrestrictive relative clauses were postcyclic or anywhere. Since, as will be pointed out below, there are no grounds for considering Relativization to be 'out of the cycle', this means that the application of cyclic and last-cyclic rules on S_1 does not represent the final cycle in the derivation of appositives.

The facts can be adequately handled by interpreting last-cyclic rules as top-cyclic (last-cyclic being only a special case of top-cyclic), and by allowing the 'upward path' of the cycle to include cycling a second time at S_n , when, on the cycle of the S immediately dominating S_n , this immediately dominating S is removed. I refrain from trying to introduce the new term 'top-cyclic', but throughout will consider all last-cyclic rules as able to apply to as many topmost S's as there are in a given derivation.

II. Arguments for transformations being noncyclic.

The transformational literature dealing with rules of modern English syntax suffers no shortage of arguments purporting to demonstrate that a given rule cannot apply cyclically and that therefore the Aspects traffic laws proposal, consisting solely of an upward cycle, must be expanded to include various other rule-types. I have found several dozen such arguments, each of which will be examined carefully in this chapter. The goal is to see exactly how much support they actually give to the proliferation of rule-types that is in such currency today among generative grammarians.

I consider first in part A all the arguments I am aware of for having a postcycle in English. Following subsections then will survey the arguments given for rules having to be last-cyclic or root-cyclic, and precyclic or anywhere. In part D of this chapter I examine many of the arguments that Pronominalization cannot be a cyclic rule. These do not fit easily into one of the other categories, for arguments relating to this rule most often were concerned more with demonstrating that it could not, contra Ross's (1967) claim, be cyclic, and not so much with establishing positively to what rule-type (if any) it must belong. A final section summarizes the results of the critical investigation of arguments in sections A-D.

In reviewing the arguments below the reader should be reminded that these will be presented in terms of the definitions given above in section I.B, not necessarily following the terminology of the respective authors. Thus, for example, the arguments in Ross 1968 for a rule being 'last-cyclic' are considered below with the postcyclic arguments, for it is clear that these involve a rule applying without respect to the cycle (i.e., they are not 'in the cycle' in the sense of (12) in I.B).

II.A. Arguments for transformations being postcyclic.

The majority of arguments to be reviewed in this section, plus several in other sections of this chapter are based on other arguments for extrinsically ordering, or otherwise guaranteeing in some language- and rule-specific manner, the relative order of application of a pair of rules.¹ The general form of this kind of argument for noncyclicity is given in (1), with step 1 in most cases a premise that will be shown to have insufficient support.

- (1) 1. Rules A and B must be explicitly guaranteed to apply in the order A-B.
2. If B were cyclic, the desired order A-B could not be ensured even by marking these rules with extrinsic ordering features:

1. A

2. B

(This may be true for various reasons.)

3. If B were postcyclic, the desired order of application A-B could be guaranteed by marking these rules:

C. A		Po, 1. A
	or	
Po. B		Po, 2. B

4. Therefore B must be postcyclic.

The arguments for postcyclicity below are grouped rather informally into eight sections, primarily with the intention of considering related rules together.

1. Arguments for the necessity of rules being cyclic also commonly rely on rule ordering arguments. See, for example, the discussion in Noll 1972:33-34.

II.A.1. 'Preposition dangling' arguments.

Perhaps the most widely-known arguments for noncyclicity are the 'preposition dangling' (alias 'preposition orphan') arguments made by Postal for the postcyclicity of Wh-Q-Movement (QUEST) (1970b:454-55 and 1971:74-76) and Wh-Rel-Movement (1971:74-76), and suggested also for Topicalization (TOPIC) (1972a:216). These are based on the fact that a preposition may optionally accompany a constituent being fronted by QUEST, REL, or TOPIC. In Postal 1971 the arguments for the postcyclicity of QUEST and REL based on this fact may be outlined as in (2). The case for TOPIC being postcyclic would presumably be similar; this will be discussed at the end of this subsection.

- (2) 1. If a preposition is fronted along with an NP under the operation of QUEST or REL, it must move as far as the NP does, and cannot be left 'dangling' in an intermediate cycle. Otherwise ungrammatical sentences result.
2. A preposition could not be left behind in an intermediate cycle if QUEST and REL moved the relevant constituents directly to the required positions.
3. If QUEST and REL were postcyclic, then the constituents moved would arrive at their respective destinations directly.
4. Therefore QUEST and REL must be postcyclic.

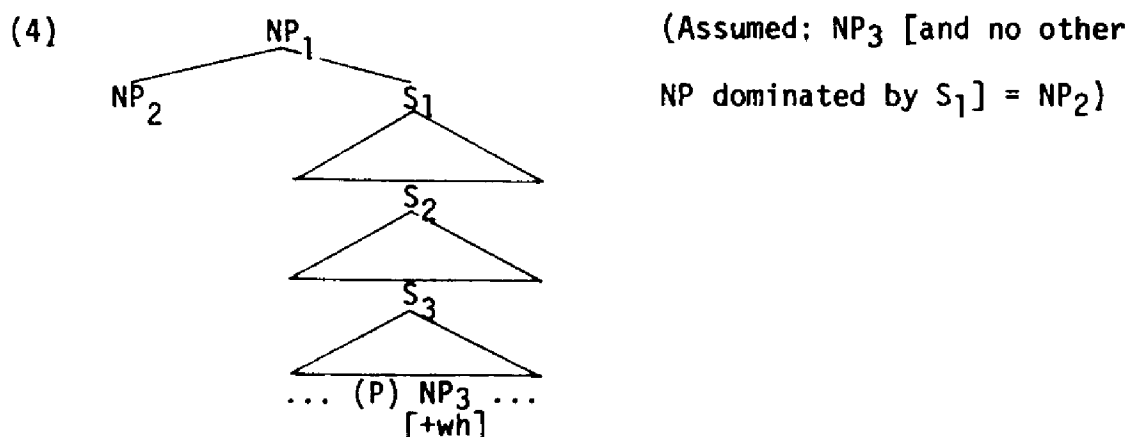
The facts that Postal refers to in step 1 may be illustrated by his own examples involving QUEST (1971:76). While the preposition which in the underlying structure is the sister of the questioned NP may be moved to the front of the sentence, as in (3b), it may not be isolated from the questioned NP at the front of some intermediate sentence, as the ungrammaticality of (3c) and (3d) indicates.

- (3) a. Who do you believe Bill saw Mary talk to?
 b. To whom do you believe Bill saw Mary talk?
 c. *Who do you believe Bill saw to Mary talk?
 d. *Who do you believe to Bill saw Mary talk?

These starred sentences are to be blocked, Postal argues, by marking QUEST as postcyclic, thereby guaranteeing that all constituents to be moved reach their acceptable surface structure positions directly, with no opportunity of prepositions being stranded behind in some intermediate cycle. Similar examples could be given showing the need to mark REL as noncyclic also, Postal asserts (1971:74).

The weakness here is in step 3, both with regard to the argument for the postcyclicity of QUEST and with regard to the argument concerning REL. In order for the conclusion of (2) to follow correctly, this third step would have to demonstrate that it was only by assigning these rules a feature indicating postcyclicity that the moving constituents would reach their destination directly. However, for REL this feature is in fact not necessary to guarantee all and only the relevant grammatical strings, and for QUEST is neither necessary nor sufficient.

In the case of REL, the rule itself apart from any consideration of rule-type, guarantees the direct movement required. As Postal writes it (1971:92), the rule applies only when on the cycle that contains the head noun, a formulation of REL which is certainly a standard one. But with such a rule, there is simply no way to move a preposition anywhere other than where the NP moves. Schematically, to a tree such as (4), REL has no possible way of applying in cycles S_1 , S_2 , or S_3 ; its structural description could not possibly be met there.



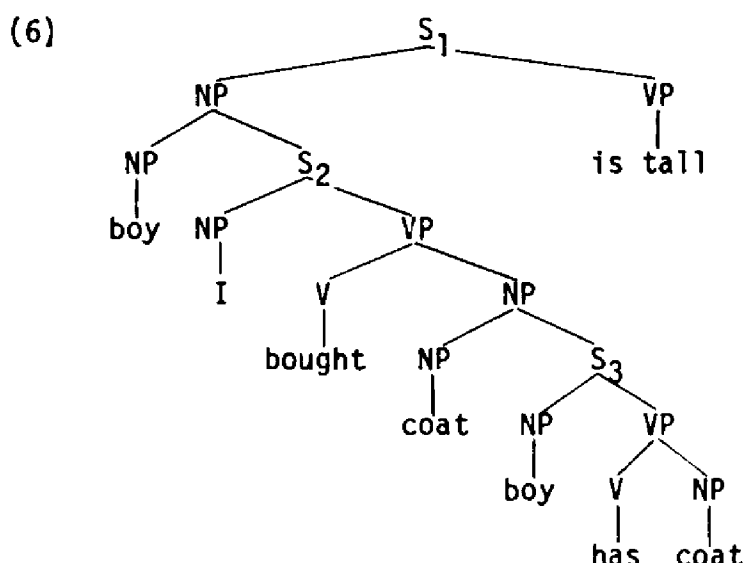
Only when the upward cyclic movement through the tree reaches the cycle that contains the head noun phrase, NP₂, can REL apply. There is thus no way a preposition could be stranded in an intermediate cycle when REL is cyclic; the structural change is such that the problem mentioned in step 1 can never arise.²

Even worse for this argument that REL should be noncyclic is an observation by John Kimball (personal communication) that in the derivation of a sentence such as (5), REL apparently must apply cyclically.

(5) The boy whose coat I bought is tall.

To underlying structure (6), Possessive Formation (POSS-FORM) and Possessive Shift (POSS-SHIFT) must apply on S₂, and REL on both S₂ and S₁.

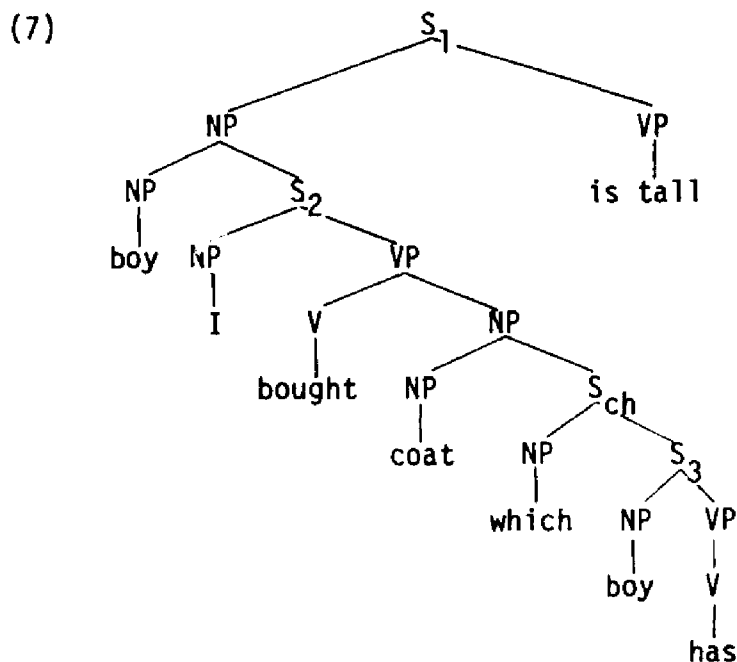
2. Postal later explicitly abandons the view that REL is postcyclic: "the wh Movement rules, at least in the case of relative clauses, apply at many different levels of structure and cannot be regarded as last cyclical" (1972b:42) ('last cyclical' here apparently meaning 'applying on [= my 'last-cyclic'] or after [= my 'postcyclic'] the cycle of rules at the topmost S').



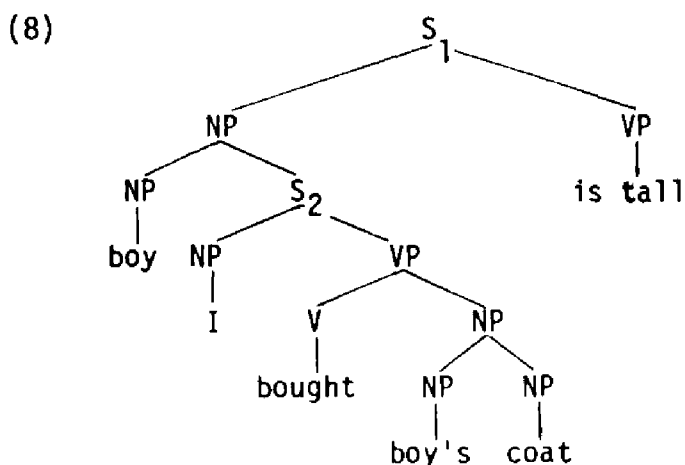
The argument for cyclicity is based simply on the fact that the application of POSS-FORM and POSS-SHIFT must intervene between the two applications of REL. If REL were last- or postcyclic, as argued by Postal, then there would be no way for it to apply at more than one point. Only if a rule is cyclic (or anywhere) can its applications in derivations be nonconsecutive.

To structure (6), then, the only rule applicable is REL as this applies on the S_2 cycle. Given a standard formulation of POSS-FORM (e.g., as in Burt 1971:91), one where the object must be a wh-marked NP,³ it is clear that this could apply on S_2 only after REL has. POSS-SHIFT, requiring the prior application of POSS-FORM, obviously cannot apply to (6). Finally, REL cannot apply on S_1 , for Ross's Complex NP Constraint would block movement of the relative out of S_3 . REL thus applies once to (6), this resulting in (7).

3. Without such a formulation of the rule it is hard to see how the condition requiring recoverability of deletions could be satisfied.



To (7), REL still cannot apply on S_1 , for the relevant NP is still within a complex NP. The result of applying POSS-FORM and POSS-SHIFT to (7) is shown in (8).



Now, finally, REL may apply on S_1 , moving (via the Left Branch Condition on Pied Piping) both boy's and coat to the front of S_2 ; sentence (5) is thus derived.

Where possessive structures such as those in (5) are derived by means of the rules for forming possessives illustrated here, then it seems clear that all the applications of REL necessary cannot be

Postal is quite aware that (10) cannot apply to generate indirect questions, that "it is incorrect to have the wh-marked NP always move to absolute sentence initial position" (1971:108). While earlier he had proposed (Katz and Postal 1964:79-117) that direct questions and some indirect questions have an abstract underlying morpheme Q, and that this Q be referred to by the rule QUEST, in Postal 1970b and 1971 he is unwilling to postulate such a morpheme and simply notes that his rule (10) is incomplete.

In later work, however, Postal (1972c) has indicated support for a question-formation rule that includes reference to a higher trigger. Once such an element is made part of the rule, then, given the appropriate modification of the base structures, the movement of questioned constituents to both sentence-initial position and to clause-initial position following the class of verbs {ask, decide, know, matter, see, tell, wonder, ...} follows naturally.⁴ Although no rule QUEST is given in

4. Although Postal does not give examples of the behavior of prepositions in indirect questions, not surprisingly this conforms closely to the paradigm for direct questions.

- (i) a. Joe asked who Bill saw Mary talk to.
 b. (?)Joe asked to whom Bill saw Mary talk.
 c. *Joe asked who Bill saw to Mary talk.
- (ii) a. Frank knew which boy Sam hoped Ed would buy the book for.
 b. (?)Frank knew for which boy Sam hoped Ed would buy the book.
 c. *Frank knew which boy Sam hoped for Ed would buy the book.
- (iii) a. We wondered who the commissioners thought the county officials should collect taxes from.
 b. We wondered from whom the commissioners thought the county officials should collect taxes.
 c. *We wondered who the commissioners thought from the county officials should collect taxes.

Generally, it seems to be the case that prepositions moved with NPs sound somewhat more stilted in indirect than in direct questions; cf. the sentences of (iv) with (ib) and (iib).

- (iv) a. To whom did Bill see Mary talk?
 b. For which boy did Sam hope Ed would buy the book?

However this difference in acceptability is to be explained, though, what is important here is that the (c) sentences in (i)-(iii), in which a preposition has been stranded, are clearly ungrammatical (and unacceptable to a significantly greater degree than the (b) sentences).

Postal 1972c, one such as Bach (1971b:157) proposes in (11) is presumably what Postal has in mind.

(11)	X	$\begin{bmatrix} +\text{Verb} \\ +\text{Interrogative} \end{bmatrix}$	Y	S[Z	NP[WH	$\begin{bmatrix} +\text{Pro} \\ -\text{Def} \end{bmatrix}$	W]	R]	P	
	1	2	3	4		5		6	7	\Rightarrow
	1	2	3	5+4		\emptyset		6	7	

Here [+Verb, +Interrogative] comprises the set of verbs that can introduce indirect questions, as well as the interrogative performative verb. Higher trigger QUEST rules not depending on a performative analysis but utilizing an abstract morpheme Q are given in Ross 1968:65 and Baker 1970:207; Bresnan's (1970:317-18) question rule relies on a COMP constituent dominating a WH trigger. No matter what shape the trigger assumes, the observational inadequacy of a rule such as (10) is overcome, and both direct and indirect questions may be generated by the same rule.

Once the insufficiency of (10), the rule on which the preposition dangling argument for QUEST is based, is removed by reformulating it to include reference to a higher trigger, then it becomes clear that the marking of QUEST for postcyclicity is wholly unnecessary and therefore unjustified. Just as in the case of REL, QUEST cannot possibly apply until the cycle containing the trigger is reached, and then the constituents to be moved are moved directly to the required positions.⁵ Given the need for a higher-trigger formulation of QUEST, there is simply no way that (3c) or (3d) could be generated by a grammar of English.

Since all the facts regarding the movement of prepositions with wh-NPs are explained fully by the otherwise motivated structural

5. This same point has been made by Bresnan (1971:277) and Koutsoudas (to appear).

"In a structure of the form (159), no rule can involve X and Y if Z is the subject of the phrase WYV and Z is not controlled by the category containing X:

(159) ... X ... [... Z ... -WYV ...] ... "

In the sentences in step 1, EACH-MOVE would have only the strings (a) and (b) to apply to.

(a) S_1 [COMP they each_X expected S_2 [COMP who_Z to kill the others_Y]]

(b) S_1 [COMP Bill wanted S_2 [COMP they each_X to expect

S_3 [COMP who_Z to kill the others_Y]]]

It would be blocked from applying because the underlined subject who is not controlled by any category containing X (in fact, it is not controlled at all).

3. Therefore, from these considerations it could be argued that QUEST was postcyclic.

This argument is not sufficient for Chomsky. In effect he gives two reasons for not accepting its conclusion:

1. Given condition (13) (=his (51), p. 13; quoted above in section I.B) as a reasonable condition on rules, QUEST must be cyclic, for it must apply in indirect as well as in non-embedded questions.

(13) No rule can apply to a domain dominated by a cyclic node A in such a way as to affect solely a proper subdomain of A dominated by a node B which is also a cyclic node.

2a. If QUEST were postcyclic, then the Specified Subject Condition would have to be modified in some ad hoc way. For example, in sentence

(14a = his 180) the condition as stated would block the movement of the wh-word on the S_1 cycle, thus preventing the derivation of the grammatical (14b).

(14) a. $S_1[\text{COMP } \frac{\text{they}}{X} \text{ expected } S_2[\text{COMP } \frac{\text{Bill}}{Z} \text{ to kill } \frac{\text{who}}{Y}]]$

b. Who did they expect Bill to kill?

This is because Z is not controlled by X or any category containing X.

2b. If QUEST is cyclic, then it may be modified so that it leaves behind a 'trace' (which Chomsky admits (p. 71, fn. 49) is to introduce a derivational constraint), a PRO controlled by the wh-word and in the position the word to be questioned originally was. Now EACH-MOVE will be appropriately blocked by the Specified Subject Condition, no matter whether it is tested for application before or after QUEST. Considering, for example, the relevant lines of the derivation in (12.1a) above, EACH-MOVE can apply neither to (15b), the input to QUEST on the relevant cycle, nor to (15c), the output of QUEST.

(15) a. $S_1[\text{COMP they each expected } S_2[\text{COMP who to kill the others}]]$

\Downarrow QUEST (S_2)

b. $S_1[\text{COMP they } \frac{\text{each}}{X} \text{ expected } S_2[\text{COMP } \frac{\text{PRO}}{\text{who}} \frac{Z}{Z} \text{ to kill } \frac{\text{the others}}{Y}]]$

\Downarrow QUEST (S_1)

c. $S_1[\text{COMP } \frac{\text{who}}{\text{who}} \text{ they } \frac{\text{each}}{X} \text{ expected } S_2[\text{COMP } \frac{\text{PRO}}{Z} \text{ to kill } \frac{\text{the others}}{Y}]]$

d. Who did they each expect to kill the others?

In both cases the embedded subject being controlled by who and not by some category containing each blocks application of EACH-MOVE.

Chomsky does not explore possible modifications of the Specified Subject Condition so that it could be relaxed in cases such as (14), thereby allowing QUEST to be postcyclic. He does indicate, however, that

the device of a trace PRO left behind by QUEST could be considered to be a special case of a broader stipulation that "every rule that moves an item from an obligatory category (in the sense of Emonds, 1970), leaves a trace" (1971:71, fn. 49); i.e., he suggests a way in which this 'trace' solution may be something other than an ad hoc patch on the rule QUEST.

I will not discuss this alternative analysis of QUEST further here. If, in spite of Chomsky's attempt to motivate a revision of QUEST to include a trace PRO and thus to provide evidence against its being postcyclic, the alternatives in 2a and 2b were shown to be equally ad hoc, there would perhaps still be reason to prefer alternative 2b, wherein QUEST is cyclic. The reason is that this, but not 2a, is consistent with the general condition on rules (13), which in turn is consistent with the simplest traffic laws scheme of any considered in section I, viz., the Aspects model where all transformations apply cyclically. Where there is a choice between two systems, one of which is theoretically simpler, Occam's razor requires that, lacking evidence showing the necessity of the more complex model, the simpler must be preferred.

Returning briefly to the argument examined in this section II.A.1, Postal (1972c:216) notes that "Topicalization is also subject to the Preposition Dangle argument," and cites the following sentences as evidence.

- (16) a. I believe Mary thinks Joan gave a book to Melvin.
- b. Melvin, I believe Mary thinks Joan gave a book to.
- c. To Melvin, I believe Mary thinks Joan gave a book.
- d. *Melvin, I believe to Mary thinks Joan gave a book.
- e. *Melvin, I believe Mary thinks to Joan gave a book.

On the basis of facts such as these an argument such as that in (2) could

conceivably be constructed.

Such an argument would be invalid for the same kinds of reasons that it was invalid for QUEST and REL, namely that it cannot be shown that complicating the rule by marking it with a feature indicating postcyclicity is necessary to guarantee correct placement of the moved constituent. When the appropriate trigger for TOPIC is identified, then this clearly is sufficient for governing the movement involved and TOPIC may be cyclic. Furthermore, since TOPIC can in some cases apply in embedded strings, reference to this trigger is essential; simply marking the rule for postcyclicity would not suffice for governing all movement of topicalized NPs. Discussion of the proper formulation of TOPIC is deferred until section II.B.1, where an argument for TOPIC being last-cyclic is analyzed.

The preposition dangle argument, then (assuming the acceptance of the discussion below concerning TOPIC), provides no evidence for any rules having to be other than cyclic. In each case the rules, when properly formulated, are governed by some element in the underlying tree structure, which alone is necessary and sufficient to guarantee correct movement of the constituents in question.

II.A.2. Particle Movement.

One of the eight postcyclicity arguments found in Ross 1968 argues that Particle Movement (PART) must be postcyclic (pp. 151-52). This argument is based on the relation of PART to a rule Ross calls Action Nominalization (ACT-NOM), the rule relating pairs of strings in (17), and discussed by Lees (1960:64-69) and Chomsky (1970).

(17) a. We told the story.

b. Our telling of the story...

- c. Kit started up the engine.
- d. Kit's starting up of the engine....

This argument is based on a claim regarding rule ordering and goes as follows:

- (18) 1. ACT-NOM must be made to apply before PART. Otherwise ACT-NOM would have to be complicated in some ad hoc way.
2. If PART were cyclic, the desired order ACT-NOM before PART could not be guaranteed merely by extrinsically ordering the rules that way. This is because in the relevant cases PART applies on a cycle lower than the one on which ACT-NOM applies; the actual order of application thus could not be affected by any extrinsic ordering restrictions.
3. If PART were postcyclic, however, the desired order of application could be guaranteed by assigning these rules the following language-specific ordering features:

C(or L). ACT-NOM	or	Po, 1. ACT-NOM
Po. PART		Po, 2. PART

4. Therefore PART must be postcyclic.

As in the case of many other noncyclicity arguments, it is the purported ordering restriction in the first step that is crucial. If there are reasons for having PART be restricted to applying after ACT-NOM, then there can be a case for marking PART so it will not apply in the cycle. If this ordering is not required by the facts, however, then there can be no justification for marking PART and ACT-NOM to be in different sets of rules, or to be extrinsically ordered with respect to each other.

Ross considers the following sentences, from which the generalization could be drawn that ACT-NOM and PART cannot both apply to the

same string.

(19) a. Her efficient looking up of the answer pleased the boss.

b. *Her efficient looking of the answer up pleased the boss.

Assuming for now with Ross that PART applies to separate the particle from the verb, and does not instead move a postnominal particle next to the verb, his generalization seems correct here. For this kind of verb-particle construction, the particle must appear next to the verb in nominalized sentences.

(20) a. *Max's knocking of his opponent out...

b. *The government's closing of the factory down...

c. *Sam's indelicate bringing of the incident up...

d. *Her showing of her new car off....

Ross's argument for ordering ACT-NOM first is the following: If ACT-NOM has applied to a string, then PART will be blocked from applying by "a constraint which is necessary in any case: particles cannot be moved over an object NP which starts with a preposition" (p. 152).⁷ That is, no complication occurs with this ordering. However, if PART has applied to a string, Ross finds no natural way to keep ACT-NOM from then applying to that string. Instead of complicating one of the rules, which would be necessary if PART preceded ACT-NOM, it is preferable to adopt that ordering solution wherein neither of the rules needs to be complicated. Thus ACT-NOM must be guaranteed to apply before PART.

Before considering these claims regarding the interrelationship between ACT-NOM and PART, it should be pointed out that the ordering Ross selects is not without its own 'cost'. That is, when ACT-NOM is

7. This constraint on PART is necessary, for example, to prevent the derivation of (1b) from (1a) (= Ross's example 5.16).

(1) a. She did away _{NP}[with her father].

b. *She did _{NP}[with her father] away.

to be ordered before PART, then each rule must be marked with otherwise ad hoc features⁸ assigning them to certain rule-types (and possibly also assigning extrinsic ordering). As Postal (1972a:140-41) and Borkin (1972:57), for example, have pointed out, such features certainly must be counted in measuring the relative complexity of a solution. The two alternatives here may thus be compared:

(21) a. Ross's proposal: ACT-NOM applies before PART.

This means that ACT-NOM is complicated by marking it as
cyclic (or by marking it as postcyclic
and extrinsically ordered before PART);
PART is complicated by marking it as
postcyclic.

b. alternative proposal: ACT-NOM applies after PART. (This
ordering is guaranteed by the cycle.)

This means that ACT-NOM is complicating by providing it
with a more explicit structural
description;
PART is otherwise uncomplicated.

Speaking only on the grounds of simplicity, it is not clear how to choose between the alternatives in (21); I know of no proposal that would rank the complexity of the structural description of a rule with the complexity of ordering restrictions necessary to be imposed on that rule.

The issue may be settled quite apart from such an ill-defined notion as rule simplicity, however. If a further kind of verb-particle

8. In Ross's (1968) system, ordering and rule-type features are not derivable from any other features of the grammar. See chapter III below for discussion of later attempts to derive rule-type assignment from certain intrinsic properties of the rules.

construction is considered, then in fact there is evidence to support the rules applying in the opposite order - i.e., PART before ACT-NOM - and thus evidence to support a strictly cyclic application of the rules concerned.

In a discussion of post-verbal elements earlier in his dissertation, Ross refers (pp. 60-61) to a kind of verb-particle construction distinguished by Fraser (1965:97-104), namely, one where the particle functions as a directional adverb. Examples of such constructions include the following.

- (22) a. Bob let out the cat.
 b. Bob let the cat out.
 c. He brought in the trays.
 d. He brought the trays in.
 e. Artis threw down the vases.
 f. Artis threw the vases down.

These differ in certain ways from verb-(nondirectional) particles such as look up, bring up, work off, take over, and drown out. What is relevant to our consideration of the rules ACT-NOM and PART is that Ross finds that these differ from other verb-particles in that they may occur either before or after direct objects in action nominalizations. He cites the following two phrases (p. 60):⁹

9. Although Ross implies that these observations come from Fraser 1965, in fact I have been able to find there no example of or comment on an action nominalization with a post-object particle. The only examples given of nominalized sentences with directional particles are those in (i), which are given a question mark by Fraser (p. 101).

(i) a. ?His bringing in of the dinner...

 b. ?The taking out of her checkbook by the woman....

About these Fraser says that "the acceptability of [these] sentences is a subject of considerable disagreement" (p. 101); however, he does want ACT-NOM to apply freely to them (p. 103).

I personally have no objection to these strings, and generally agree with Ross's intuitions regarding sentences such as those in (24)

- (23) a. his bringing of the trays in
 b. *his eking of a bare existence out.

Examples of action nominalization sentences with the particle following the object would include those in (24).

- (24) a. His moving of the lever down/?up was ill-advised.
 (Bolinger 1971:10)
 b. His throwing of the ball up (rather than down) was stupid.
 (ibid.:9)
 c. Bob's letting of the cat out was made all the more difficult
 by the fact that it was snowing.
 d. His bringing of the trays in couldn't have been more like
 a French waiter.
 e. Artis' throwing of the vases down was done with surprising
 aplomb.

These could be contrasted with the sentences of (25), structurally parallel but different in that the particle does not have any directional sense.¹⁰

- (25) a. *His throwing of his dinner up was stupid. (Bolinger
 1971:9)
 b. *The judge's letting of the accused off was made all the
 more difficult by the fact that the courtroom was filled
 with hostile reporters.

(continues fn. 9) and (25). Due to the absence in Fraser 1965 of comment about such sentences, in what follows I discuss these as part of Ross's own argument.

10. The sentences of (25) seem variously acceptable as factive nominalizations. (See Lees 1960:64-69 for a comparison of this and action nominalizations.) That is, with no postverbal of, (25b) seems quite acceptable, (25d) a little less so, and (25a) and (25c) still ungrammatical. This seems to be directly related to the extent to which the various main clause predicates are compatible with a 'fact' interpretation.

of verb-directional preposition and verb-particle constructions.¹²

In a recent paper, Emonds (1972) offers evidence that implicitly challenges Ross's (and Fraser's) treatment of particles and reduced

12. Fraser (1965:99-104) discusses the following similarities between particles and directional prepositions with respect to their occurrences in the verb phrase.

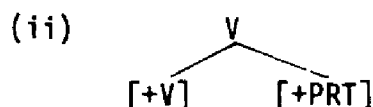
1. Neither a pre-object reduced directional preposition nor a pre-object particle may be moved when the object is questioned (p. 100).

- (i) a. *In what did the butler bring?
- b. *Up what did the teacher bring?

2. "The action nominalization transformation can consider the verb-P₁ [= a verb-reduced directional preposition] sequences exactly like the verb-particle combinations and thus the of will be retained in the nominalization" (p. 103).

3. "The stress assignment of the verb-particle-noun phrase and verb-P₁-noun phrase combinations are exactly the same" (pp. 103-4).

These three similarities are accounted for by the form of the output of P-MOVE and by underlying verb-particle constructions originating as in (ii) (p. 69).



4. A fourth similarity is mentioned by Fraser, namely, that both can occur either before or after an object, and both "under approximately the same conditions. By this we mean that for both elements, when the noun phrase is of sufficient complexity the P₁ and the particle must be in the position immediately following the verbal element" (p. 99). This similarity, in particular the restriction on when the preposition or particle must appear adjacent to the verb, is unexplainable as long as there are two distinct rules moving particles or particle-like elements over objects. Why should two different rules moving two different constituent-types and moving them in opposite directions have exactly mirror restrictions on application, with movement under P-MOVE becoming increasingly more obligatory and movement under PART increasingly more restricted as the object becomes more complex? Given this otherwise unexplained similarity, plus the others mentioned in this footnote, it seems reasonable to try to collapse these processes. This has been done by Emonds (1972), in fact, and will be discussed in more detail shortly.

Besides these similarities, however, Fraser mentions two ways in which these constructions seem to differ.

1. While neither prepositions nor particles may conjoin when before a direct object (iii), after the object prepositions but not particles may be conjoined (iv) (pp. 101-2).

- (iii) a. *The man let in and out the dogs.
- b. *The student looked up and over the article.
- (iv) a. The man let the dogs in and out.
- b. *I showed her up and off. (Ross 1968:60)

The difference between sentences (iva) and (ivb), however, seems to be attributable simply to the respective lexical entries for the verbs and

prepositions. Although Emonds does not explicitly discuss the rule here called P-MOVE and the Fraser-Ross analysis of sentences such as those in (22), his observations bear directly on the facts cited by Ross, and derivatively on the rule ordering argument that forms the basis for argument (18).

Emonds proposes, then, that particles and prepositions are one and the same syntactic category, and that what Fraser called 'particles' are

(continues fn. 12)

- c. show [+__ off (NP)] 'display (someone/something) with pride'

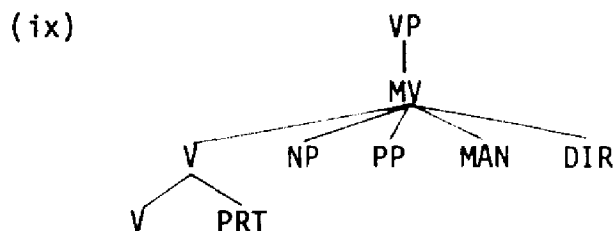
Thus the two occurrences of let in (v) are identical, both meaning 'allow NP to go in a direction D', with the value of D being specified by the specific prepositions of direction chosen under the P node. There is thus no hindrance in the application of CONJ-RED to (v).

The meanings of show in (viib) and (viic), however, do not share a common semantic core. It is this factor which explains the inapplicability of CONJ-RED to (vi) and all other such structures where idiomatic verb-particle combinations appear with (phonologically) identical verbal elements.

2. The only other dissimilarity Fraser points out between these two constructions is that the preposition may be preceded by a manner adverbial, whereas a particle may never be (p. 102).

- (viii) a. The man let the dog {in quickly/quickly in}.
 b. He carried the backdrops {off quietly/quietly off}.
 c. The class brought the question {up quickly/*quickly up}.
 d. The invading army took the country {over easily/*easily over}.

This is explained in Fraser's system in terms of his PS rules. Expansions of VP include that shown in (ix).



By PART, the particle can be moved only as far right as the object NP, and thus can never be made to follow MAN. The ungrammatical forms of (viii,c,d) are thus excluded by the formulation of this rule. Since a directional prepositional phrase in underlying structure follows the MAN constituent, this explains why the preposition left when the directional PP reduces may be to the right of MAN.

Some additional rule must be postulated, of course, to handle permutation of MAN and DIR; in sentences such as (viii,a,b), for example, the DIR constituent may either follow or precede MAN.

generated in the post-object position as intransitive prepositions. He cites the following reasons for combining these:

1. If post-verbal particles are prepositions that are subcategorized not to take objects, then only is it explained why "many prepositions are also particles, why the prepositions which are particles have the same meaning in both usages, and why prepositions and particles have similar distributions....Lastly, there is no formal possibility of particles with objects as distinct from prepositions with objects" (p. 548). Thus, for example, with, at, for, and toward are obligatorily transitive prepositions (i.e., are never 'particles'); in, out, down, and around may or may not have an object; and apart, away, back, and together are obligatorily intransitive (i.e., are only 'particles').

2. The emphatic word right modifies only prepositional phrases of space and time, and post-verbal particles (pp. 551-52). Some of Emonds' examples include:

- (28) a. Make yourself right at home.
 b. Some people can't work right before dinner.
 c. They looked it right up and left.
 d. John brought the bottles right down.

These possibilities of occurrence of right may be most generally stated if particles are simply prepositions.

3. In the expletive construction X with NP!, the first constituent must be either a directional preposition plus object NP, or a directional postverbal particle (p. 553).

- (29) a. Into the dungeon with that traitor!
 b. Out the door with it!
 c. Off with his head!
 d. Out with what you know!

This fact could be most clearly described by treating particles and prepositions alike and defining the construction as in (30).

- (30) P (NP) with NP
 [+Dir]

Along with this positive evidence for the nondistinctness of the categories 'particle' and 'preposition',¹³ notice that an analysis of particles as post-object intransitive prepositions is not counter-indicated by any of the differences cited by Fraser between particles and reduced directional prepositional phrases. In footnote 12 above it was shown that of the six points of comparison Fraser made between the two types, three were handled in terms of the formulation of P-MOVE, one similarity was the sharing by P-MOVE and PART of a very idiosyncratic condition and in fact suggested a simplifying reanalysis along the lines of Emonds 1972, and two were differences between the constructions. Neither of these differences represent evidence against Emonds' reanalysis of 'particle', however. The different possibilities of conjoining particle-like elements is a function of the various lexical entries and does not require postulating a separate underlying category 'particle'. Second, the fact that a directional preposition and a manner adverbial may appear in either order, as in examples (viii) of footnote 12, would require an extra rule in Emonds' system, just as it did in Fraser's. The only difference in these rules, however, is the

13. Emonds has two other reasons for combining particles and prepositions, which, strictly speaking, do not argue against Fraser's (1965) system in that he himself generated certain particle-like elements from underlying prepositions. (1) Some verbs may or must have an adverb complement of direction, this complement being either a prepositional phrase or a postverbal particle (p. 550). The subcategorization of these verbs is generalized when both of these elements share a common category. (2) Directional Adverb Preposing applies to full prepositional phrases and also to postverbal directional particles (pp. 553-54). Again, a rule of the grammar is simplified if it does not have to refer to the disjunction {P[+Dir] + NP, PRT[+Dir]}.

order of elements in the structural description. The respective rules are shown in (31), where MAN and DIR dominate some phrase appropriate to these categories.

(31) Fraser 1965:			Emonds 1972:		
... MAN	DIR DIR	MAN ...	
1	2	⇒ opt.	1	2	⇒ opt.
2	1		2	1	

Given the positive evidence for generating particles as intransitive prepositions¹⁴ following the main verb object, and given the lack of argument against this (at least as represented in Fraser 1965 and Ross 1968), I will assume that this analysis is correct. Where Ross has two underlying categories (particle and preposition) and two rules (PART and P-MOVE), these rules accounting for essentially the same movements but in opposite directions, Emonds requires one less category and only a single rule. His rule of Particle Movement will be abbreviated PART', to distinguish it from its counterpart where the particle moves away from the verb. This could be formulated:¹⁵

14. As Fred Householder has noted, Emonds' 'intransitive prepositions' could also be considered to be regular 'transitive' prepositions with (recoverable) objects deleted, perhaps by the rule mentioned in footnote 11 above. In what follows, nothing depends crucially on whether surface objectless prepositions have an underlying object or not.

15. I will not try to define here the restriction on movement governed by the complexity of the object, an identical problem for both PART and PART'. Note that the two rules are not strictly complements with respect to the blocking of sentences such as:

(i) a. *They locked up him.
b. *Ella auctioned off them.

PART requires a condition added to an otherwise optional rule making it obligatory when the object is a pronoun; PART' is uniformly optional, with this restriction incorporated simply into the rule itself. I am not certain whether this represents another bit of evidence supporting Emonds' analysis, or whether it is just an artifact of the notational system we now have for writing rules.

(32)	PART':	X	V	NP [-Pro]	NP[P]	Y	
		1	2	3	4	5	\Rightarrow opt.
		1	2 # 4	3	\emptyset	5	

It remains, then, to examine the interrelationship of PART' and ACT-NOM, to see if this replacement of PART by a complementary (or perhaps a simpler) rule, one supported on independent grounds, affects the argument under consideration. Let us ignore for now questions of the cost of extrinsic ordering restrictions and differential rule-type marking, and ask only how these rules must be formulated to account for the relevant facts, summarized in (33).

(33) a. Underlying structure: (22b,d,f)	...	V ₁	NP ₁	NP P	...
b. PART' applied: (17c, 22a,c,e)	...	V / \ V ₁ P	NP ₁	...	
c. PART' and ACT-NOM applied: ¹⁶ (17d, 19a)	...	V / \ V P / \ V ₁ ing	NP / \ of NP ₁	...	
d. ACT-NOM applied: (23a, 24)	...	V / \ V ₁ ing	NP / \ of NP ₁	NP P [+Dir]	...
e. ACT-NOM wrongly applied: (19b, 20, 23b, 25)	* ...	V / \ V ₁ ing	NP / \ of NP ₁	NP P [-Dir]	...

16. Irrelevant details of ACT-NOM will not be considered here (e.g., as pointed out in Lees 1960, the subject NP is put into the possessive case, the verb in the nominalized clause must be nonstative, no member of the traditional Aux must be present except *Ins*, *of* is inserted only when there is a direct object). Ross (1968:152) declines to formulate the rule or to speculate as to its structural description.

Here ACT-NOM is restricted to applying only where the next constituent after the object (if any) is a directional preposition; that is, it blocks where it would otherwise have to apply to a string with a post-object, nondirectional intransitive preposition. PART' may be formulated without any special conditions, but must be complicated to be able to apply both to strings that have not undergone ACT-NOM and to those that have.

Neither of the sets of rules (34) and (35) is strikingly simpler than the other. The rules of (35), however, violate Sanders' (1970:20) proposed principle of Unconditionality, which would metatheoretically exclude any rule with "non-universal conditions of analysis or applicability"; and my intuitions lend at least weak support to this principle in this case. If one of these is simpler than the other, then it seems to be (35). If neither is simpler than the other, then we would expect that an alternative formulation would be possible which would uniquely give the form of these rules.

Consider now these same two transformational processes when PART' applies before ACT-NOM. As far as I can determine, there is only one possible way to formulate these with this order of application.

- (36) 1. PART' (= 32):
- | | | | | | |
|---|-------|--------------|-------------|---|--------------------|
| X | V | NP
[-Pro] | NP[P] | Y | |
| 1 | 2 | 3 | 4 | 5 | \Rightarrow opt. |
| 1 | 2 # 4 | 3 | \emptyset | 5 | |
2. ACT-NOM:
- | | | | | |
|---------|--------|----|------------------|---------------|
| ... | V | NP | (NP[P
[+Dir]] | ... |
| 1 | | 2 | 3 | \Rightarrow |
| 1 # ing | of # 2 | 3 | | |

PART has its most general formulation; ACT-NOM is restricted as in (35) to applying only when the post-object element is a directional

preposition. If choice was difficult between the statements of the rules in (34) and (35), it seems quite clear that (36) is preferable to either one. It does not involve several different formulations of the rules, and it presents a more general statement of the processes than is possible in either (34) or (35).

Independent evidence from facts of Dative Movement (DAT) tends to suggest that ACT-NOM should make reference to the kind of constituents (if any) that follow the object NP, i.e., that the simple formulation of ACT-NOM in (34) is inadequate. Consider the following sentences, not dealt with by Fraser, Emonds, or Ross, where either DAT and/or ACT-NOM have applied.

(37) Underlying¹⁷

a. Sam gave a scarf to Betty.

DAT applied

b. Sam gave Betty a scarf.

ACT-NOM applied

c. Sam's giving of a scarf to Betty...

d. Luke's telling of the story to the police...

DAT and ACT-NOM applied

e. *Sam's giving of Betty a scarf...

f. *Luke's telling of the police the story....

The generalization is simply that these two rules cannot both apply to a string.

This restriction may be built into the rules in one of two ways. Where ACT-NOM will apply only before DAT, as in (38), then DAT must be complicated to exclude (37e.f).

17. I assume here that DAT deletes either to or for. For the present, only examples with to will be considered.

- (38) 1. ACT-NOM: ... V NP ...
 1 2 \Rightarrow
 1 # ing of # 2
2. DAT: ... V NP to NP ...
 1 2 3 4 \Rightarrow
 1 4 \emptyset 2
- condition: 2 \nmid of + NP

When DAT applies first, as in (39), then it will be maximally general and ACT-NOM must be complicated in a way reminiscent of its formulation in (36).

- (39) 1. DAT: ... V NP to NP
 1 2 3 4 \Rightarrow
 1 4 \emptyset 2
2. ACT-NOM: ... V NP (NP[P NP] ...
 1 2 3 \Rightarrow
 1 # ing of # 2 3

That is, if there is a constituent after the object, it must be a prepositional phrase and not a simple nominal for ACT-NOM to be able to apply. Thus it could apply to (37a), which has a to + NP following the direct object, but not to (37b), where the second NP contains no preposition.

Three factors suggest that (39) is preferable to (38). First, the rules in (39) but not (38) may be naturally formulated without an extra condition. As in the evaluation of (34) and (35) above, this itself is not necessarily a strong support, although it is interesting that (38) does violate a possible condition on grammars, such as Sanders (1970) proposes, whereas there is nothing about the formulation of the rules in (39) that seems unnatural or systematically objectionable.

Second, (39) but not (38) is compatible with DAT being a cyclic rule. I will not attempt to provide positive support for the cyclicity of DAT here, but only note that Ross (1970b:271) holds DAT to be cyclic. I am aware of no arguments that DAT cannot be cyclic.

Finally, it could be pointed out that the formulations of ACT-NOM in (36) and in (39) are very naturally collapsible:

(40) ACT-NOM (accounting for all the facts discussed here involving particles and indirect objects):

...	V	NP	(P	...
				[+Dir]	
	1	2		3	⇒
	1 # ing	of # 2		3	

This collapsing is possible insofar as to may be considered to be [+Dir]. This is hardly a controversial claim, as Fraser (1965) has observed: "directional adverbials and indirect objects are mutually exclusive. Second, intuitively the interpretation of these indirect objects is the same as the directional adverbials" (pp. 141-42). While this treatment apparently leaves unexplained the facts in (41), where indirect objects with for (a preposition that here does not seem to be [+Dir] in any obvious sense)¹⁸ manifest the same behavior under ACT-NOM as to indirect objects, it does capture a broad generalization about the kinds of postverbal constituents possible in action nominalizations.¹⁹

(41) ACT-NOM applied

- a. Eugene's buying of a doughnut for Ella...
- b. Ed's winning of a prize for Edith...

18. Fred Householder (personal communication) has pointed out that in at least some phrases for seems to have a directional sense (e.g., Head for the hills!, Aim for his head!, Go for his throat!).

19. Berman (1974:10) also has pointed out the similarity of DAT and PART in their relation to ACT-NOM and the significance of this for Ross's argument (18).

DAT and ACT-NOM applied

c. *Eugene's buying of Ella a doughnut...

d. *Ed's winning of Edith a prize....

Perhaps it would be good here to summarize the direction of the counter-argument I have raised against Ross's argument (18) for the postcyclicity of PART.

1. In handling some basic facts regarding particles and action nominalizations, Ross utilizes the rules PART and ACT-NOM. If ACT-NOM applies only before PART in derivation, the rules may (perhaps) be stated more generally. This entails marking PART as postcyclic.

2. Ross cites additional facts regarding particle-like elements. All these facts are handled by the rules PART, P-MOVE, and ACT-NOM, and by an underlying particle-preposition distinction.

3. Emonds shows that certain generalizations can be made only if the particle-preposition dichotomy is abandoned.

4. When this distinction is removed then all the facts at issue may be handled by only two rules - PART' and ACT-NOM.

5. These rules receive their most general formulation if PART' applies before ACT-NOM in the relevant strings.

6. Facts of the interrelationship of DAT and ACT-NOM lend some support to the rules applying in the order PART' - ACT-NOM.

The conclusion now is obvious. The order PART' before ACT-NOM, indicated on the grounds of the greater generality of rule statement possible, may be guaranteed most simply by the transformational cycle; the rules require neither extrinsic ordering restrictions nor marking for membership in some noncyclic set of rules. Given the facts dealt with here, and given the most general formulation of the rules possible, the evidence in no way supports the use of differential rule-type

assignment as a device for governing the relative order of application of rules.²⁰

II.A.3. Extraposition rules.

I am aware of ten places in the literature where it is argued that an extraposition-type rule must be postcyclic. Four of these involve Extraposition (EXTRA) (Ross 1968:146-49, 150-52; McCawley 1970:288; Higgins 1973:177-81), three deal with Extraposition from NP (EX-NP) (Ross 1968:154, Lakoff 1968b:28, Borkin 1972:70), and three discuss the rule-type of Extraposition of PP (EX-PP) (Ross 1968:163-64, 164-65, 165). For convenience, these ten arguments will be considered here in six sections.

a. EX-NP (Lakoff 1968b). The first argument is one for the postcyclicity of the rule Lakoff calls "Extraposition of Relative Clauses." Although not listed explicitly by Lakoff, the steps of this argument seem to be as follows:

- (42) 1. QUEST must be made to apply before EX-NP. (Lakoff cites Ross 1968 in support of ordering the rules this way.)
2. If EX-NP were cyclic, the desired order could not be guaranteed merely by ordering this after QUEST. This is because QUEST is postcyclic and thus by definition could not be ordered before any cyclic rule.

20. This whole discussion of PART and ACT-NOM is quite beside the point, and argument (18) may be easily dismissed if it is assumed that ACT-NOM is not a transformational rule at all, but that the relevant facts may best be handled within some lexicalist framework. Jackendoff (1972:125), for example, argues against the conclusion as to the post-cyclicity of PART in this way. Here, and in all discussions of non-cyclicity arguments, I have attempted as much as possible to argue within the framework presupposed by the respective authors.

3. If EX-NP were postcyclic, however, the desired order could be guaranteed by assigning these rules the following language-specific rule-type and order features:

Po, 1. QUEST

Po, 2. EX-NP

4. Therefore EX-NP must be postcyclic.

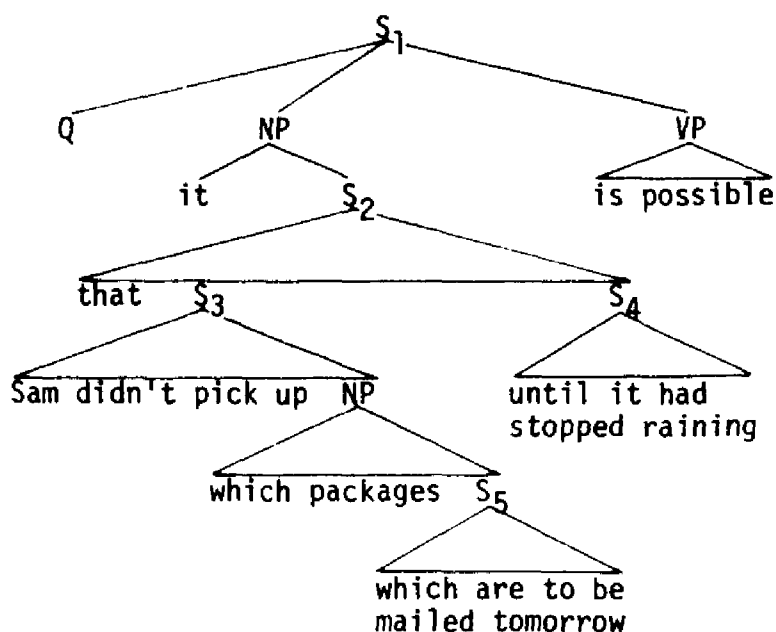
This argument fails in that the ordering restriction referred to in step 1 has been shown to be unnecessary. Ross (1968) presents basically two arguments for such an ordering. One involves the derivation of a sentence such as (43a = Ross's 5.35b); in the second, this ordering is used to block sentences such as (43b = Ross's 5.41), where an NP has been moved out of an extraposed relative clause.

(43) a. Which packages is it possible that Sam didn't pick up
until it had stopped raining which are to be mailed
tomorrow?

b. *The coat which a girl came in who had worn was torn.

The first of these arguments has been analyzed by Lehmann (1972: 545-49) and shown to be invalid. While Ross argues that the four rules PART, EXTRA, QUEST, and EX-NP must all apply, in that order, to (44) in order to derive (43a), Lehmann points out that in fact the same derived structure results whether or not PART has applied.

(44)



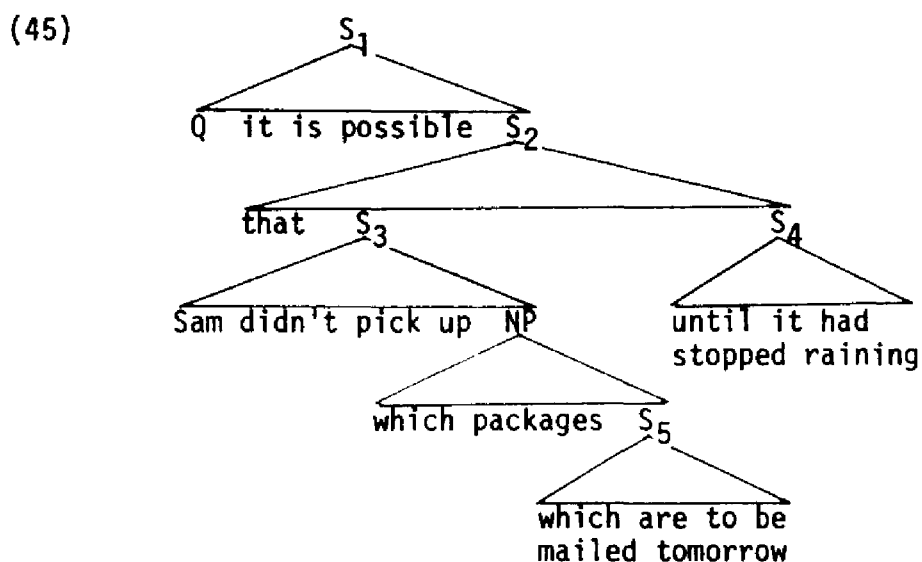
Assuming that sentences must have unique derivations, she argues, PART must be assumed not to have applied in the derivation of such sentences. But when just the rules EXTRA, QUEST, and EX-NP are considered, then any possible order of application yields only grammatical sentences, including, in particular, (43a). Any ordering restrictions on the application of these rules would thus be only superfluous.

It could be pointed out here that in the derivation of this sentence these three rules apply strictly cyclically.²¹ On S_3 EX-NP will not apply, for the embedded S_5 is clause-final; only when the cycle reaches S_1 can any of these three rules apply. Assuming that these processes all operate cyclically, and given Ross's Sentential Subject Constraint, EXTRA is the only rule able to apply on S_1 .²² The structure

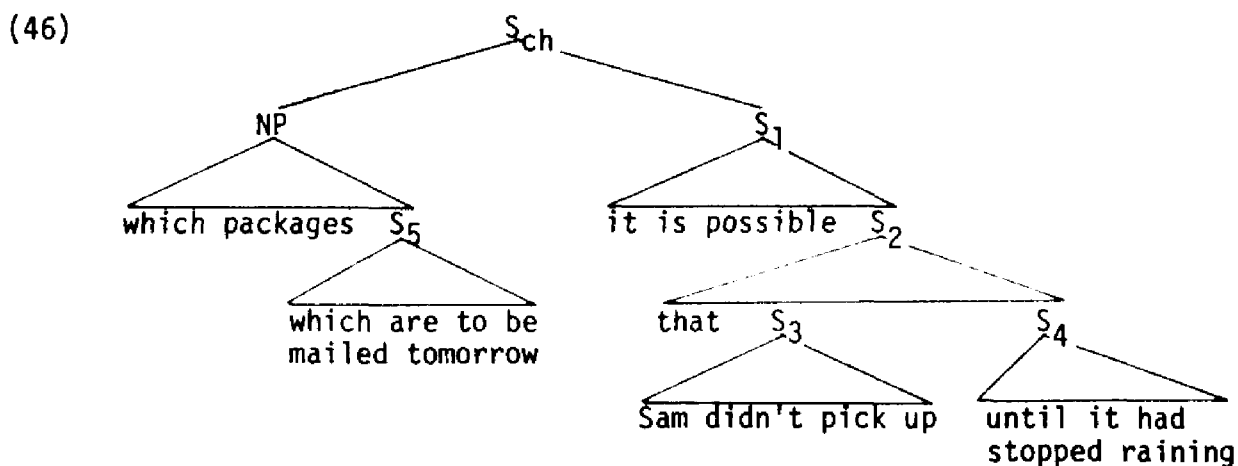
21. By 'strictly cyclic' here and throughout I will mean rules applying on the appropriate S on the upward path of the derivation through the tree. In particular, a rule not applying 'strictly cyclically' may make reference only to some cyclic domain already passed in the cycle.

22. EX-NP could not apply on S_1 , for it would have to 'look down', applying wholly within a cyclic subdomain; QUEST would be blocked because it would call for moving an NP out of S_2 , an S "dominated by an NP which itself is immediately dominated by S " (Ross 1968:134).

derived from its application is (45).



Now, since EX-NP could only apply on S_3 but not on S_1 , QUEST is the only rule that could be applied. Because of the Left Branch Condition on Pied Piping, it is the NP dominating S_5 that must be fronted, and not just the NP sister of S_5 , which packages. QUEST Chomsky-adjoins (Ross 1968:103) the questioned NP to S_1 , forming a new S node as in (46).



(47) Which packages which are to be mailed tomorrow is it possible
that Sam didn't pick up until it had stopped raining?

When the cycle is finished at the S_1 node, then it moves to S_{ch} .

Here EX-NP may apply moving S_5 to the end of S_{ch} . If this rule is chosen not to apply, the grammatical (47) results. Where it does apply, (43a) is generated. In every case rules applying strictly cyclically and without any extrinsic ordering restrictions generate all and only the desired sentences.

In the second of Ross's arguments that QUEST must be explicitly guaranteed to apply before EX-NP, the interpretation of his Complex NP Constraint (CNPC) becomes relevant. As stated in Ross 1968, the CNPC functions as a constraint on rule application or rule analysis, preventing rules from operating when they would otherwise move elements out of sentences that had a sister, lexical head noun (Ross 1968:70):

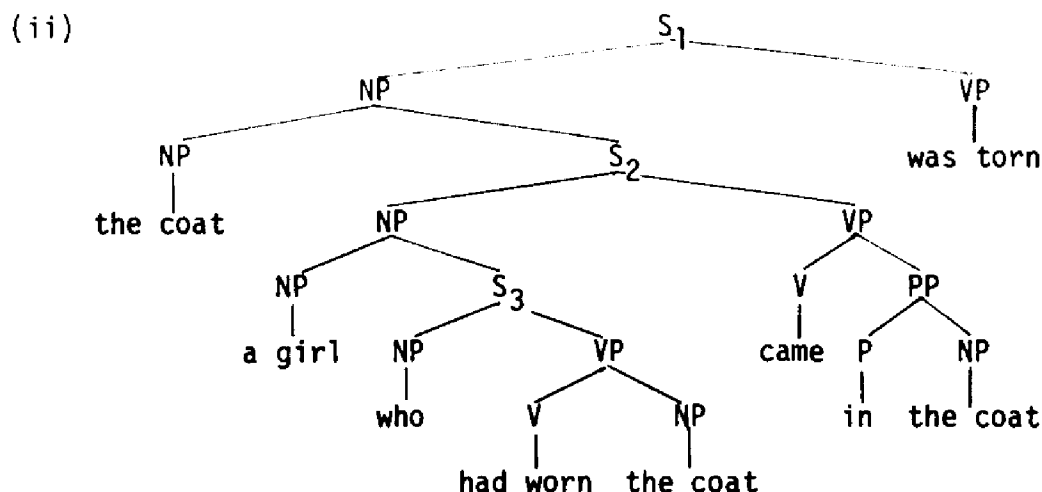
- (48) No element contained in a sentence dominated by a noun phrase with a lexical head noun may be moved out of that noun phrase by a transformation.

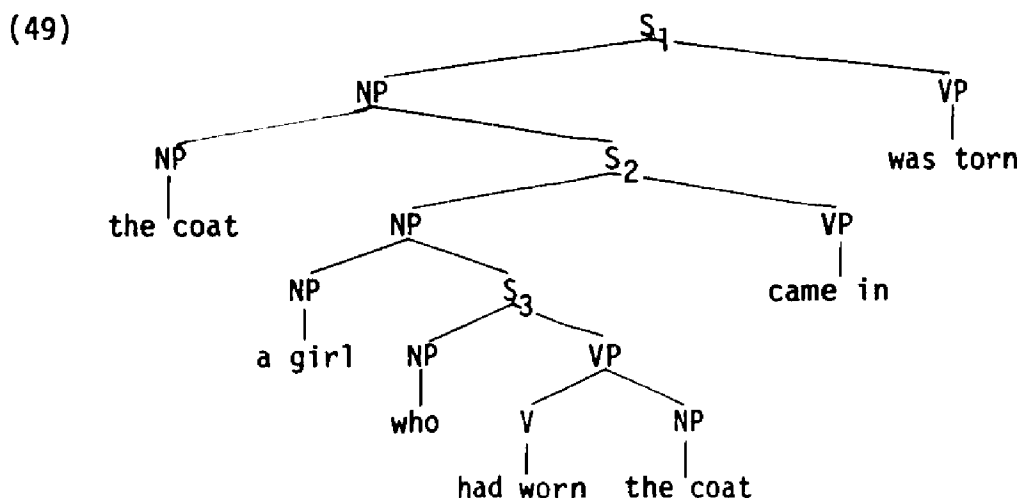
Thus, for example, REL would be blocked by the CNPC from applying on the S_1 cycle in (49), thereby explaining the ungrammaticality of (50).²³

23. Fred Householder notes that at least one dialect of English may find (50) acceptable, namely in the sense of (i).

- (i) a. The coat which a girl who had worn it came in was torn.
b. The coat in which a girl who had worn it came was torn.

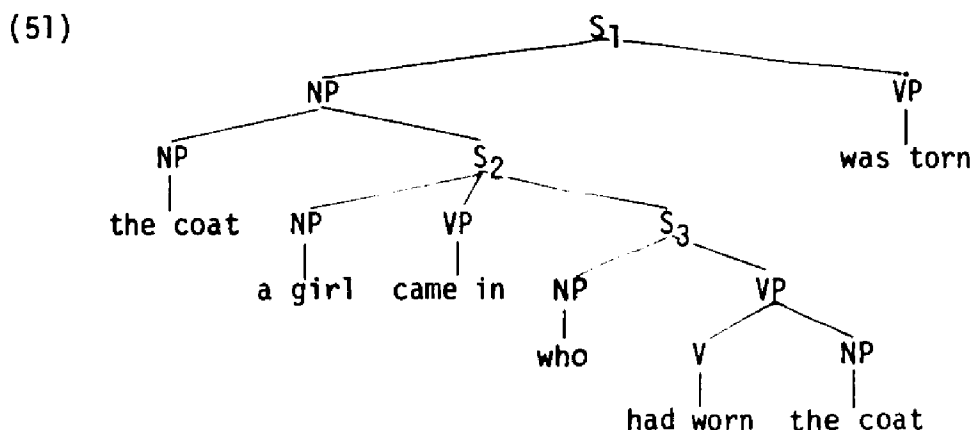
Assuming (ii) to be the structure underlying the sentences of (i), it is clear that the CNPC is not applicable here.





(50) *The coat which a girl who had worn came in was torn.

If EX-NP were to apply on the S_2 cycle, (51) would be derived, from which the ungrammatical (43b) could be derived by applying REL on S_1 .



(43) b. *The coat which a girl came in who had worn was torn.

The statement of the CNPC given in (48) is not sufficient to block movement of the coat in (51), for S_3 there has no sister, lexical head

(continues fn. 23) While (ia) and (ib) are derivable by the regular operations of REL and Pronominalization, it is not clear to me how to get rid of the coat in S_3 for those dialects which find (50) synonymous with the sentences of (i).

In any case, I think it safe to say that the structure represented in (49) may not be realized as (50) for any speakers of English.

noun. With only this 1968 version of the CNPC, clearly some further device is necessary to block the movement of NPs out of extraposed clauses.

In later work, however, Ross has argued (1969a) that the CNPC should be considered a constraint on derivations and not a constraint on possible rule applications. Under this interpretation (43b), for example, would be thrown out as a violation of the CNPC, for it contains an NP that once was in a sentence with a sister, lexical head noun but that was later moved out of that sentence. Following this argument and the reinterpretation of the CNPC Ross proposes, Koutsoudas (1973) observes that sentences such as (43b) now offer no evidence in support of any extrinsic ordering of QUEST and EX-NP. Under this revised interpretation of Ross's constraint the rules may apply in either order, or simultaneously; all and only the ungrammatical strings will be marked as such by the CNPC.

When it can be shown that these rules can apply in any order, then, even if QUEST were postcyclic, no conclusion could be drawn about the rule-type of EX-NP. In particular, no evidence exists here that it could not be cyclic.

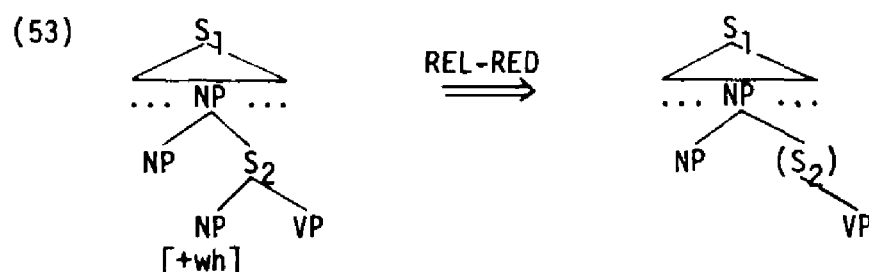
Since (2) above seems to be the only argument in the literature that QUEST must be noncyclic, and since, as we have seen, it is invalid, argument (42) (and all others like this which rest on a questionable claim about the need for ordering two rules) thus provides no motivation for any system of ordering conventions which allows rules to be of various rule-types. Considering all the facts discussed here, EX-NP is fully consistent with an Aspects-type scheme in which all rules are cyclic.

b. EX-NP (Borkin 1972). A second argument for EX-NP being postcyclic is found in Borkin 1972. This "unauthorized appendix to M. K. Burt's From Deep to Surface Structure," written under the aegis of George Lakoff, proposes as a working hypothesis that there is no extrinsic ordering of rules (pp. 57f). Yet there are at least two cases where it is claimed that one rule must be made to apply before another one, and where these would not apply in the correct order merely by virtue of their intrinsic structural formulation or by virtue of the cycle. In both cases it is the ordering device of differential rule-type assignment that is used to guarantee the correct order of application. One of these arguments deals with Number Agreement and Raising, and is discussed below in section II.A.8.a. The other (p. 70) concerns the interrelation of EX-NP and Relative Clause Reduction (REL-RED) and is summarized here in (52).

- (52) 1. There must be an explicit guarantee in the grammar that REL-RED apply before EX-NP. Otherwise ungrammatical sentences could be generated.
2. If EX-NP were cyclic, the desired order could not be ensured by an extrinsic ordering restriction, for such devices are assumed not to be available to grammars.
3. If EX-NP were postcyclic, the desired order could be guaranteed by marking these rules:
- C. REL-RED
- Po. EX-NP
4. Therefore EX-NP must be postcyclic.

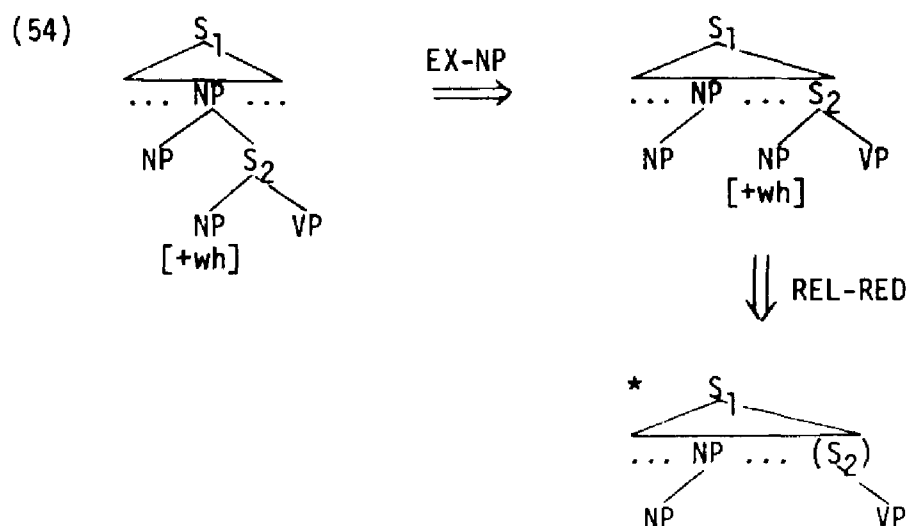
Although examples are not given in Borkin 1972 of the interaction of these rules, presumably they interrelate as follows: if REL-RED applies first to a complex NP, then EX-NP cannot apply because of the

pruning of the relative clause S.



In (53) REL-RED has deleted the relative pronoun, and then S_2 dominating it has been pruned. EX-NP, which is defined on an NP and an S immediately dominated by another NP, is thus unable to apply.

However, if of these two unordered rules EX-NP is chosen to be applied first, then nothing would stop REL-RED from applying; this is illustrated in (54).



But, judging from sentences such as those in (55), both of these rules must not be allowed to apply in the same cycle.²⁴

(55) a. *The boy ran home working.

b. *The dogs could not be trusted in the kennel.

24. The sentences of (55) are starred for the reading where the postverbal clause modifies the subject NP.

c. *Homes stayed a little warmer that winter heated by coal.

The need for ordering these rules, asserted in step 1 of (52), seems to be based on an inadequate formulation of REL-RED, however. Note that Borkin's rule is not defined on the head NP, but apparently is allowed to delete freely any wh-NP + copula sequence. While this is the type of REL-RED mentioned in Ross 1969b:290 (cited by Borkin (p. 70) regarding its discussion of pruning), it is certainly too generally stated. For example, unless constrained in some way it would delete who is in direct and indirect questions, as in the following sentences pointed out by Koutsoudas (1973:72).

(56) a. Who is coming? \Rightarrow *coming?

b. I know who is coming. \Rightarrow *I know coming.

An obvious reformulation which would restrict REL-RED to applying in only the right environment is to define this rule in terms of the relative pronoun and copula, as these appear in an S which is a sister of the head noun.

Given such a redefined REL-RED, then, it and EX-NP are mutually bleeding rules and absolutely no ordering is necessary²⁵ - neither rule ordering nor differential rule-type assignment. But once it is shown that there is no need for ordering these rules, then there can be no basis for concluding that the rules must be assigned to different rule-types.

Even if a way could be found to write REL-RED so that it is not defined on the head NP and so that it nevertheless avoids deleting

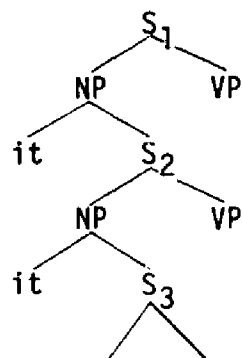
25. This assumes that all transformations must apply sequentially. In systems which allow simultaneous application of rules, ungrammatical sentences such as those in (55) could not be excluded merely by revising REL-RED as indicated, for the input tree of (53) and (54) would satisfy the structural descriptions of both REL-RED and EX-NP. For such systems, the reformulation of Ross's CNPC is relevant, and is sufficient to exclude the unwanted strings.

elements in sentences such as those in (56), there would still be no argument here for the postcyclicity of EX-NP. The reason is that Ross's revised CNPC discussed above would be sufficient to throw out all derivations where both of these rules have applied. Koutsoudas (1973) has pointed out that with such a CNPC there is then no reason for REL-RED and EX-NP to be in any way restricted in their application relative to each other. If no ordering argument can be made, then the conclusion to argument (52) cannot stand. EX-NP, as far as the facts considered here are concerned, can apply strictly cyclically.

c. EXTRA and EX-NP (Ross 1968 and McCawley 1970). A third kind of argument for the postcyclicity of extraposition rules is one that involves appeal to derived constituent structure and to possible intonation breaks as the basis for differential rule-type assignment. Examples of these that I have found include Ross's arguments (1968:146-49 and 163-64) for the postcyclicity of EXTRA and EX-PP, and McCawley's (1970:288) for the postcyclicity of EXTRA. These three arguments may be summarized as in (57).

- (57) 1. It Replacement, or Raising (RAIS), must be made to apply before EXTRA and EX-PP. Otherwise a surface constituent structure would result in which the major constituent break would not correspond to where the phonological rules should assign the main intonation break.
2. If EXTRA and EX-PP were cyclic, it would serve no purpose to extrinsically order them after RAIS, for they could still apply on a cycle lower than the one on which RAIS would apply. That is, no extrinsic ordering features could guarantee that EXTRA, for example, where this can

apply on S_2 below, would apply only after RAIS, as this applied on S_1 .



(Sentence (58) below is an example where both rules have applied to such an underlying configuration.)

3. If EXTRA and EX-PP were postcyclic, however, then they could be made to apply after the cyclic rule of RAIS by marking all these rules:

C. RAIS

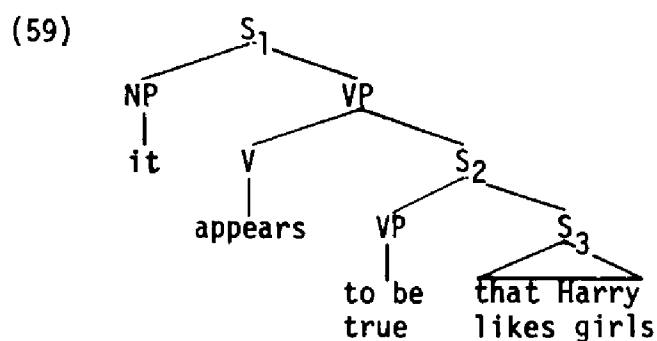
Po. EXTRA, EX-PP

4. Therefore EXTRA and EX-PP must be postcyclic.

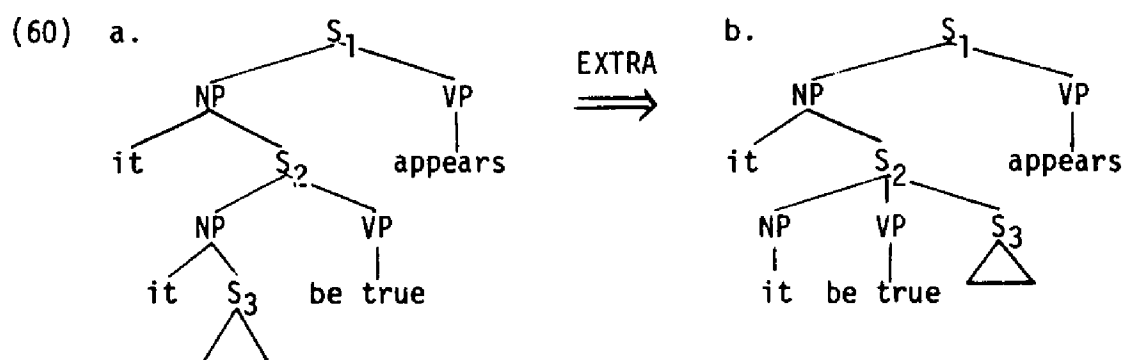
As representative of the two other examples of this argument, we may look in detail at Ross's contention that EXTRA must be postcyclic. He considers sentences such as (58).

(58) It appears to be true that Harry likes girls.

According to Ross's claim, a wrong derived constituent structure for a sentence such as this, where both EXTRA and RAIS have applied, is (59 = his 5.9).

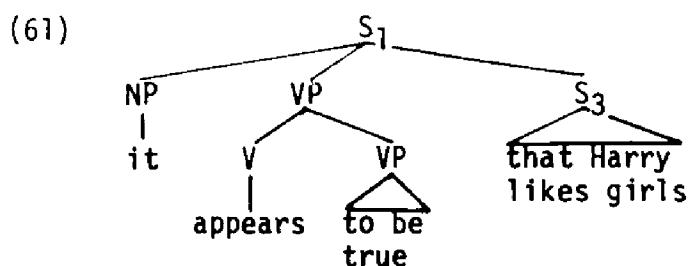


The structure in (59) arises, as Ross points out, where EXTRA applies first on a lower cycle, S_2 . This application is illustrated in (60), with (60a) being the underlying structure.



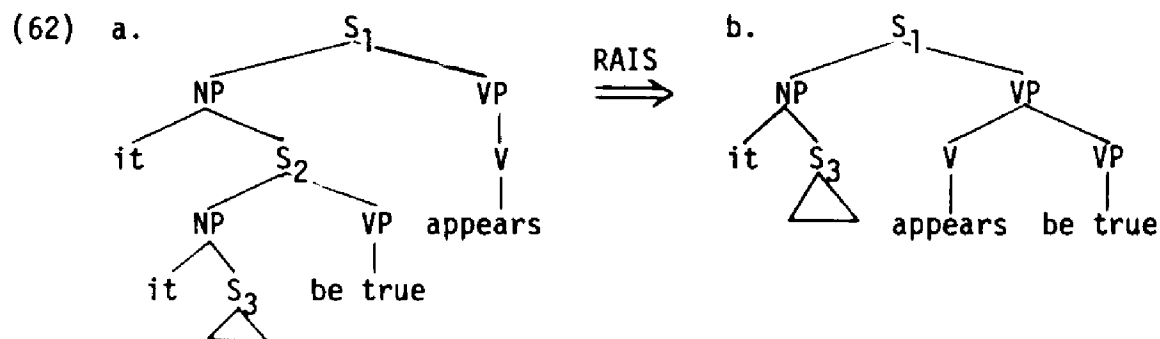
When RAIS then applies on S_1 of (60b), (59) is the resulting derived structure.

Instead of (59), Ross feels that (61 = his 5.6) more correctly reflects his intuitions about how the constituents ought to be arranged on the tree. Specifically, he wants the largest break to follow true and not appears.



If EXTRA could be restricted to applying postcyclically, then it would

only follow RAIS in order of application. RAIS then would apply to underlying structure (62a).



To (62b), EXTRA applying postcyclically would indeed derive (61). Therefore, Ross concludes, in order to guarantee the desired order of application, EXTRA and RAIS must be marked with different rule-type features. (The examples given to support the conclusion for EX-PP having to be marked as postcyclic are similar, and need not be repeated here.)

The unusual feature about step 1 of this argument is that it appeals solely to phonological evidence in determining the shape of syntactic rules (specifically here, whether these rules should have associated with them restrictions assigning them to different rule-types). In the first place, the hypothesis that phonological rules assigning intonation must be able to operate directly upon derived constituent structure is one that Ross (1968) does not clearly commit himself to or even begin to elaborate. In fact I am aware of no theory of intonation that would predict potential pauses and intonation breaks strictly on the basis of syntactically motivated derived constituent structure.²⁶

26. If Bolinger (1972) is correct in his discussion of the relation between syntax and sentence intonation, then such a theory of intonation never could arise. Cf. his conclusion in this article: "The distribution of sentence accents is not determined by syntactic structure but by semantic and emotional highlighting. Syntax is relevant indirectly in that some structures are more likely to be highlighted than others. But a description along these lines can only be in statistical terms" (p. 644).

In the second place, I am somewhat uncomfortable with the certainty of Ross's intuitions. While he seems confident that his example sentence may have a major pause after true, it could be argued that there must be two places in the sentence where a major pause could occur:²⁷

(63) It appears - to be true - that Harry likes girls.

Further, when various major lexical elements are stressed the relative length of pauses possible between constituents varies, as exemplified by the sentences in (64).

(64) a. It appeárs - to be true that Harry likes girls.

b. It appears to be true that Hárry - likes girls.

c. It appears to be true that Harry líkes - girls.

If all these different places to pause in the pronunciation of this sentence must be reflected directly by the derived constituent structure, then the two rules RAIS and EXTRA certainly need to be supplemented by other devices that will appropriately rearrange elements of the final derived P-marker.

Such other devices, or 'readjustment rules', have of course been proposed as necessary for the correct application of the rules of the phonological component. In the system of Chomsky and Halle 1968, for example, these readjustment rules move constituents, alter the features of segments and boundaries, and perform other miscellaneous operations on the output of the rules of the syntax. Assuming a necessity for readjustment rules, something which apparently no one has denied, and

27. Ross's example might have been more convincing had he used a modal instead of the main verb appear. That is, a sentence such as (58) does not seem to have as natural a two-part division as does (i).

(i) It might be true that Harry likes girls.
Even here, though, pauses are possible at different points in the string, dependent upon the relative stressing of major lexical elements (e.g., after Harry or likes, or even after might), which bears directly upon the question of what the (single) derived constituent structure ought to be after the application of EXTRA and RAIS.

given their power, it is clear that, as Koutsoudas (1971:354) has pointed out, "phonological evidence can never be used to falsify any given syntactic surface structure." That is, arguments relying on no clear syntactic evidence, but based instead on intuitions regarding derived constituent structure and the relative length of possible pauses cannot be sufficient to determine, for example, that two rules must be guaranteed to apply in a certain order. Such arguments are necessarily inconclusive, for they implicitly require a knowledge of the set of readjustment rules which simply does not exist now.

In terms of the argument for the postcyclicity of EXTRA and EX-PP, then, this means that it cannot be established that RAIS must be required always to apply before these rules. Insofar as there is no argument here for the necessity of ordering, there can be no basis for marking either of these rules as in any way noncyclic; in broader terms, no support can be found here for any theory which allows the rules of its grammars to be divided into various ordered sets of rules.

d. EXTRA (Higgins 1973). Another argument for the postcyclicity of EXTRA is one suggested by Higgins (1973), in the course of discussing Emonds' (1970) analysis of sentences with extraposed clauses. This concerns the relation of EXTRA and Pseudo Cleft Formation (PS-CLEFT), and may be outlined as in (65).

- (65) 1. It must be guaranteed that EXTRA apply after PS-CLEFT in derivations. Otherwise in certain cases where both rules have applied, ungrammatical pseudo-clefts will be derived.
2. If EXTRA were cyclic, there would be no way to ensure this ordering. This is because PS-CLEFT applies on a cycle

higher than the one on which EXTRA operates.

3. If EXTRA were postcyclic, then the desired relative order of application could be guaranteed by assigning these rules to different rule-types as follows:

C. PS-CLEFT

Po. EXTRA

4. Therefore EXTRA must be postcyclic.

The crucial examples here involve sentences with verbs that must or may appear on the surface with an object complement sentence preceded by it (resent, like, dislike, doubt, and a few others). Higgins' example is shown in (66), with (66b) the form of the relevant pseudo-cleft string.

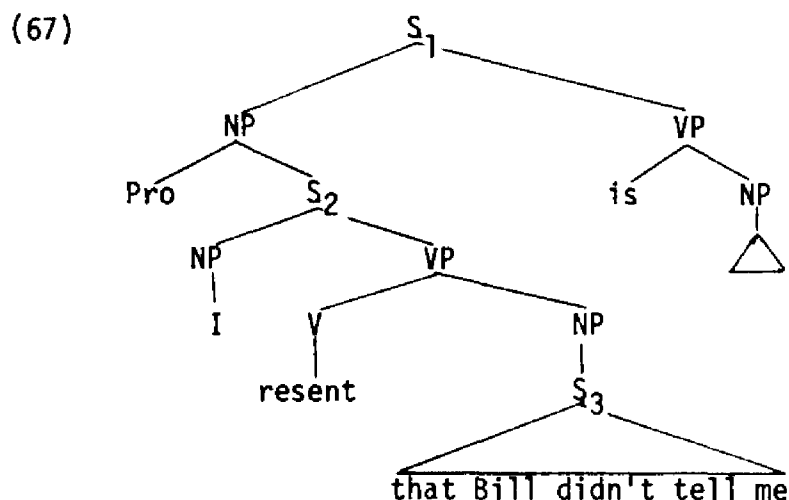
(66) a. I resent it/* \emptyset that Bill didn't tell me.

b. What I resent (*it) is that Bill didn't tell me.

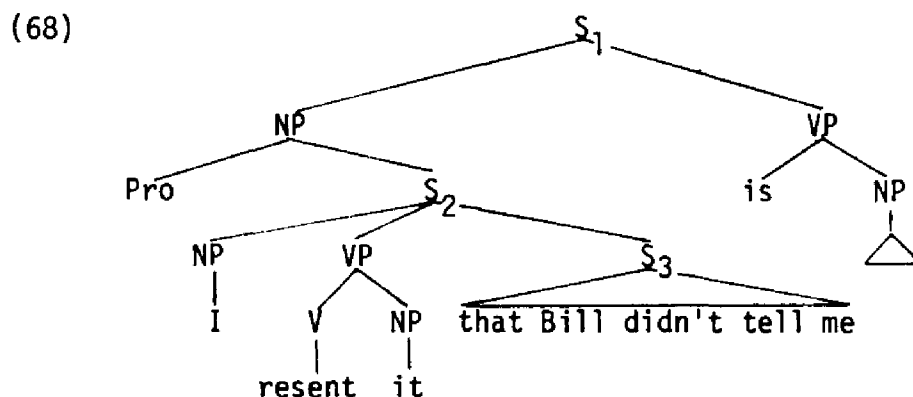
The interesting thing here is that it must appear after resent in (66a), but must not in (66b). Assuming that EXTRA has applied in (66a), and given either of two competing analyses of PS-CLEFT, Higgins shows that indeed the restriction on application referred to in step 1 of (65) must obtain.

Consider first an analysis of PS-CLEFT along the lines of Akmajian 1970.²⁸ Following Higgins' assumption regarding the absence of the crucial it from the underlying structure, sentence (66b) will be represented as in (67) at a point before any relevant rules apply.

28. A fuller discussion of different generative treatments of pseudo-clefts appears in section II.A.6 below. For now it will be sufficient to consider only the Akmajian (1970)- and Ross (1972a)-style analyses actually outlined by Higgins.



If EXTRA is cyclic, it must apply on S_2 , for resent normally requires the it which presumably is a mark of this rule having operated. Before the start of the S_1 cycle, then, the tree will be approximately as in (68).²⁹

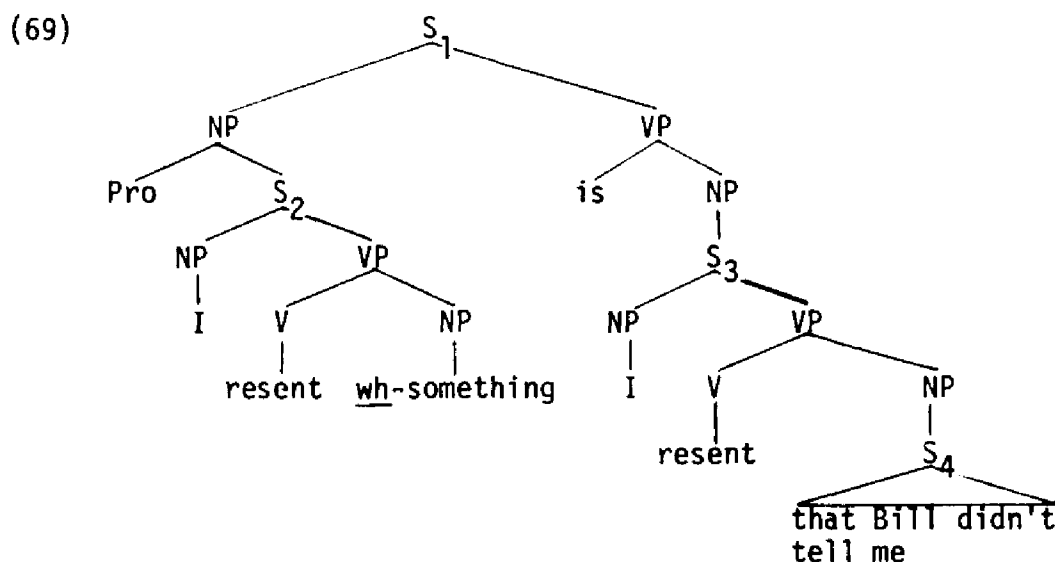


Now PS-CLEFT applying on the topmost S will insert S_3 into the dummy NP of the main clause predicate. The wh-Pro form left behind will be involved in the necessary relativization-like processes and the ungrammatical form of (66b) will be derived. Specifically, there is no obvious way that PS-CLEFT may be naturally extended so that it will move both it and S_3 into the focus position. From these facts, then,

29. Whether the extraposed clause is daughter- or Chomsky-adjoined to S_2 (or to the VP) is not relevant here. The significant point is that the it and the extraposed clause are not sister constituents.

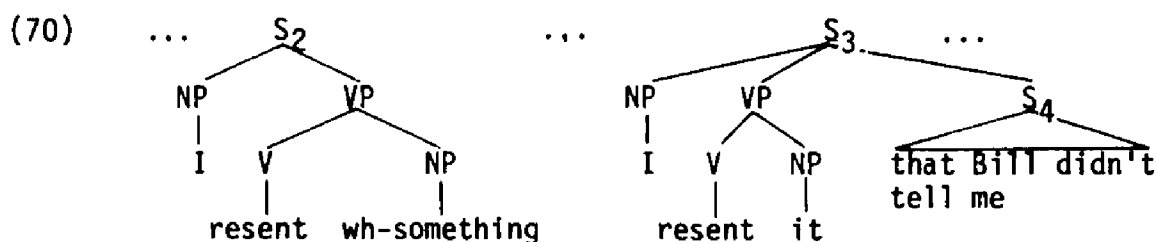
EXTRA must be guaranteed to be scanned for application only after PS-CLEFT has moved S_3 away from the verb that governs its obligatory application. With such an order of application, EXTRA will in fact never apply and the unwanted it never be generated.

With Ross's (1972a) deletion analysis of pseudo-clefts, the relevant underlying structure is as in (69).



If Ross's PS-CLEFT could apply to (69), then the grammatical (66b) would be generated, for the rule simply deletes all material to the left and the right of the NP focus constituent, under the condition that this material is identical to the relevant parts of the clause in subject position. In (69) this would mean deleting I and resent from S_3 .

If EXTRA is cyclic, however, then since its application is required by verbs such as resent, it will operate on the S_3 cycle. This will result in a string (70), which is not properly analyzable by Ross's PS-CLEFT.



To save a cyclic EXTRA, Ross's rule would have to be grossly complicated to allow NPs as well as S's to remain in focus position, and to delete any it's that have arisen through the operation of EXTRA.

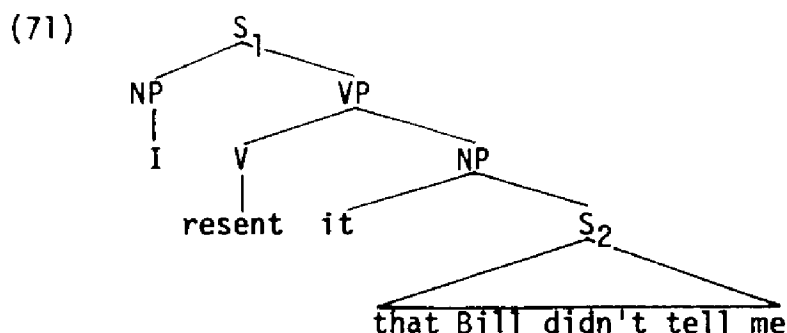
Given the complications called for in PS-CLEFT if Higgins' rule EXTRA is cyclic, it seems reasonable to propose, as in argument (65), that EXTRA should be marked as a postcyclic rule. In this way no it would appear in pseudo-clefts such as (66b).

There is an alternative explanation of the distribution of it in sentences such as those in (66), however, which does not lead to a conclusion which calls for assignment of transformations to different rule-types. This rests crucially on two features: an analysis of pseudo-clefts in terms of movement to an empty predicate slot and not deletion of identical material, and having the it of extraposition constructions present in underlying structures. With respect to the first of these, it will be argued on independent grounds in section II.A.6 below that such a treatment of pseudo-clefts is the preferable one. I will not anticipate those arguments here, but for now will assume their validity, and will consider argument (65) in terms of such an analysis only.

Higgins apparently takes no strong stand on the status of the extraposition it, implying simply (p. 179) that it would be difficult to avoid the conclusion of (65) no matter whether it was inserted via some rule or whether it was present in underlying structure and then (sometimes) deleted by an It Deletion (IT-DEL) process. In fact, the

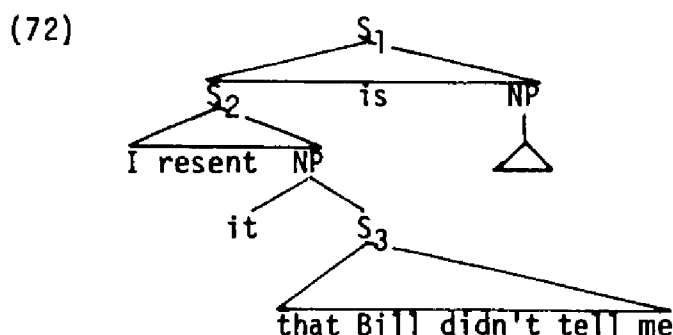
choice as to how to derive this it is crucially significant in evaluating (65) as an argument for the necessity of EXTRA applying postcyclically. Specifically, adopting Rosenbaum's (1967) or Ross's (1968) treatment with its rules EXTRA and IT-DEL means that all and only the grammatical strings here are generated by all rules applying strictly cyclically.

This may be illustrated by example sentence (66a), the structure of which before any relevant rules have applied on the top cycle is (71).

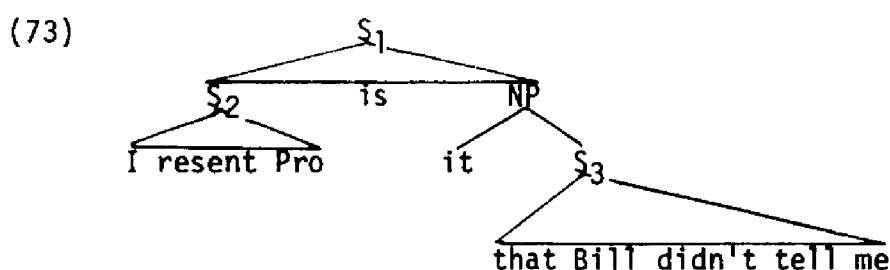


On the S_1 cycle, EXTRA has no possibilities of non-vacuous application, and, following Ross's (1968:99-101) argument against EXTRA 'applying vacuously' to structures such as (71), does not apply. IT-DEL generally applies to such configurations, deleting it when there is an S sister. As many have pointed out, however (e.g., Lakoff 1968a:15, Rosenbaum 1967:41-42, Ross 1968:68), verbs such as resent must be marked as exceptions to this rule. The it in (71), then, is not deleted; under this analysis neither EXTRA nor IT-DEL applies.

In pseudo-clefts, then, neither of these rules applies in any relevant lower structure. The input to PS-CLEFT is schematically (72).



On the S_1 cycle, PS-CLEFT then moves the NP object of resent into focus position; (73) is the resulting structure.



At this point, still within the domain of the S_1 cycle, the structural description of IT-DEL is satisfied, the latter rule being fed by the application of PS-CLEFT. It is no longer governed by an exceptional higher verb resent, and thus will obligatorily apply to delete the appropriate it. Given the otherwise motivated structural description of PS-CLEFT, and given the obligatoriness of IT-DEL in structures such as (73), only the grammatical version of (66b) can be generated.

This treatment of it has one immediate benefit with respect to the rules EXTRA and TOPIC. Higgins points out that an argument such as (65) can be constructed on the basis of sentences such as (74) involving TOPIC.

- (74) That you refuse even to discuss the matter I most certainly do resent (*it).

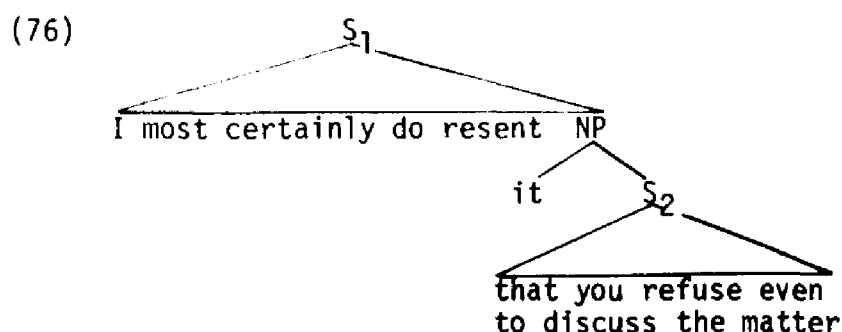
That is, if there is no underlying it, then a strictly cyclic EXTRA will have to apply on a lower cycle, and an awkward it will be inserted into the string. Therefore, it might be concluded, it must be guaranteed that EXTRA be given a chance to apply only after TOPIC has applied.

As Higgins notes, the problem with this conclusion is that there exists another argument leading to exactly the contradictory conclusion. Given Ross's Sentential Subject Constraint, a sentence such as (75) would be evidence for arguing that EXTRA can only apply before TOPIC.

(75) That book it is unlikely that John will have read.

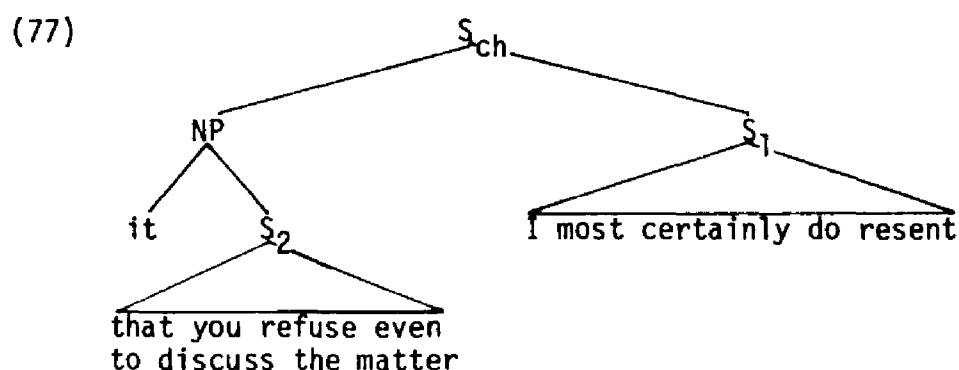
Not until EXTRA has moved that John will have read that book out of subject position can TOPIC extract the object NP.

The relative ordering of EXTRA and TOPIC in derivations is not mutually inconsistent, however, if it is present in the P-marker at the point when EXTRA is considered for application. In such a case a cyclic EXTRA (and IT-DEL) will not apply in the cycle governed by resent in the derivation of (74). After TOPIC has fronted the it + S noun phrase, however, then IT-DEL will correctly remove the it. Thus, the input to TOPIC will be as outlined in (76); for convenience, the higher clause containing the trigger for TOPIC is disregarded.³⁰



30. See section II.B.1 for a defense of the necessity of formulating TOPIC as a transformation defined on a higher verbal trigger. Given the considerations regarding the status of S_{ch} nodes mentioned in note 126 below in section II.D, the omission here of the higher cycle is irrelevant.

TOPIC raises and fronts the object NP, this resulting in (77).



Now on the higher cycle, IT-DEL will apply, the output directly underlying the grammatical (74).

With respect to the order of application of these rules in the derivation of (75), it is clear that here, too, a cyclically applying EXTRA/IT-DEL and TOPIC will account in a fully general way for the relevant facts. Thus, this ordering paradox involving EXTRA and TOPIC is naturally resolved where this it is present at the time EXTRA is scanned for application.

We cannot here argue the question of how the it's in these structures are to be handled. Traditionally at least, grammarians have made some distinction between (a) the obviously pronominal it (Chuck handed me the book and I opened it) and (b) the "preparatory" (Jespersen 1933:154), "anticipating" (Poutsma 1928:202f), or "expletive" (Langendoen 1966) it of 'extraposition' constructions. These it's differ, for example, in that only the former can be pluralized (e.g., through the operation of Conjunction Reduction), and only the latter functions as a place holder. More recently, however, others have wanted to generate the latter it via some standard pronominalization rule (see, for example, Langendoen 1969:52-55, 1970:57,140,171; also the suggestion implicit in Chapin 1970:376-77). I am not aware of

arguments that would strongly support either of these positions at the expense of the other.

The significance of this with respect to argument (65) is clear. Insofar as it cannot be argued that the it under discussion here must arise via EXTRA or some other transformation, to that extent the conclusion in an argument such as (65) regarding the necessity of EXTRA being noncyclic is unfounded. Where there is a rule IT-DEL, then it as well as EXTRA and PS-CLEFT and TOPIC may apply in strict conformity with the cyclic principle.

e. EX-PP (Ross 1968). Another argument for the noncyclicity of an extraposition-type rule is one found in Ross 1968:165 that deals with EX-PP. This is based on a claim that EX-PP must be restricted to applying after QUEST, and is outlined in (78).

(78) 1. Movement rules, including QUEST, must be guaranteed to apply before EX-PP. Otherwise the grammar must be complicated by adding a constraint:

"(5.52) If a prepositional phrase has been extraposed out of a noun phrase, neither that noun phrase nor any element of the extraposed prepositional phrase can be moved" (Ross 1968:165)

2. If EX-PP were cyclic, the desired order could not be guaranteed by ordering it after movement rules; there could be cases where EX-PP applied on a cycle lower than the one on which a movement rule applied.
3. If EX-PP were postcyclic, the desired order of application could be guaranteed by assigning these rules the following features:

C(or L). Movement rules

Po. 1. Movement rules

or

Po. EX-PP

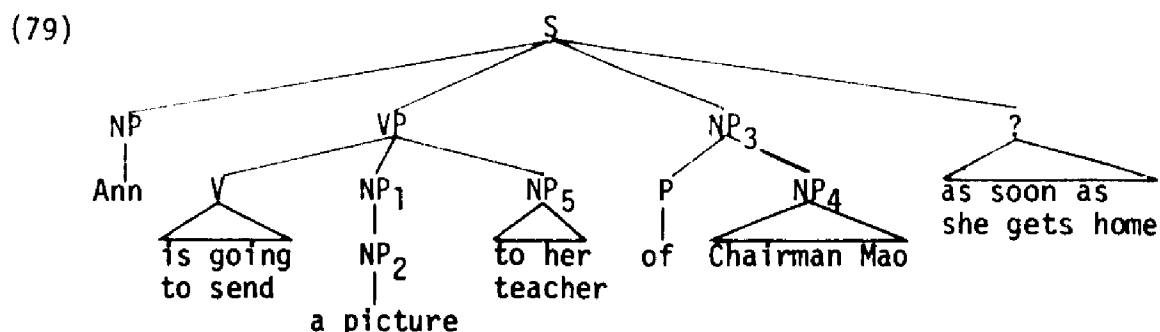
Po, 2. EX-PP

Only with this ordering could generalization (5.52) be eliminated.

4. Therefore EX-PP must be postcyclic.

It is clear that (78) rests crucially on the validity of Ross's generalization (5.52) in step 1. If it can be shown that (5.52) is not a necessary or a correct constraint on the movement of NPs from prepositional phrases, then Ross has no argument that EX-PP must be ordered after QUEST. But if there is no necessity for such an ordering (i.e., if EX-PP may apply before QUEST in derivations), then there is no reason why EX-PP cannot simply be cyclic. It will be shown below that regardless of the relative order in which EX-PP and QUEST apply, in fact (5.52) is not needed in the grammar of English. I conclude, then, that since there is no basis for the ordering restriction mentioned in step 1, there is no case here for the noncyclicity of EX-PP.

As the constraint is stated, it would block the application of, say, QUEST to either NP₁ or NP₄ in Ross's example (79), a P-marker to which EX-PP has applied moving NP₃ out from under the domination of NP₁.



- (80) a. NP₁ moved:³¹ Which picture is Ann going to send to her teacher of Chairman Mao as soon as she gets home?
- b. NP₄ moved: Who is Ann going to send a picture to her teacher of as soon as she gets home?

Ross in fact affixes a star to both of these sentence.

According to my own intuitions, however, and those native speakers I have checked with, a sentence such as (80a) is questionable or ungrammatical only in the case where the entire NP and not just a determiner is questioned. That is, there is perhaps something at least a little odd about the sentences in (81), where these require an answer such as that suggested in parentheses.

- (81) a. ??/*What is Ann going to send to her teacher of Chairman Mao as soon as she gets home? (Ans: a picture)
- b. (?)What did we send to Watson on the phage? (Ans: a report)
- c. (?)What will Miss Jones read to the class by Faulkner? (Ans: a short story)

But the form of the question in (80a) seems to be perfectly grammatical. So too are the corresponding questions from the other examples in (81).

- (82) a. Which report did we send to Watson on the phage? (Bresnan 1972:337)
- b. Which short story will Miss Jones read to the class by Faulkner?

Similarly with Ross's example (80b), where the extraposed object of the preposition has been moved by QUEST, I seriously question his

31. Assuming, with Ross (1968:57), that NP₁ is not deleted here, note that QUEST can apply only to NP₁ and not to NP₂. Its application on the lower NP is blocked by the Left Branch Condition (Ross 1968:114) on Pied Piping. Similarly, in the application of REL to noun phrases in the position of a picture in (79), it is NP₁ that is actually moved. This is illustrated in (84) below.

judgment as to its grammaticality. While speakers may mention that they feel some awkwardness with the of following the longer constituent to her teacher, many have found this flaw not grammatically fatal. Other sentences of this same type sound even less awkward.

(83) NP₄ moved:

- a. What did Mary read a report to the class about?
- b. Who did Max make out a check for \$100 to?
- c. What will free passes be given for?

I thus wish to register a complaint against Ross for starring the crucial examples (80a) and (80b), contending that they have been too hastily marked deviant and that, when properly evaluated, they do not provide support for any constraint such as that proposed in step 1 of (78).

But even if Ross is correct in starring the examples in (80) involving QUEST, evidence from the application of REL to structures such as (80)³² is quite clear in demonstrating the inaccuracy of Ross's generalization (5.52). Unlike QUEST, which in some cases apparently should not be allowed to apply to NP₁ (an NP from which a NP[P NP] has been extraposed), there apparently is no restriction on the application of REL in such an environment.

(84) NP₁ moved:

- a. The picture which Ann is going to send to her teacher of Chairman Mao as soon as she gets home is the most unusual one of him that I've seen.
- b. Jack was bored with the report that Mary read to the class about World War I.

32. Ross's examples include no cases where REL has applied.

c. The check that Max made out for \$100 to his aged mother was the largest he'd ever written.

d. If you hurry you can still get the free passes that will be given for Saturday's race.

Neither is there any restriction on the application of REL to objects of extraposed prepositional phrases (NP₄ in (79)).

(85) NP₄ moved:

a. The friend that Ann is going to send a picture to her teacher of as soon as she gets home is living in Paris this year.

b. The war that Mary read a report to the class about was one that no one had ever heard of before.

c. I don't think you know the person that Max made out a check for \$100 to.

d. The race that free passes will be given for begins at 8 p.m.

For REL, then, the supposed restriction of NP movement in strings which have undergone EX-PP simply does not hold, as the sentences of (84) and (85) indicate.

To summarize, if a prepositional phrase has been extraposed out of a noun phrase,³³ then, contrary to Ross's claim in his constraint

33. As Postal (1971:219) has observed, EX-PP "involves many special and poorly understood constraints"; it is "not at all clear what principle determines whether a prepositional phrase can undergo it." We will not here attempt to examine the intricacies of this rule. As a first approximation of the conditions on this rule, however, it perhaps would be true to say that the possibilities of EX-PP applying are greatly enhanced if the NP sister of the prepositional phrase (i.e., NP₂ in (86)) is a member of the class of so-called 'picture nouns' (e.g., picture, report, review, evidence, criticism). Clearly more than this is involved, though, as the strangeness of the sentences in (i) shows.

(i) a. ?Jones leaked the story to the newspapers of the crime.

b. ??/*Sally sent the first chapter to the publishers last week of her book.

If a PP can be extraposed, however, then the subsequent movement of NPs in that string seems relatively unrestricted, as summarized in (86).

(5.52), there is little restriction on the applicability of QUEST and REL. Schematically, the facts here are as in (86).

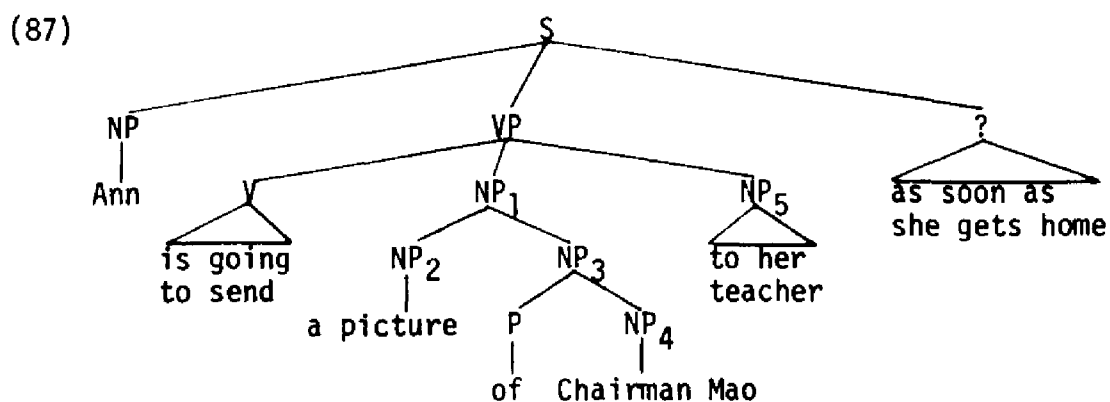
(86) In structures such as:



QUEST can move NP₄ (83), and at least some NP₁ (80)-(82)

REL can move NP₄ (85) and NP₁ (84)

Now notice the paradigm with QUEST and REL when EX-PP has not applied to a string. The tree before these rules have applied is (87).



As in the case where QUEST applies to a picture in (79), so here the acceptability of sentences varies with 'how much' or the NP is questioned. When all of NP₂ is replaced by a question word, then the results seem pretty bad to me.

(88) NP₂ moved by QUEST:

- a. *What is Ann going to send of Chairman Mao to her teacher as soon as she gets home?
- b. ??/*What did we send on the phage to Watson?
- c. ??What will Miss Jones read by Faulkner to the class?

If the determiner only is questioned, however, then the sentences seem distinctly better than those in (88),³⁴ although to my ear, they are

34. Why which-N questions are better than what questions in these

definitely not as felicitous as (80a) and (83a,b).

(89) NP₂ moved by QUEST:

- a. Which picture is Ann going to send of Chairman Mao to her teacher as soon as she gets home?
- b. ?Which report did we send on the phage to Watson?
- c. ?Which short story will Miss Jones read by Faulkner to the class?

As a first hypothesis, it might be thought that the Left Branch Condition is relevant here, being violated in (88) and (89), but not in (80a), (81), and (82), thereby explaining the different possibilities of moving NP₂ in (79) and (87). This does not seem to be generally possible, however, given the movability of this same NP₂ under the operation of REL. Thus the following sentences seem quite unobjectionable.

(90) NP₂ moved by REL:

- a. The picture which Ann is going to send of Chairman Mao to her teacher as soon as she gets home is the most unusual one of him that I've seen.
- b. Jack was bored with the report that Mary read about World War I to the class.

Most likely the answer is to be found in a more careful statement of Pied Piping and of the Left Branch Condition, explanatory devices which are notoriously sensitive to particular rules (cf., for example, the discussion of the idiosyncracies of these in Postal 1971:98-99). Of interest here, however, is that the possibilities of movement under QUEST and REL as these apply to NP₂ in (87) parallel very closely the

(continues fn. 34) constructions is not clear to me. Whatever the explanation turns out to be, however, it does not seem that it would affect the conclusion to be reached in this discussion, namely, that there are no more restrictions on movement rules after EX-PP has applied to a string than there are before this has applied.

possibilities of these rules applying to the same NP in (79).

Finally, note that the object of an unextraposed PP may be moved by these rules.

(91) NP₄ moved by QUEST:

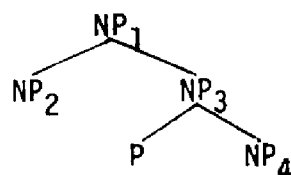
- a. Who is Ann going to send a picture of to her teacher as soon as she gets home?
- b. What did Mary read a report about to the class?

(92) NP₄ moved by REL:

- a. The friend that Ann is going to send a picture of to her teacher as soon as she gets home is living in Paris this year.
- b. The war that Mary read a report about to the class was one no one had ever heard of before.

From the facts in (88)-(92), the following summary may be made:

(93) In structures such as:



QUEST can move NP₄ (91), and perhaps some NP₂ (89)

REL can move NP₄ (92) and NP₂ (90)

Comparing (93) and (86), we note that tree configurations such as (93) involve slightly more restrictions on NP movement, this perhaps due to violations of the Left Branch Condition on Pied Piping. What is of particular interest here is that the facts in no way justify a constraint such as Ross's (5.52); whether QUEST and REL apply before or after EX-PP, there is scarcely any restriction on which NPs they may move.

The significance of (5.52) not being a valid constraint for post-cyclicity argument (78) is clear. Since there is no need for this

constraint, there is no basis for claiming that QUEST must be ordered before EX-PP. This means that EX-PP (and QUEST and REL, for that matter) may apply strictly in a cyclic manner and generate only grammatical strings.³⁵ While I know of no argument that EX-PP must be cyclic, I trust it is clear that (78) is not sufficient to show that EX-PP must be noncyclic.

f. EXTRA, EX-NP, EX-PP (Ross 1968). The remaining arguments for extraposition rules being postcyclic are three more found in Ross 1968. These concern EXTRA (pp. 150-52), EX-NP (p. 154), and EX-PP (pp. 164-65), and, like all the previous arguments discussed in this section II.A.3, are based on a supposed ordering restriction. In this case it is asserted that PART must apply before each of these rules; the arguments based on this can be reconstructed and collapsed as follows:

- (94) 1. PART must be made to apply before EXTRA, EX-NP, and EX-PP. Otherwise certain grammatical sentences could not be generated.
2. If EXTRA, EX-NP, and EX-PP were cyclic, the desired order could not be guaranteed by extrinsically ordering these after PART. This is because PART is postcyclic and thus could not be ordered before any cyclic rules.
3. If EXTRA, EX-NP, and EX-PP were postcyclic, then the desired order could be guaranteed by assigning these rules the following language-specific rule-type and order features:

35. This of course assumes (a) an adequate formulation of EX-PP, (b) an explanation of the difference between which + N and what questions, and (c) a more careful formulation of Pied Piping. These three elements are needed for English grammar on independent grounds, however, and do not relate to the evaluation of the constraint proposed in step 1 in (78).

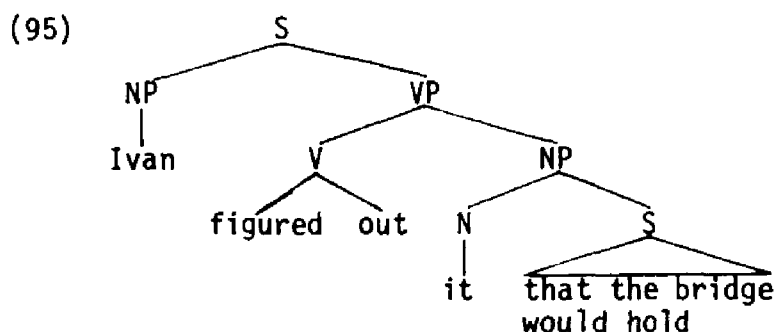
Po, 1. PART

Po, 2. EXTRA, EX-NP, EX-PP

4. Therefore EXTRA, EX-NP, and EX-PP must be postcyclic.

In the first place, it should be pointed out that the rule interrelations mentioned in step 1 of this argument are all cases where the prior application of PART is dictated by the structural descriptions of the rules themselves. Given Ross's restrictions on vacuous application (pp. 99-101, 151), the extraposition rules cannot possibly apply until PART has moved a particle to the end of the verb phrase, thereby giving the constituent to be extraposed something to extrapose over.

Using Ross's example involving EXTRA, underlying structure (95) is a structure to which PART but not EXTRA may apply.



(96) neither rule applies:

a. Ivan figured out that the bridge would hold.

PART and EXTRA apply:

b. Ivan figured it out that the bridge would hold.

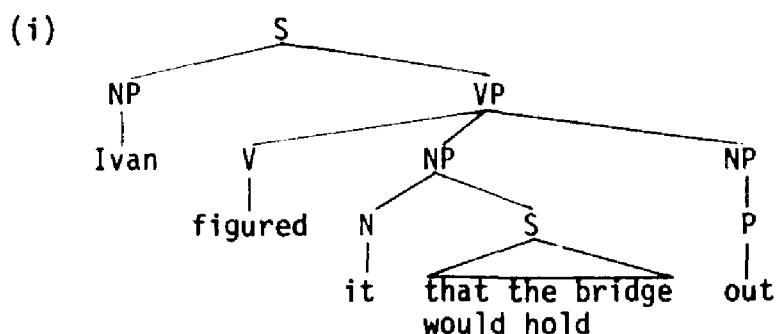
only PART applies:

c. *Ivan figured that the bridge would hold out.

Lehmann (1972:542-43) has pointed out that extrinsic ordering restrictions have no part to play in generating (96a,b) and blocking (96c). In the generation of (96b), intrinsic ordering relations determine

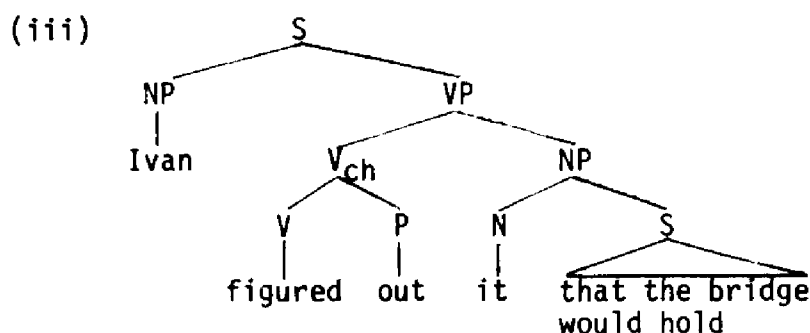
that PART applies before EXTRA; to block (96c), some kind of ad hoc constraint having nothing to do with order is necessary that requires PART and EXTRA both to apply to such structures as (95).³⁶

36. When particles are analyzed as underlying post-object intransitive prepositions, as discussed in II.A.2 above, then such an ad hoc constraint is unnecessary. The underlying tree comparable to (95) is (i).



Note that when such a tree is analyzed by PART', the rule must apply, for the object NP is 'complex'. This means that (ii), where neither PART' nor EXTRA have applied, could never be generated.

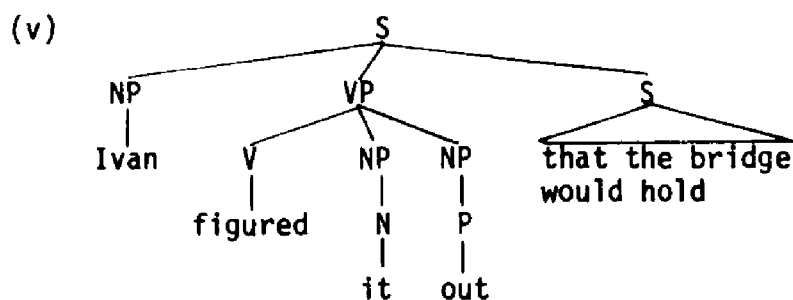
(ii) (= 96c) *Ivan figured that the bridge would hold out.
The result of applying PART' is shown in (iii), with (iv) the resulting surface string.



(iv) (= 96a) Ivan figured out that the bridge would hold.

Because of the factor of vacuous application, EXTRA cannot apply to (iii).

If, on the other hand, EXTRA is the rule that applies to (i), then (v) is the derived structure, with (vi) ultimately resulting.



As for EX-NP, Ross simply asserts that "it, like [EXTRA], must follow [PART]" (p. 154), giving no new evidence for this. I assume that he has in mind the same kind of argument as he proposed for the ordering of PART and EXTRA. From such an argument his conclusion regarding extrinsic ordering follows, although of course the rules may be said to be intrinsically ordered.

Ross's evidence for PART having to be ordered before EX-PP is similar to the 'evidence' cited in the preceding two paragraphs. He finds that the derivation of (97c) requires the rules to be strictly ordered (pp. 164-65).

(97) a. Why don't you pick up some review of this article?

↓ PART

b. Why don't you pick some review of this article up?

↓ EX-PP

c. Why don't you pick some review up of this article?

But again, all (97) indicates is that PART is in a feeding relation with respect to EX-PP, a kind of relation for which no extrinsic ordering restrictions are justified.

In the second place, even though there is no basis for requiring that PART apply before EXTRA, EX-NP, and EX-PP, still it is true that in the relevant derivations PART will only precede the application of these three extraposition rules. Thus, if it could be demonstrated that PART was postcyclic, then, in order to observe the intrinsic ordering relations holding among these rules, these other three rules

(continues fn. 36)

(vi) (= 96b) Ivan figured it out that the bridge would hold. PART' cannot apply to (v), for the rule requires that the object NP not be pronominal. Thus, the otherwise motivated structural description of these rules is, under this analysis, sufficient to generate all the relevant good sentences and none of the unacceptable ones.

would need to be marked as postcyclic also.

As I have attempted to demonstrate in section II.A.2 above, however, Ross has no argument for PART being postcyclic or in any other way noncyclic. Where PART applies strictly cyclically, then, with respect to the facts considered here, there is no argument for EXTRA, EX-NP, or EX-PP having to apply noncyclically. The invalidity of (94) follows from the invalidity of (18) above.

These six arguments considered here in section II.A.3 for extra-position rules being postcyclic thus all seem to me to be weak or invalid. Upon examination, none are found to be based on evidence that would require that the rules be marked as being in any way noncyclic. All are consistent with an Aspects-type traffic laws system wherein all rules apply in an upward cyclic manner.

II.A.4. Adverb Preposing.

Another rule that has sometimes been argued to be postcyclic is Adverb Preposing (ADV-PRE).³⁷ I am aware of two arguments involving

37. There seems to have been little discussion justifying the direction of this rule. Ross (1968), for example, merely assumes that it moves an adverbial forward in the string and not, say, from sentence-initial position to some place to the right in the sentence. Neither he, nor anyone else that I am aware of who has postulated a similar rule has shown evidence indicating that it must be in predicate-final position that these originate in underlying structure. Chomsky (1965:102) has pointed out that at least certain of the adverbials he generates in his base Predicate Phrase "might, in fact, be in part more closely associated with the Auxiliary...or with Sentence Adverbials which form a 'pre-Sentence' unit in the underlying structure." If it cannot be determined what constituents adverbs are most closely associated with in underlying structure, then this certainly is an argument in favor of a base where constituents are linearly unordered. Many other arguments for such a base have been given by Sanders (1968, 1970, 1972).

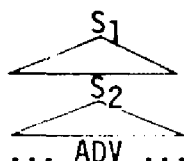
An explanation of the direction of the Adverb Movement rule is provided implicitly by the system of Geis 1970, considered in section II.A.3.b below. In her treatment, adverbials are underlying predicates cooccurring with embedded subject complement sentences. Predicates in

this rule, one by Geis (1970:130-35) and one by Ross (1968:168).

Ross's argument is the final one to be discussed of the eight in his dissertation, and is analyzed here first.

a. Ross 1968. Ross again bases his postcyclicity argument on a rule ordering argument, this one involving the interrelation of ADV-PRE and four rules that Ross asserts to be cyclic.

- (98) 1. ADV-PRE must be explicitly made to apply after "such cyclic rules as Equi NP Deletion [EQUI], Complementizer Placement [COMP-PL], Passive [PASS], and It Replacement [RAIS]" (Ross 1968:168). Otherwise these cyclic rules would have to be complicated.
2. If ADV-PRE were cyclic, the desired order could not be guaranteed merely by ordering it after EQUI, COMP-PL, etc. This is because ADV-PRE could apply on a cycle lower than that on which these cyclic rules would apply. For example, a cyclic ADV-PRE could only apply on S_2 below, and EQUI, COMP-PL, and RAIS could only apply on S_1 .



3. If ADV-PRE were postcyclic, however, the desired order could be guaranteed by marking these rules for different rule-types:

(continues fn. 37) her system are verbs plus any objects, and are generated following their subjects. The forward movement of her ADV-PRE is thus a function of her treating adverbs as predicates and of generating predicates as sentence-final constituents.

C. EQUI, COMP-PL, PASS, RAIS

Po. ADV-PRE

4. Therefore ADV-PRE must be postcyclic.

The extent of the complications Ross mentions in step 1 (but nowhere begins to spell out) is not at all clear, nor is it self-evident that the method Ross chooses to handle these complexities is preferable to an alternative to be mentioned below. In fact, the complication of rules when ADV-PRE is written so that it can apply cyclically is entirely comparable to the complication of rules when ADV-PRE is marked to be postcyclic. Insofar as there is no advantage, then, to marking these rules for different rule-types (i.e., insofar as no evidence exists indicating that the rules require the extra features necessary to assign them to different sets of rules), argument (98) does not represent support for the possibility of noncyclic rules.

Consider the interrelation of ADV-PRE and COMP-PL. I assume that when Ross refers to problems with the application of these two rules he has in mind restrictions such as those represented in (99)-(101); there the embedded sentences, when appearing as main sentences, would be grammatical whether or not ADV-PRE applied. As embedded sentences, however, only some are acceptable after ADV-PRE has applied.³⁸

- (99) a. Sue feared that around midnight Jack would come home.
- b. The FBI imagined that immediately everyone had fled.
- c. Fred expected that tomorrow the doctor could see him.
- d. They all assume that at 10:00 the attack will come.

- (100) a. *Sue feared for around midnight Jack to come home.
- b. *The FBI imagined immediately everyone to have fled.

38. Judgments of grammaticality are meant to reflect readings where the preposed adverb is taken as a constituent of the embedded, not the main sentence.

- c. *Oscar intends about noon to leave.
 - d. *Max wanted suddenly to stand to his feet.
- (101)
- a. *Sue feared around midnight Jack's coming home.
 - b. *The FBI imagined immediately everyone's having fled.
 - c. *The old man will survive (on) Sunday climbing the mountain.
 - d. *Marvin defended early in the second half leaving the game.

Assuming that these examples are representative of the behavior of at least a large portion of the verbs that take complement structures, we note the following restriction: if ADV-PRE is allowed to apply on the lower S before COMP-PL applies on a higher S, then COMP-PL has to be constrained in some way to ensure that only a that complementizer be inserted when the lower S has a preposed adverb.³⁹ Such a treatment Ross finds objectionable, and proposes instead that ADV-PRE be made to operate only after COMP-PL has already applied, thus avoiding complicating this latter rule.

The trouble with this is that the asymmetry of acceptable preposed adverbs as in (99)-(101) is something which one rule or another will have to be complicated to handle. If Ross, for example, is uncomfortable with a more complicated rule of COMP-PL and wants to keep this in its most general formulation, then he will have to settle for a more complicated ADV-PRE. In terms of the regularity noted above, this would mean adding a restriction to ADV-PRE so that it applies only if the sentence is directly preceded by a that complementizer or by nothing (i.e., if it is a topmost S). If neither rule is to be complicated, how are we to explain the ungrammaticality of the sentences of (100) and (101)?

It will be helpful here to spell out explicitly the two proposals

39. Geis (1970:133), in her study of English adverbials, makes a similar generalization regarding the cooccurrence of complementizers and fronted adverbs.

for the formulation of ADV-PRE and COMP-PL, indicating the respective complexities of each, both the complexities of the structural descriptions required, as well as the complication of assigning different rule-type features in the case where they cannot both simply apply cyclically. While both treatments incorporate the facts just discussed regarding the interrelationship of ADV-PRE and COMP-PL, the amount of rule complication required is clearly not the same in both cases.

(102) a. Ross's proposal:

ADV-PRE is complicated:

- (a) in embedded sentences applies only when that complementizer present,
- (b) marked as postcyclic,
- (c) marked as upward bounded;⁴⁰

COMP-PL is complicated:

- (a) marked as cyclic.

b. alternative proposal:

ADV-PRE is otherwise uncomplicated;

COMP-PL is complicated:

- (a) inserts only that complementizer when the embedded sentence has a preposed adverb.

40. Ross, with his multiple rule-type system, is required to have a notion of sentence 'bounding'; this may be considered as a qualification of his traffic laws scheme (9) in chapter I which has the effect of constraining the domain of application of rules. In such a system all rules, such as ADV-PRE, "which adjoin elements to the left of variables must be marked idiosyncratically, for some are upward bounded, and some are not" (Ross 1968:169). See chapter IV below for further discussion of bounding and multiple rule-types.

Note that, following the discussion in footnote 37 about the direction of ADV-PRE, if Ross had a rule postposing adverbs instead of proposing them, then no rule in his grammar would need to be marked for boundedness. His ADV-PRE, the only variable movement rule that is not unbounded to the left, would, when reformulated as Adverb Postposing, fall in with the generalization that all rules adjoining elements rightward over variables are upward bounded.

Specifically, although complication (a) of ADV-PRE in Ross's proposal corresponds exactly to complication (a) of COMP-PL in the alternative proposal, there is nothing in the latter alternative that corresponds to the three other complications in Ross's treatment of these rules. With respect to the pair of rules ADV-PRE and COMP-PL, then, there clearly can be no argument from relative simplicity of rules such as Ross makes in (98) that would favor an alternative that made use of rules of different rule-types.

What about the other rules Ross claims would be complicated if ADV-PRE were cyclic? Would PASS, EQUI, and RAIS all need to be complicated if ADV-PRE were cyclic and could apply before them?

As for PASS, it does not seem that ADV-PRE could possibly interfere with its application. As customarily defined, PASS does not make crucial use of variables (see Ross 1968:247); this rule refers to NPs that are on either side of a V, and does not take into account NPs (including Ross's [+Adverb] NPs) in other positions in the string.

Insofar as the restrictions on the applications of ADV-PRE and COMP-PL are as discussed above and as illustrated in (99)-(101), there need be no complication of EQUI or RAIS if ADV-PRE applies first on a lower sentence. This is because the operation of both of these rules is dependent on COMP-PL having first inserted a for-to or a POSS-ing complementizer into the phrase marker. However, if in certain environments COMP-PL can only insert that, as it must when the constituent sentence has a preposed adverb, then in these environments EQUI and RAIS would be effectively blocked from ever applying. Since this particular restriction against the application of these two rules is entirely a function of the elaboration of COMP-PL along the lines of the alternative proposal of (102), the structural descriptions themselves of EQUI and RAIS require

absolutely no complications of any kind in order to block the ungrammatical strings in (100) and (101).

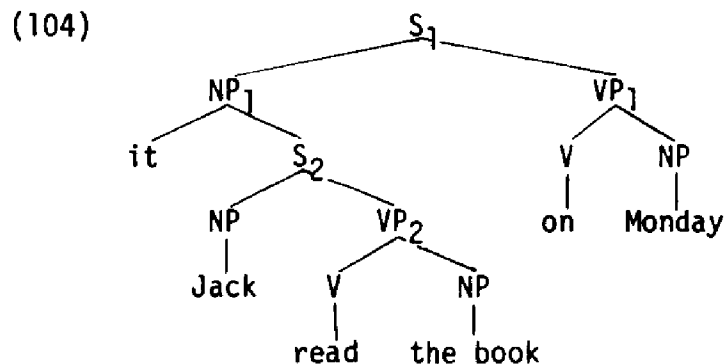
Assuming that I have considered versions of the four cyclic rules mentioned in step 1 of (98) that are reasonably similar to what Ross had in mind in his dissertation, I can see no justification for postulating ADV-PRE as belonging to a different set of rules from EQUI, COMP-PL, PASS, and RAIS; more specifically, I do not find the support Ross claims there is for ADV-PRE being postcyclic. Arguing on the basis of simplicity, which is Ross's ground in (98), the evidence points to COMP-PL and not ADV-PRE as the rule which should be complicated to account for the differences in grammaticality among the sentences of (99)-(101). Given this direction of complication, one requiring no postulation of a set of different rule-types, there is then no need to complicate either PASS, EQUI, or RAIS. Where there is thus no reason - even on grounds of simplicity - for choosing an explanation that involves appeal to multiple rule-types, but where, on the contrary, this explanation is relatively more complex, then an argument such as (97) can offer no support to any theory which allows its grammars to divide rules into cyclic vs. postcyclic sets of rules as Ross proposes.

b. Geis 1970. The only other argument that I have seen for ADV-PRE being postcyclic is in Jonnie Geis's (1970) dissertation on English verb phrase adverbials. She argues there for a treatment of these adverbials as underlying higher verbs, basing this among other things on various tests for constituency (e.g., using the rules Verb Phrase Deletion and Sentence Deletion), on cooccurrence restrictions between adverbials and main verbs, and on the different possible scopes

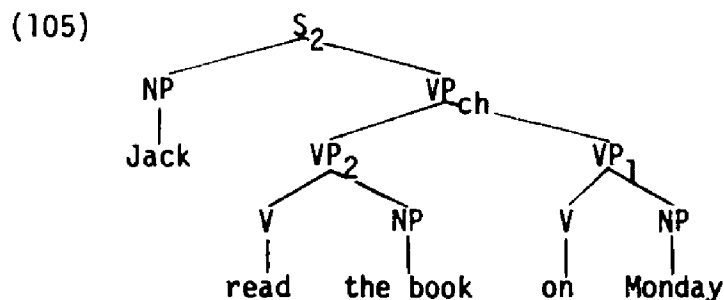
of negation in sentences with verb phrase adverbials (this along with the assumption that only S's can be within the scope of negation). In evaluating her argument for the noncyclicity of ADV-PRE, this generative semantics-style position on the derivation of surface verb phrase adverbials may be accepted in toto. To understand the argument she gives it is necessary only to illustrate the structures underlying surface adverbials, and her rules Adverb Lowering (ADV-LOW) and ADV-PRE.

A typical derivation of a sentence having an optional adverbial is shown below. The underlying structure of (103) is (104).

(103) Jack read the book on Monday.



The cyclic rule ADV-LOW applies on the S_1 cycle, Chomsky-adjoining an adverbial verb phrase to the right of the verb phrase of the sentence embedded in its subject (p. 130). Tree (105) results from the application of this rule to (104). (Pruning deletes S_1 and NP_1 ; it presumably is removed by a rule It Deletion.)



Only at this point is ADV-PRE able to apply, for Geis formulates it so that it applies to the rightmost VP in a structure such as VP_{ch} above.⁴¹ The rule is given as in (106), and would apply to derive (107).

- (106) ADV-PRE: $X \quad S[NP \quad vp[VP \quad VP]] \quad Y$
- | | | | | | |
|---|-----|---|-------------|---|---------------|
| 1 | 2 | 3 | 4 | 5 | \Rightarrow |
| 1 | 4+2 | 3 | \emptyset | 5 | |
- " + indicates sister-adjunction; \underline{X} and \underline{Y}
are end variables" (pp. 135, 250)⁴²

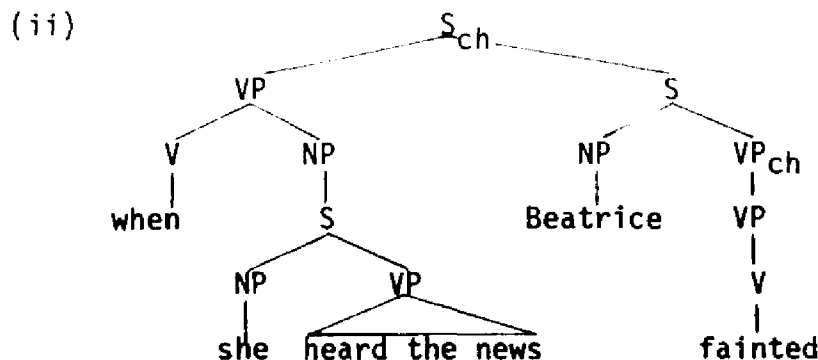
41. This formulation of ADV-PRE prevents it from applying to what Geis calls "required adverbials" (p. 237f). As illustrated in (i), these in some cases cannot undergo ADV-PRE.

- (i) a. The strike may last for days.
b. *For days the strike may last.
c. Pete lived in a red house.
d. *In a red house Pete lived.

Their underlying structures contain only a single S, thus blocking the application of ADV-LOW and consequently ADV-PRE. (Note that (id) is grammatical with subject-verb inversion: In a red house lived Pete. It is not clear how Geis would derive this.)

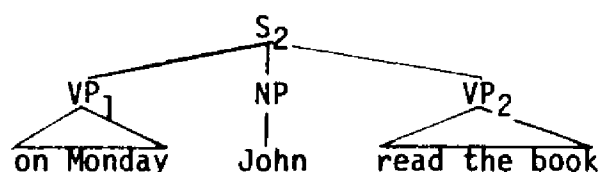
42. Geis argues that the preposed adverbial is sister- and not Chomsky-adjoined to the front of the sentence. She bases this on sentences like (i = her 102), which has undergone backward pronominalization.

(i) When she heard the news, Beatrice fainted.
With Chomsky-adjunction, this "would predict that sentences like 102 should be ungrammatical, since the preposed adverbial clause would not be commanded by the second occurrence of Beatrice after the rule had applied" (pp. 135-36). That is, she would not be commanded by Beatrice in (ii).



Given sentences like those in (iii), however, I fail to see the point of this argument; as has been frequently noted, 'command' is relevant to backward pronominalization only in that in this direction

(107)



We have now seen enough of Geis's system to be able to evaluate her argument that (106) must be a postcyclic rule. I outline this as follows:

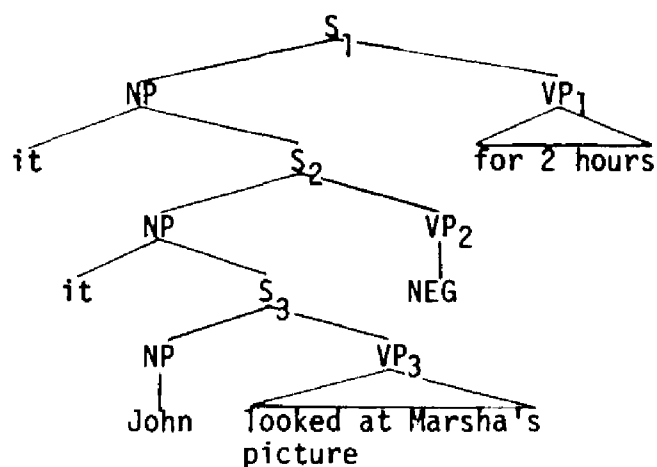
- (108) 1. An adverb must not be brought to sentence-initial position if the predicate of the next higher S contains NEG or another adverbial. This is to prevent disturbance of the deep structure scope relations of NEG's and adverbials.
2. If ADV-PRE were cyclic, there would be no natural way to prevent it from applying wrongly in embedded clauses.
3. ADV-PRE cannot be last-cyclic, for it must apply in some embedded clauses.
4. If ADV-PRE were postcyclic, then it could be restricted to applying only to the proper adverbials.
5. Therefore ADV-PRE must be postcyclic.

The restriction referred to in step 1 may be illustrated by Geis's examples with NEG predicates. Consider first underlying structure (109), where a negated sentence is within the scope of an adverbial.

(continues fn. 42) the pronoun may not command its antecedent.

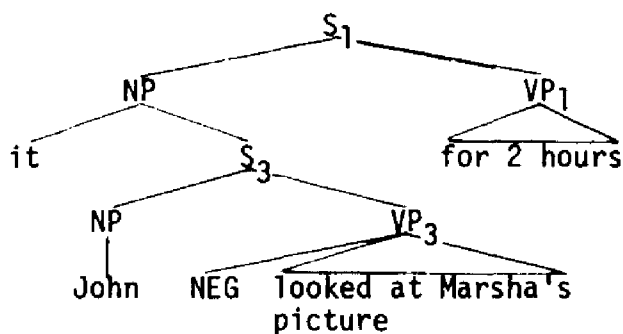
- (iii) a. For him to work all night indicates that Harry really cares about his family.
- b. It surprised the boy who saw her that Sally was walking on crutches.
- c. The man who put her through school liked the work Mary did.

(109)



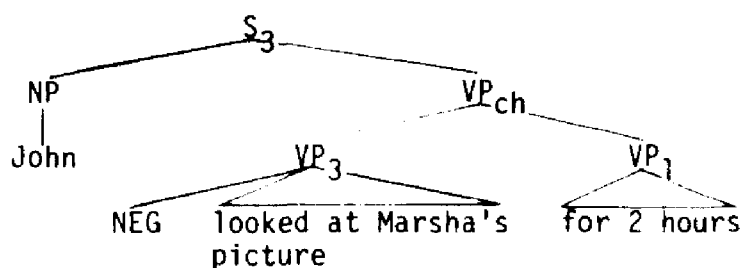
On the S_2 cycle, Negative Lowering (NEG-LOW) attaches NEG to the next lower VP, resulting in (110).

(110)



Then ADV-LOW applies, with the derived structure now a simplex sentence.

(111)

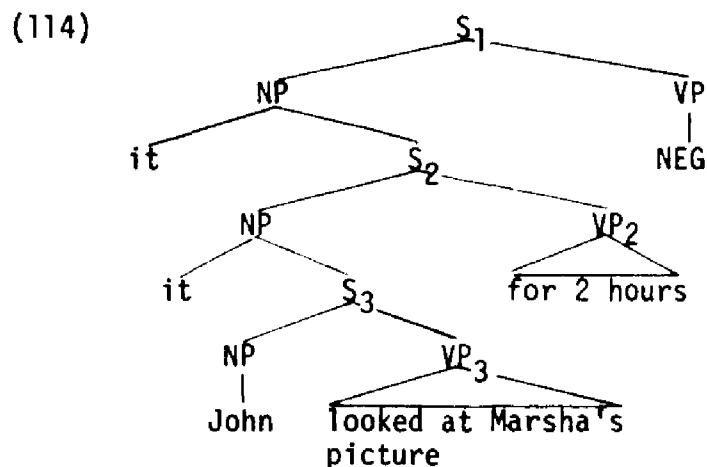


If no other relevant rules apply, (111) will be realized as (112). If ADV-PRE is chosen to apply to (111), then (113) is the resultant surface string.

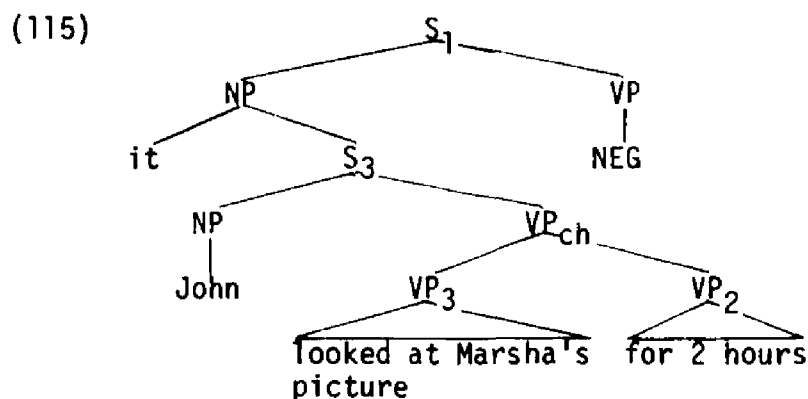
(112) John didn't look at Marsha's picture for 2 hours.

(113) For 2 hours John didn't look at Marsha's picture.

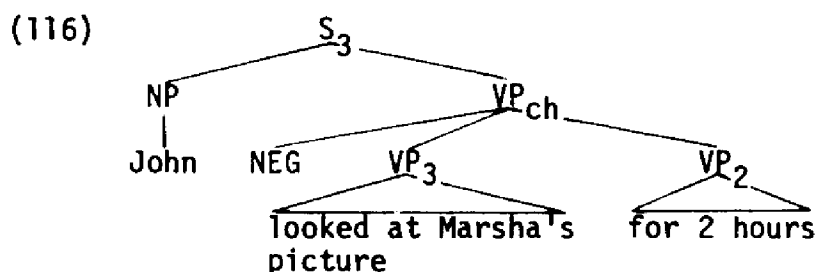
Next we trace the derivation of a sentence in which a NEG is the highest predicate, containing within its scope an adverbial. (114) is a structure underlying such a sentence.



ADV-LOW will apply on the S_2 cycle, giving the intermediate structure (115).

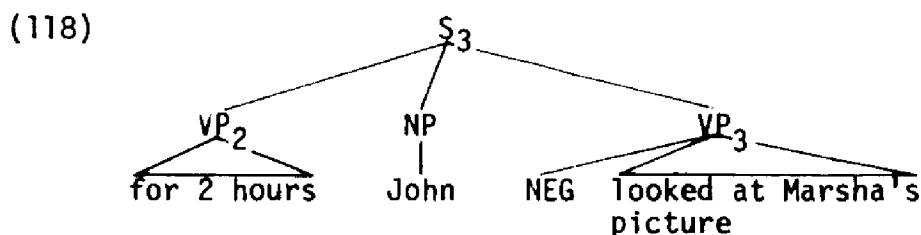


Now, following the convention discussed on page 35 above whereby the cycle returns to apply on an S_n if on the next higher cycle the S dominating S_n is deleted, ADV-PRE has a chance to apply on S_3 . If this does not apply, then NEG-LOW applying on S_1 will give the final derived structure (116); this underlies sentence (117).



(117) John didn't look at Marsha's picture for 2 hours.

If ADV-PRE is allowed to apply on S_3 , then, after NEG-LOW has operated on S_1 , structure (118) will result, which eventually becomes (119).



(119) For 2 hours John didn't look at Marsha's picture.

But notice that the same two sentences have both been derived from two different underlying structures. This is appropriate enough for (112 = 117), for this sentence is ambiguous with respect to what is being negated. In one sense (i.e., that arising from underlying structure (109) and structurally represented by the position of NEG in derived constituent structure (111)), it is presupposed that John did something for two hours and is denied that what he did during any of that time was to look at Marsha's picture. In another sense (the one deriving from underlying structure (114) and distinguished by the attachment of NEG to the whole VP of (116)), it is presupposed only that John did something and denied that what he did was to spend exactly two hours looking at the picture.⁴³

43. Although Geis claims more than once (pp. 11, 57) that sentences

What is inadmissible is to derive sentence (113 = 119) from both underlying sources, for this has only the meaning that is compatible with underlying structure (109); it cannot derive from a sentence where the adverbial for 2 hours is within the scope of NEG, as it is in (114).

The semantic integrity of the respective deep structures can be preserved, Geis notes, by somehow restricting ADV-PRE from applying to (114) or to any intermediate structures derived from it. In fact the structural description of ADV-PRE prevents its application to (116), for it can apply only if no element intervenes between the subject and the predicate. The critical structure, however, is (115), for (ignoring the condition specified in (106)) there is no natural way to prevent the application of a simple, cyclic ADV-PRE here.⁴⁴ So ADV-PRE cannot

(continues fn. 43) such as (112 = 117) have no interpretation where only the adverbial is negated, my intuitions so far do not agree with this. That is, I find one sense of (112 = 117) to be where it is presupposed that John looked at Marsha's picture and it is asserted that the length of time he looked was something other than two hours. This sense is more clearly seen in (i), a sentence-type not mentioned at all in Geis 1970.

(i) Not for two hours did John look at Marsha's picture.
If speakers consistently get readings of such sentences with only the adverbial negated, then this argues either against the underlying structure of sentences with adverbials that Geis proposes, or against the view that the scope of a negative can only be a sentence. That is, to a structure such as (104), a NEG predicate can have as subject either S_1 (including also S_2 within its scope; cf. (114)) or S_2 (cf. (109)), but not S_1 alone. Yet sentence (i) here (and one sense of (112 = 117)) apparently requires such a disallowed kind of negation.

This is not the place to examine in detail the whole of the argument for adverbs originating as higher predicates; in what follows we will disregard the possibility of a third reading of (112 = 117).

44. Geis makes a similar argument from sentences with two adverbials (pp. 131-32; see also pp. 77-78 and 120-25). For example, in (i), for an hour has the rest of the sentence, including the other adverbial, within its scope; in the deep structure, it would be the highest predicate.

(i) The students protested outside the Administration Building
for an hour.
If ADV-PRE applied cyclically, then it could front the adverbial of the embedded sentence, this resulting in (ii).
(ii) Outside the Administration Building the students protested
for an hour.

be cyclic.

It might be thought that marking this rule for last-cyclicity would solve the problem, for in a series of 'logical' predicates (here, NEG's or adverbials) it is true that only adverbials that are highest in the tree can be fronted. This fails, as Geis points out (p. 132), for adverbials may be preposed in embedded that clauses. Her examples:

- (120) a. I'm absolutely sure that on Halloween the Great Pumpkin
will rise out of the pumpkin patch.
- b. We all know that for days there were National Guardsmen
in Washington.

So it is not simply that ADV-PRE applies only at the topmost S.

Geis makes the rule postcyclic, then, formulating it with a condition that apparently is designed to ensure its application in only the relevant S's. When we examine carefully the range of environments in which ADV-PRE must apply, and compare that with the rule as she formulates it in (106), however, it becomes obvious that (a) her formulation is inadequate, and (b) there is no ground for making this rule noncyclic in any way.

The condition Geis adds to ADV-PRE specifies that the variables X and Y must be "end variables." I take this to mean that these can stand for no segments, but must cover only the end #'s of the topmost S of the

(continues fn. 44) But in (ii), Geis claims, outside the Administration Building has the rest of the sentence within its scope; most crucially, it has for an hour within its scope. Thus the scope relations of the two adverbials become reversed if ADV-PRE can apply cyclically.

I have found it very difficult to discern any scope differences between (i) and (ii), or between the sentences of (iii).

- (iii) a. The students protested for an hour outside the Administration Building.
- b. For an hour the students protested outside the Administration Building.

I thus restrict discussion to cases of sentences with one adverb and one NEG. Questions of scope in such sentences are (with the proviso of footnote 43) for me much clearer.

tree. That is, if I understand "end variable" correctly, the rule is formulated so that its structural description will be satisfied only on the highest S of a tree. As such, nothing prevents it from being strictly cyclic, i.e., able to be examined for application at each cycle in a derivation. Given the condition on (106) as stated, it would in fact apply only on topmost S's; but, since this range of application would be guaranteed by the rule itself and not by any additional rule-type features explicitly marking it [+last-cyclic], this would be only an 'intrinsic last-cyclicity', a manner of application completely consistent with a requirement that all rules be cyclic.

But of course ADV-PRE cannot be restricted to applying only on highest S's; it must be able to apply also to embedded sentences like those in (120).⁴⁵ So the condition imposed on the rule cannot be adequate. As an aid to formulating a rule that will account for the facts discussed by Geis, I outline in (121) the environments in which ADV-PRE must be restricted from applying and in which it must be allowed to apply.

(121) ADV-PRE cannot apply within an S when that S is in the environment:

a. X — V Y
[+Log]

application blocked when next higher verb is a
'logical' predicate - a NEG or another adverbial
(e.g., (115));

45. I am puzzled by Geis's ignoring the observation she made three pages earlier about ADV-PRE applying in embedded clauses. Or, perhaps, I have not understood what she means by "end variables."

ADV-PRE can apply within an S when that S is in the environment:

- b. X — V Y
[-Log]

application possible when next higher verb (on the right) is not a logical predicate (e.g., It appears that on Monday John was sick);⁴⁶

- c. X V NP[it — Y]

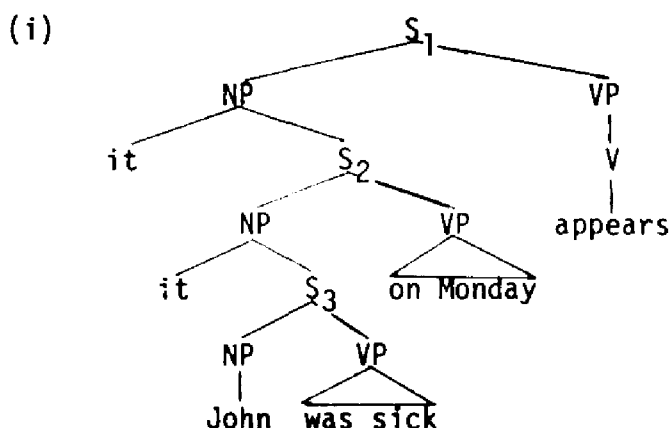
application possible when embedded in a predicate (e.g., (120));⁴⁷

- d. —

application possible on a topmost S.

Given these possibilities of application, it is clear that ADV-PRE must be defined on the next higher verb (if there is one). One formulation that would account for all the facts here and that would be consistent with the overall treatment of adverbials adopted by Geis is offered

46. In Geis's system, this example would apparently have the underlying structure shown in (i).



Appears is not what we have called a logical predicate, and thus ADV-PRE is acceptable on the lower cycle.

47. The formulation of (121c) is somewhat simplified, the optional postverbal NP and the complementizer that being omitted for ease of presentation.

in (122):

$$\begin{array}{ccccccccc}
 (122) & X & (V & \text{NP[it]} & - & S[\text{NP} & - & \text{VP}[\text{VP} & - & \text{VP}]] & - & (V) & - & Y \\
 & & 1 & & & 2 & & 3 & & 4 & & 5 & & 6 \Rightarrow \\
 & & 1 & & & 4 + 2 & & 3 & & \emptyset & & 5 & & 6 \\
 & & \text{condition:} & \text{if } 5 > V, & \text{then } V \text{ is } [-\text{Log}]
 \end{array}$$

The absence of a variable between the V's and the embedded S in the structural description is meant to ensure that the rule applies only to an S immediately below the cycle of current application. The condition added to the rule guarantees that if a sentence with a preposable adverbial is embedded in the subject, the adverb will move only if it is not within the scope of a NEG or another adverb. I can think of no more general statement of this rule that would describe all the facts that Geis discusses.

Now notice that there is absolutely no reason to restrict ADV-PRE to applying in some noncyclic manner. As noted above, it cannot be last-cyclic, for some embedded sentences must allow preposed adverbs. From this it could be shown that it cannot be root-cyclic either. Also, to mark ADV-PRE as postcyclic would require complicating it still further (e.g., the possibility of a NEG appearing between the subject and the predicate, as in (111), would have to be incorporated into (122)). Given that ADV-LOW is cyclic and that it feeds ADV-PRE, this means that ADV-PRE could not be a precyclic rule. While I know of no argument that requires ADV-PRE to be a cyclic rule (and not, say, an anywhere rule or a rule of some additional rule-type), certainly all the facts here indicate that marking ADV-PRE as last- or postcyclic is completely unwarranted.

The conclusion here regarding argument (108) is thus the same as that reached in analyzing Ross's argument for the postcyclicity of

ADV-PRE. In neither case is there evidence, either on grounds of simplicity or of 'descriptive adequacy' for ADV-PRE applying in any manner other than in strict conformity to the cyclic principle.

II.A.5. All Movement.

We continue with discussion of another postcyclicity argument by Ross, this one concerning a rule which moves a preverbal all into various positions within the verb phrase, a rule we may call All Movement (ALL-MOVE). This rule is mentioned in the course of making some generalizations about cyclic and postcyclic rules, and in commenting on the need to keep his rule Performative Deletion from reapplying to its own output. In Ross 1970b:271, ALL-MOVE is illustrated with the sentences in (123) below.

- (123) a. They all must have left.
- b. They must all have left.
- c. They must have all left.

It is assumed that (123a) is the underlying representation. (123b) is derived from (123a) by ALL-MOVE; it "seems likely" (ibid.), then, that (123c) is not derived directly from (123a), but arises only by another application of ALL-MOVE (i.e., to (123b)). The argument based on this rule and upon the assumption that (123c) is derived from (123a) only via (123b) is reconstructed and summarized in (124).

- (124) 1. Cyclic rules must not be allowed to apply to their own output. Otherwise There Insertion (THERE) and Dative (DAT) would have to be complicated.
- 2. Postcyclic rules must be able to apply to their own output. For example, the postcyclic rules (Latin) Scrambling (SCRAM) and (Hidatsa) Nominal Affix Reordering (NOM-AF) must be

allowed to so apply.

3. ALL-MOVE must be able to apply to its own output.

4. Therefore ALL-MOVE must be postcyclic.

The third premise of this argument rests, as noted above, solely on Ross's good feelings. To that extent it may be questioned whether there could be any significance to the conclusion, even if the first two premises could be established. In addition to the questionable support of step 3, note that this argument commits the fallacy of the undistributed middle;⁴⁸ from steps 2 and 3 Ross is guilty here if affirming the consequent and thus the conclusion is invalidly drawn. From the first three steps of (124) all that we can know is that ALL-MOVE is not cyclic. Presumably, however, Ross had in mind a fourth premise, namely that all syntactic rules are divided into two and only two mutually exclusive sets - cyclic and postcyclic. When such a premise is attached to (124), then the fact that a rule must apply iteratively is indeed a valid diagnostic for its being postcyclic. Here we shall assume that some other than intuitive support can be provided for step 3, and will also assume that Ross had in mind a model where there are only two subdivisions of transformations.⁴⁹

Consider first the claim that cyclic rules must not be allowed to apply to their own output. In support of this Ross points out that THERE and DAT (in formulations he assumes) would have to be complicated unless there were such a general restriction. We discuss these below, and then mention some counterevidence to the generalization of step 1.

48. This was first pointed out to me by Fred Householder.

49. I will not here try to reconcile Ross 1970b, which apparently assumes that rules are either cyclic or postcyclic, with Ross 1970a, which argues for Gapping as an anywhere rule. (Both of these papers apparently were written at roughly the same time, i.e., 3-4 years before their date of publication.)

1. If THERE were allowed to iterate, then, according to Ross, the following derivation would be possible.

- (125) a. A man was standing in the surf.
 b. There was a man standing in the surf.
 c. *There was there a man standing in the surf.
 d. *There was there there a man standing in the surf.

This presupposes a formulation of THERE roughly on the order of (126), where a subject NP is moved to the right of the first occurrence of be in the string, and in its place the form there is inserted.

- (126) X S[NP Y be Z
 1 2 3 4 5 \Rightarrow
 1 there 3 4+2 5
 condition: 3 \nrightarrow be or an S

Note in particular that the subject NP, term 2 in (126), is completely unrestricted. Thus the rule could apply to a full noun phrase such as a man in (125a), and to the empty morpheme there in (125b) and (125c).

But this cannot be an adequate formulation of THERE. Certainly the rule must be restricted to applying only to indefinite subjects, as many (Ross (1968:241) included) have pointed out. Thus in the following sentences THERE has wrongly applied.

- (127) a. *There will be the hole in Jack's pocket. (Ross 1968:241)
 b. *There was the man standing in the surf.
 c. *There had been the thief stealing light bulbs.
 d. *There is she waiting outside.⁵⁰

50. In both senses of (i) the there apparently has a source different from the there in (127d).

(i) There she is waiting outside.

In the reading of (i) with a comma intonation after is, there has a meaning such as [+deictic, +away-from-speaker]. Where the sentence has no major break and a sharp pitch drop on outside, there signals the

This simply means that an adequate formulation of THERE must at least require the subject of the sentence in which it operates to be marked [-Def].

Once (126) has been corrected by the addition of [-Def] to term 2,⁵¹ then the only way it could apply to its output is to specify that the empty there added in the structural change is not really empty at all, but comes marked with the feature [-Def]. Only then would some extra restriction have to be placed on the application of THERE in order to block (125c,d).

But I can think of no reason to argue that there must be so marked when it is inserted by the application of THERE. It is enough that there becomes an NP in derived structure;⁵² there is apparently no basis

(continues fn. 50) speaker's surprise or annoyance. The form there of rule (126) has neither of these (or, as far as I can tell, any other) meanings.

51. I do not mean to suggest that (126) is deficient only in that it lacks one feature specification. The verb, for example, cannot be restricted to be, as the sentences of (i) indicate.

- (i) a. There arose on the lawn such a clatter.
- b. There appeared a face in the window.
- c. There occurred a terrible crime last night.

McCawley's (1970:293-94) comment about THERE requiring reference to the higher verb 'EXIST' thus would have to be expanded; this higher predicate would have to include also something like 'COME-INTO-EXISTENCE'.

52. In support of there being considered an NP, Burt (1971:237) points out that it participates in several rules that are defined on NPs:

- 1. Subject Verb Inversion - Was there an explosion?
- 2. Tag Question Formation - There was an explosion, wasn't there?
- 3. Passive - There was believed to have been an explosion.
- 4. Number Agreement - There were five men in town.
- 5. Raising - There is likely to be an explosion.

There are, however, at least two rules making crucial reference to NPs that cannot apply to this there:

- 1. Appositive - *There, and there is a cow in the meadow, is a boy under the haystack fast asleep.
- 2. Relativization - *There, which is a cow in the meadow, is a little boy under the haystack fast asleep.

Application of these latter two rules to there NPs presumably could be blocked by appropriately defining the identity relation required to obtain between NPs in the operation of these rules.

for thinking it must in addition bear this particular feature specification. THERE, when properly formulated, could be said to be self-bleeding, the structural description of the rule itself blocking any reapplication to its output. As such, it contributes nothing to the question of whether or not cyclic rules⁵³ must be explicitly required not to apply to their own output.

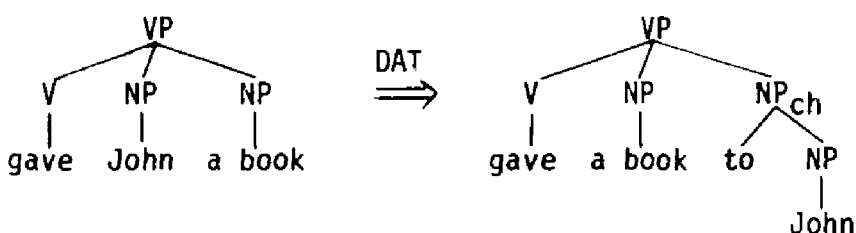
2. When DAT can apply to its own output, Ross claims, then there would be no motivated way to stop the derivation of (128c).

- (128) a. I gave John a book.
 b. I gave a book to John.
 c. *I gave to John to a book.

As far as I can tell, the simplest rule presupposed by (128) is (129).

- (129) . . . NP NP . . .
 1 2 \Rightarrow
 2 to # 1 \emptyset

This would apply to (128a) as shown in (130).

- (130) a. 

Structure (130b) satisfies the structural description of (129), which, if allowed to reapply, would generate the ungrammatical (128c).

The need to block DAT from iteration is obviously dependent on this rule adding a to or a for, and not deleting these; in the latter case the rule would be self-bleeding and, as with THERE, would be

53. For the purposes of discussion we accept Ross's assumption here that THERE (and below, DAT) is cyclic. Bresnan (1970:306) cites an argument for the cyclicity of THERE due to Ross.

irrelevant in investigating the iterativity of rules. Ross, however, provides no evidence that the rule must insert rather than delete a morpheme.⁵⁴ Yet if there is no way to choose the correct formulation of DAT, then this rule cannot represent evidence for cyclic rules having to be restricted in the way Ross claims in (124).

Evidence relevant to determining how this rule should apply seems to favor weakly the deletion version. For example, the strings of (131) would be exceptions to (129), but would not affect or be affected by a deletion DAT.⁵⁵

- (131) a. They called the baby John.
- b. *The called John to the baby.
- c. We elected Ned president.
- d. *We elected president to Ned.

Postal observes that there are many cases of verbal forms that appear with the preposition but are restricted from undergoing (a deletion) DAT, but hardly any cases where a verb requires the order indirect object + direct object with no preposition. This he sees as suggestive of the rule deleting and not inserting a preposition: "in general, given an optional rule of the type under discussion, the exceptions tend to be cases where idiosyncratically a form does not permit application. Cases where the rule is idiosyncratically obligatory, although far from unknown, are rarer" (1971:126).

While these may not represent compelling reasons for choosing a formulation of DAT in a direction opposite that of (129), yet the absence of positive support for Ross's version (129) means that step 1 of (124)

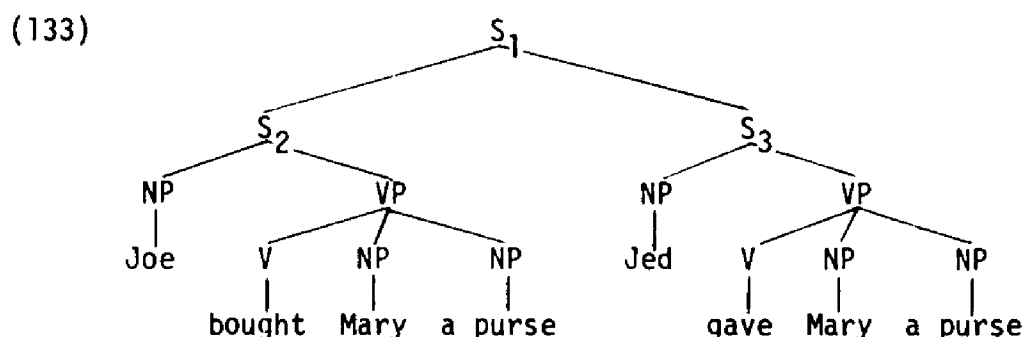
54. In a later paper, in fact, Ross (1971:571) mentions DAT as applying to delete the preposition, although again he gives no evidence for this direction of application.

55. Andreas Koutsoudas has called my attention to these sentences.

is rendered at best seriously weakened.⁵⁶

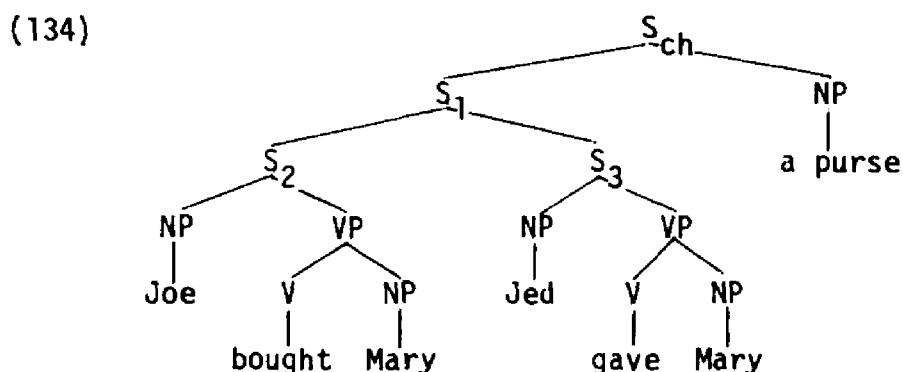
3. Even if it turns out that strong evidence can be found in support of DAT as a preposition-adding and not -deleting rule, other facts suggest that the ability to reapply is not necessarily related to a rule being cyclic or not and thus that an argument such as (124) is from the start ill-advised. Consider, for example, the rule Conjunction Reduction (CONJ-RED), a rule argued by Ross to be cyclic (see Bresnan 1970:306). Given the formulation of CONJ-RED in Ross 1968:220, this clearly must be allowed to reapply to its own output. For example, sentence (132) has as an underlying structure (133), to which the rule first applies to reduce only the constituent-final a purse.

(132) Joe bought and Jed gave Mary a purse.

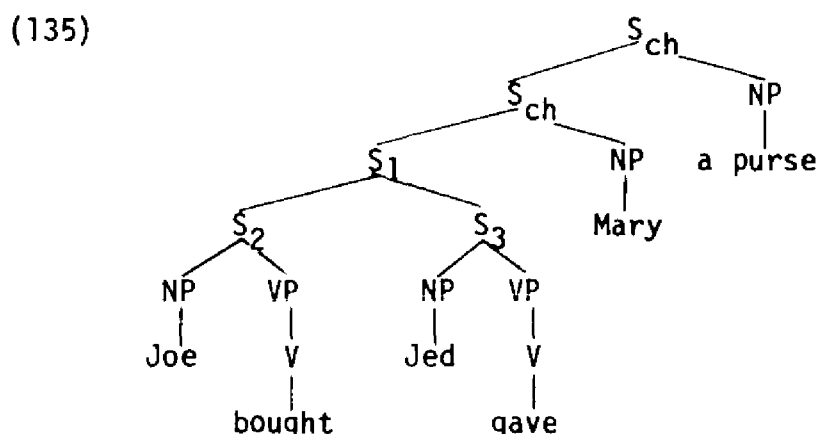


(134) results from this first application of CONJ-RED.

56. It could be noted at this point that it is not easy to find rules (of whatever purported rule-type) to test for the allowability of reapplication. The vast majority of the rules in Ross 1968, for example, are either self-bleeding (e.g., EXTRA, all deletion rules) or vacuously self-feeding (e.g., ADV-PRE, all feature-changing rules), this latter referring to rules which produce outputs that are consistent with the structural description of the rule, but which would not be affected by any subsequent (vacuous) 'application'.



Now, still on the S_1 cycle,⁵⁷ CONJ-RED may apply again, for S_2 and S_3 have identical constituents that are now rightmost members of a higher constituent. The second application of CONJ-RED yields (135), which underlies sentence (132).



Thus Ross's own rule CONJ-RED seems to argue against the generalization he wishes to make regarding cyclic rules. At present I know of no other rule that has been claimed to be cyclic which could provide evidence for or against the admissability of reapplication, and thus conclude that no conclusions may be drawn relating cyclicity and the ability to iterate in the manner Ross attempts to do in argument (124).

57. In the interpretation of the principle of cyclic application adopted here, creation of a higher cyclic node does not require that the cycle immediately move to that node. Only when all the rules are through applying at a given cyclic node (however this termination is to be determined) does the cycle move upward. Also, note here that CONJ-RED could not apply on the S_{ch} cycle in (134), for S_{ch} is not a coordinate node.

We turn next to considerations of the second step in Ross's argument here for the postcyclicity of ALL-MOVE. This is the claim that Latin SCRAM and Hidatsa NOM-AF, rules which are merely asserted to be postcyclic and "late," respectively, must be allowed to apply to their own outputs. As in the discussion of step 1 of (124), so here it will be seen that the evidence is anything but clear in support of the generalization that postcyclicity implies the ability to iterate.

1. In the case of Latin SCRAM, note that it must be allowed to apply to its own output only insofar as two assumptions are granted Ross concerning its formulation: (a) that it apply to adjacent constituents only, and (b) that the operation it describes be permutation and not copying and deletion.

But the first assumption cannot be granted. In sentences with postpositives such as quidem, autem, igitur, enim, constituents on either side may be rearranged, but the particle itself generally is not able to appear in other than second position. Thus, for example, sentences (136a,b) are both acceptable, (136c,d) are both impossible, and (136e,f) are in most contexts ungrammatical.

- (136) a. Amicam quidem bonam.
 b. Bonam quidem amicam.
 c. *Quidem amicam bonam.
 d. *Quidem bonam amicam.
 e. *Amicam bonam quidem.
 f. *Bonam amicam quidem.

I take it, then, that Ross's (1968:42) rule SCRAM must be reformulated with a variable between the items to be interposed.

The second assumption necessary for a formulation of a rule SCRAM so that it requires reapplication(s) to its own output - that it permute

elements instead of copy and delete - is not so obviously faulty. It has been noted, though, that permutations can be factored into otherwise needed types of transformations (i.e., into simple additions (of which copying is a special case) and deletions), and that the set of elementary operations performed by transformations can be reduced by excluding permutations as a distinct type of structural change. Given the desirability of metatheoretically restricting the types of transformations available to grammars, then, and assuming that SCRAM may be as generally described in terms of copying and deleting as in terms of permutation there is reason to reformulate Ross's (1968, 1970b) rule with yet a second change. This revised SCRAM is spelled out in (137).

$$\begin{array}{rcccccc}
 (137) & X & A & Y & B & Z & * \\
 & 1 & 2 & 3 & 4 & 5 & \Rightarrow \\
 & 1 & \emptyset & 3 & 4+2 & 5 &
 \end{array}$$

(Here 'A' and 'B' abbreviate the constituents that may be moved. The asterisk marks the rule as mirror image; as with Ross's version, it is assumed to apply only to clause mates.)

SCRAM may now be restricted to applying once in a cycle (or, assuming postcyclicity, once in a derivation) and still generate all the necessary commutation of elements. The rule marks which constituents must be moved, and then rearranges them all at once.⁵⁸ For example, Ross's Latin sentence (138b) may be derived in a single step, with two substrings of (138a) being operated on at once by the revised SCRAM.

58. Such simultaneous application of a rule to different subparts of a string that each meet its structural description is governed by a "Convention of Simultaneous Application" (Kimball 1973a:56). Chomsky and Halle (1968:344) propose a similar convention for phonology.

- (138) a. $\frac{\text{Homō}}{\text{B}} \quad \frac{\text{bonus}}{\text{A}} \quad \frac{\text{amat}}{\text{B}} \quad \text{puellam} \quad \frac{\text{pulchram}}{\text{A}}$ 'The good man loves the beautiful girl'.
- b. Pulchram homō amat bonus puellam.

As the reader may verify for himself, any other combination of the five Latin words in (138) (or of the words of indefinitely longer sentences) may be produced by a single application of SCRAM.

Insofar as a rule such as (137) may be motivated, then, to that extent is Ross's generalization in step 2 of (124) unsupported. As I have attempted to indicate, in fact (137) seems necessary on both factual and metatheoretical grounds, and thus represents evidence against the relation Ross sees between (purported) postcyclicity and the necessity for iteration.⁵⁹

2. The second example Ross cites to support his claim in step 2 is NOM-AF, a rule discussed by G. H. Matthews (1965) for Hidatsa, an

59. There are many questions that could be raised here, both with respect to mirror image rules, and with respect to the process of scrambling itself. Hankamer (1972), for example, proposes that mirror image rules be disallowed in syntax, arguing particularly on the basis of evidence against Gapping and Conjunction Reduction as mirror image rules. (This is discussed below in section II.A.7.) Ross (1971:572) suggests that "there are no true cases of bidirectionality in syntax," this dependent on analyses of languages such as English and French as underlying VSO languages. (Given a later espousal of English as an underlying SOV language (Ross 1973b), it is not clear whether Ross would still want to rule out all mirror image rules.)

As for SCRAM, Ross (1968:40f) suggests that perhaps this is not really a transformational rule at all, but is a part of the stylistic component, in which case it would not be known to what extent it shares the restrictions and conventions of regular syntactic rules.

Finally, note that with Ross's version of SCRAM, it is not always possible to tell whether or not it has applied to a string and, if it has applied, to know how many times it has operated. Where this rule permutes elements, and may reapply an indefinite number of times, the same order of elements can be derived by SCRAM applying any even number of times (or not at all) to the same two constituents. With the version of SCRAM in (137), however (and assuming the simultaneous application convention of footnote 58), it can always be determined upon inspection whether or not the rule has applied.

American Indian (Siouan) language. In this language, some of the arguments of the predicate are marked on the verb stem with clitics. In Matthews' system, these clitics are generated by the base rules as sister constituents to the full noun; the rule NOM-AF (139) then moves them over one constituent at a time until they are all in their proper order in front of the verb, on which they appear as prefixes in surface structure.

$$(139) \text{ NOM-AF (p. 52): } \begin{array}{c} \left\{ \begin{array}{l} \text{Af} \\ \text{Agnt} \end{array} \right\} \quad \text{N} \\ 1 \quad 2 \quad \Rightarrow \quad 2 + 1 \end{array}$$

The application of NOM-AF is illustrated in (140). (For ease of presentation the constituent structure of this sentence is not indicated.)

(140) a. Underlying:

súka ii wacéo a úixi áciwi c
 [dog INST man SUBJ antelope track MOOD]
 'The man tracked an antelope with a dog'.

b. First application of NOM-AF:

súka ii wacéo a úixi áciwi c
 N AF N AF N

c. Second application of NOM-AF:

súka wacéo ii úixi a áciwi c
 N N AF N AF

d. Derived:

súka wacéo úixi ii a áciwi c.

Given the base structures Matthews proposes for Hidatsa, and given his rule (139), it seems clear that this must reapply in order to generate a string such as (140d).

However, the significance of this for Ross's argument is doubtful.

In the first place, Matthews, writing within a pre-Aspects framework, never tries to give any general answers to the traffic laws problem. Specifically, in this work he does not attempt to characterize 'post-cyclic' (or any other of his four sets of transformations) in terms of reapplication possibilities (or in any other terms).

In the second place, it is not the case that all of Matthews "late" rules must be allowed to reapply to their own output. Just the opposite is true, in fact; a Number Ordering rule (NUM-ORD), listed by Matthews (p. 254) in the same set of rules as NOM-AF, must be explicitly required not to iterate. Ross's citing NOM-AF from Matthews 1965 as supporting his generalization regarding postcyclic rules is thus completely inappropriate and misleading.

Consider briefly the rule NUM-ORD and its application to a string. This is defined as in (141), where the constituent Nbr becomes the rightmost immediate constituent of the third term.

$$\begin{array}{rcll}
 (141) \text{ NUM-ORD (pp. 45, 219):} & \text{Nbr} & \text{Af} & \left\{ \begin{array}{l} \text{VP} \\ \text{Cmp} \\ \text{Nc} \end{array} \right\} \\
 & 1 & 2 & 3 \quad \Rightarrow \\
 & \emptyset & 2 & 3 + 1
 \end{array}$$

To a string such as (142a), NUM-ORD must apply once and only once. (This example is discussed on pp. 223-24; other illustrations of the application of NUM-ORD appear on pp. 45-47 and 219-23.)

(142) a. Underlying:

wacéo Plr A kúi Plr G xì éo c
 [man grandmother old MOOD]
 'The men's grandmothers are old'.

b. First application of NUM-ORD:

wacéo Plr A kúi Plr G xì éo c
 Nmbr Af Nc Nmbr Af VP

c. Derived:

wacéo A kúi Plr G xì éo Plr c

d. Inadmissible second application of NUM-ORD:

wacéo A kúi Plr G xì éo Plr c
 Nmbr Af VP

Thus, if we look no further than Matthews 1965, there is no basis for making the generalization Ross does regarding postcyclic rules.

We summarize in (143) the various rules discussed here to discover what is left of Ross's generalizations relating cyclicity and iterativity. The six rules below are marked, following Ross's assumptions here in this argument, as either cyclic or postcyclic. Then, when evidence would support either the need to be able to reapply, or the need to be restricted from reapplying, this is so indicated.

(143)	<u>cyclic</u>	<u>post-cyclic</u>	<u>must not iterate</u>	<u>must iterate</u>	<u>neither</u>
THERE	x				(self-bleeding)
DAT	x		?		(self-bleeding?)
CONJ-RED	x			x	
SCRAM		x		?	(no necessity?)
NOM-AF		x		x	
NUM-ORD		x	x		

As mentioned above, I know of no other rules commonly argued to be cyclic that either must or must not be allowed to apply to their own outputs. There are only a few cases of rules that have been argued to

be postcyclic where iteration must be blocked (e.g., Topicalization), but I am not aware of any rules that Ross has ever proposed are postcyclic where the question of reapplication can even be raised.⁶⁰

From (143), then, there is no way to construct an argument along the lines of (124), one which rests crucially on a relation between rule-type and iteration requirements. ALL-MOVE, we may conclude, cannot be judged to be either cyclic or postcyclic, even if Ross's assertions about its having to reapply to its own output can be substantiated. In terms of this overall study, this is yet another case where a claim that a rule of English syntax must be noncyclic cannot be substantiated.

II.A.6. Preposition Deletion.

A further postcyclicity argument due to Ross (attributed to him by Bill Ritchie, personal communication) is an unpublished one that Preposition Deletion (P-DEL) must be postcyclic, this based on its relation to Pseudo-Cleft (PS-CLEFT). This argument could be summarized:

- (144) 1. P-DEL must be guaranteed to apply only after PS-CLEFT has had a chance to apply. Otherwise all and only all the relevant grammatical strings could not be generated.
2. If P-DEL were cyclic it would not apply after PS-CLEFT, even if extrinsic ordering features were employed. This is because P-DEL applies on a cycle lower than the one where PS-CLEFT applies.

60. Of the five rules argued to be postcyclic in Ross 1968, for example, EXTRA, EX-NP, and PART are all self-bleeding, and EX-PP and ADV-PRE are vacuously self-feeding. Where vacuous application is excluded, then, none of these provides any evidence one way or the other regarding the need to mark rules for (or against) iteration.

3. If P-DEL were postcyclic, then the order of application P-DEL before PS-CLEFT could be easily guaranteed by marking these rules:

C. PS-CLEFT

Po. P-DEL

4. Therefore P-DEL must be postcyclic.

The applicational restriction referred to in step 1 may be illustrated by the pairs of sentences in (145).

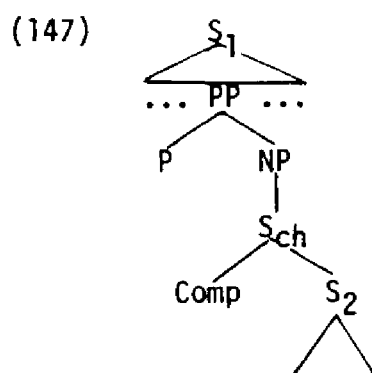
- (145) a. They planned (*on) for Dr. Smith to deliver the address.
 b. What they planned on was for Dr. Smith to deliver the address.
 c. The nation rejoiced (*at) that it had been spared the ravages of war.
 d. What the nation rejoiced at was that it had been spared the ravages of war.
 e. Ted was aware (*of) that he had forgotten his French.
 f. What Ted was aware of was that he had forgotten his French.
 g. We are getting ready (*for) to leave.
 h. What we are getting ready for is to leave.

In sentences where object complements may be analyzed as objects of prepositions, the preposition must be deleted when the complement sentence has a that or a for-to complementizer, as has been discussed by Rosenbaum (1967:7,83) and R. Lakoff (1968:46-47), and as is illustrated in (145a,c,e,g). This preposition must be present if it immediately precedes a simple noun phrase, either a noncomplex NP object, or the NP subject of a complement sentence with the so-called POSS-ing complementizer.

- (146) a. They planned on Dr. Smith('s) delivering the address.

- b. The nation rejoiced at the victory.
- c. Ted was aware of the implications.
- d. Farmers will soon be getting ready for spring coming.

In pseudo-cleft sentences, however, such prepositions may (e.g., (145b)) or must (e.g., (145d,f,h)) appear in the fronted constituent, regardless of what kind of complementizer is present in the subordinate clause. Thus it must somehow be guaranteed that a sentence such as S_1 in (147) not be consecutively the input for P-DEL and PS-CLEFT.



It is assumed by (144) that PS-CLEFT can apply only on a cycle higher than S_1 and that S_1 represents part of the input to PS-CLEFT. Given these assumptions it is correct that P-DEL cannot be simply cyclic, but must be marked to apply in a set of rules that follows rules such as PS-CLEFT (assumed here to be cyclic).⁶¹ To properly evaluate this argument, then, we must see what evidence exists for such a higher-S analysis of pseudo-cleft sentences.

Virtually all generative analyses of the pseudo-cleft derive this construction from an underlying structure containing one or two subordinate S's, where either the non-pseudo-cleft counterpart of a pseudo-cleft sentence appears as a single embedded S, or where the

61. Bach 1969 gives arguments that a rule PS-CLEFT such as is assumed in (144) must be cyclic. In none of the discussions of PS-CLEFT that I am aware of is this rule assumed to be anything other than cyclic.

clefted part and the focused part appear (either separated or together) in the two constituent sentences. The most complete summary of facts about pseudo-cleft and various analyses of these that I know of appears in Grosu 1972:80-98 and 208-11;⁶² from this discussion I list several facts that must be accounted for by any adequate analysis of this sentence-type.⁶³

1. Selectional restrictions between the focus and the verb in pseudo-clefts are the same as between the focus and verb in their non-pseudo-cleft counterparts (p. 82). Grosu illustrates this with the following examples:

- (148) a. John broke a gláss.
- b. What John broke was a glass.
- c. *John broke a bóok.
- d. *What John broke was a book.

A fact such as this indicates that a pseudo-cleft must be derived from an underlying structure that includes its non-pseudo-cleft counterpart.

2. Generally it is the case that "certain elements appearing in position[s] of neutralization, such as ever, any, and reflexive pronouns, are grammatical only if commanded by the appropriate neutralizing element" (p. 82). This restriction is observed by non-clefted sentences and by some pseudo-clefts. The set of pseudo-clefts not observing this restriction, however, is exactly the set of

62. A recent article in Language (Grosu 1973) repeats most of the discussion of pseudo-clefts found in Grosu 1972.

63. After this study was completed, Roger Higgins' dissertation ("The Pseudo-Cleft Construction in English," M.I.T., 1973) was brought to my attention. This work argues that pseudo-clefts are generated in the base in a form essentially identical to their surface form, that there is no specific rule PS-CLEFT. I have not had a chance yet to examine this carefully, but it obviously bears on the discussion below and strikes me at first glance as deserving a most careful study.

pseudo-clefts where the corresponding non-pseudo-clefts do conform to this restriction. Thus compare the examples in (149); the element that triggers what Grosu calls a neutralization is circled, and the neutralized element is underlined.

- (149) a. Jill couldn't believe [that Jack would ever finish school].
 b. [[What Jill couldn't believe] was [that Jack would ever missile damaged].
 c. [that the missile] damaged itself.
 d. [[What the missile damaged] was itself].
 e. *Jill ever believed [that Jack couldn't finish school].
 f. *[[What Jill ever believed] was [that Jack couldn't finish school]].
 g. *The fact [that Alice shaved Alex] bothered himself.
 h. *(The one) who the fact [that Alice shaved Alex] bothered was himself.
 i. *[What bothered himself] was the fact [that Alice shaved Alex].

In each case, the pseudo-cleft has a 'neutralized' element in a position not commanded by the appropriate 'neutralizer'. It is acceptable only if the appropriate command (and, for reflexives, clause mate) relation holds in the non-pseudo-cleft counterpart. This is most readily explained by deriving both sentence-types from the same S in the underlying structure.

3. Semantically, the focus of the pseudo-cleft construction (syntactically the predicate) asserts something with respect to a certain presupposed content (syntactically, the relative clause-like subject). In semantic representation the focus must be appropriate to the presupposition (p. 87). Thus, for example, if 'John ate something'

is presupposed, then the asserted object of this eating must be [+object, +edible, ...].

4. The two parts of the pseudo-cleft construction behave like islands, the boundaries of which must not be violated by chopping rules (pp. 88-90). This can be exemplified by the sentences in (150) below.

- (150) a. Bob told Carl that what David liked to wash was the Ford.
 b. *Who did Bob tell Carl that what liked to wash was the Ford?
 c. *What did Bob tell Carl that what David liked to wash was?

5. The acceptability of pseudo-clefts is in inverse relation to the size and nature of the constituents intervening between the focus and the verb of which it is an argument (pp. 90-95). This is illustrated by the following examples. (A blank indicates the place of the focused constituent in the corresponding non-pseudo-cleft sentence.)

- (151) a. [What Howard thought that Mary had sold ___ to the man] was a blue vase.
 b. ?[What Howard thought that Mary had sold ___ to the man yesterday after 2 hours of fierce haggling] was a blue vase.
 c. ??[What Howard thought that Mary had sold ___ yesterday to the man who said he planned to run for governor next election after 2 hours of haggling] was a blue vase.

6. Various sentences other than those where the clefted part begins simply with the unspecified form what (meaning, roughly, 'the thing which') are also to be considered pseudo-clefts, this because of the fact that they display the preceding five properties (pp. 85-86). These include sentences such as those in (152).

- (152) a. The one who has all the money is Al.
 b. The person who has all the money is Al.
 c. The man who has all the money is Al.

d. The thing that Nancy ate was an apple.

e. The fruit that Nancy ate was an apple.

7. A final fact to be mentioned here about pseudo-clefts is that various modals and/or negatives may occur with the copula (this has been noted in Stockwell et al. 1968:828).

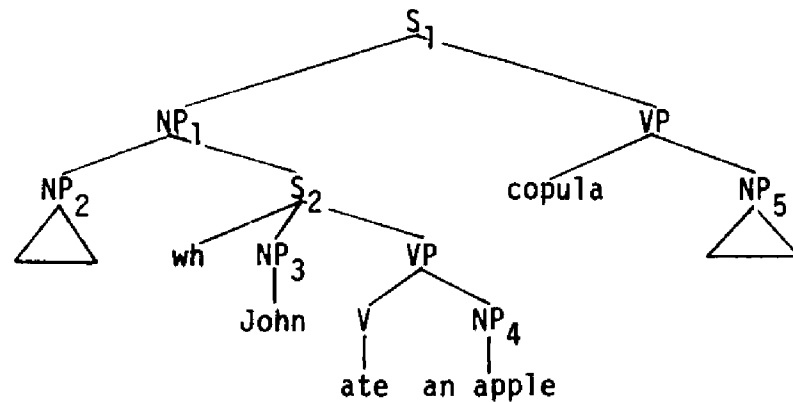
(153) a. What the baby wants is spinach.

b. What the baby wants may be spinach.

c. What the baby wants could (only, hardly, not really) be spinach.

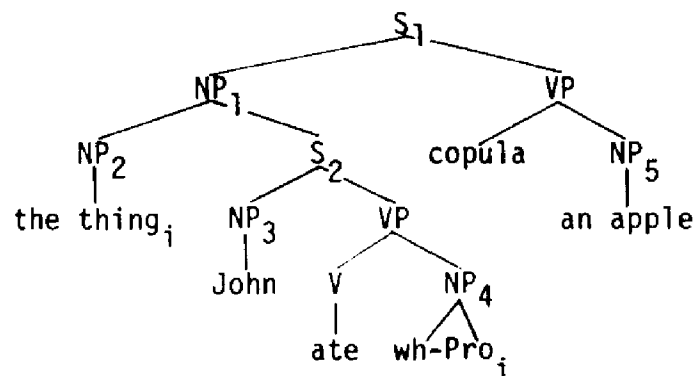
While other facts beyond these seven could have been noted here (e.g., the identity of elements that can be focused by PS-CLEFT), these are sufficient for evaluating various analyses of this construction. We first briefly outline Grosu's treatment of pseudo-clefts, and show how in his system the preceding facts are accounted for. For Grosu, a pseudo-cleft sentence arises from an underlying predicate nominal construction, with the non-pseudo-cleft counterpart of the pseudo-cleft embedded in the subject as a relative clause. The head of the relative is an empty node, as is the predicate NP. The part of the meaning of the sentence that is presupposed is explicitly indicated, and serves as the basis for stress placement in the surface string. An underlying tree is shown in (154), along with the steps (not crucially ordered) in deriving the pseudo-cleft.

(154) a.



presupposition: John ate something

- b. the empty head NP_2 is filled (presumably with the thing, coreferential with the element to be focused; Grosu does not discuss the process of filling, although it could be related to the presupposition);
- c. wh is placed on the focus (i.e., the constituent in S_2 that has no identical counterpart in the presupposition);
- d. the rule Focus Placement (FOCUS-PL) copies NP_4 onto NP_5 , leaving behind a pro-form. The structure at this point is:



- e. Relativization attracts wh-Pro to the head of S_2 ;
- f. the thing which optionally becomes what, deriving the string: What John ate was an apple.

Grosu admits that allowing underlying empty nodes, as in (154a), is somewhat undesirable, although he finds no better way to account for the

facts (and does suggest (p. 96) a way of constraining their use). Facts number 1 and 2 above are accounted for by (154) in that the underlying structure of pseudo-clefts includes their non-pseudo-cleft counterparts. The third fact is not so clearly dealt with by the analysis of (154), for the empty nodes cannot contribute to the semantic interpretation. The focus presumably may be determined from comparing the relative clause and the presupposition, however; and from the fact that the focus is a constituent of the VP the necessary compatibility between it and the verb can be guaranteed.

The fourth fact about pseudo-clefts mentioned above is guaranteed in Grosu's system by both parts of this construction arising from a complex NP structure,⁶⁴ and from Ross's Complex NP Constraint (CNPC; this is stated in (48) above) in its formulation as a constraint on derivations. In (154a), NP₄ may move out of S₂ by FOCUS-PL, insofar as this is a copying and not a chopping rule (see Ross 1968:208), but neither NP₄ nor any other element of S₂ may be chopped out of this S.

Fact number 5 is explained naturally by pseudo-clefts being formed by a rule moving a constituent rightward over a variable. Grosu shows that, with respect to rightward movement rules, Ross's bounding convention is too strong, and that it must be replaced by a scalar statement relating acceptability of such rightward movement rules to the kind and number of constituents crossed. Grosu's revision in turn is explained in terms of the unacceptability that results as constituents are broken up and internested. The facts in 5 above, then, have a natural explanation under Grosu's treatment since the focus at one point forms a (continuous) constituent with other elements of the VP, and in the course

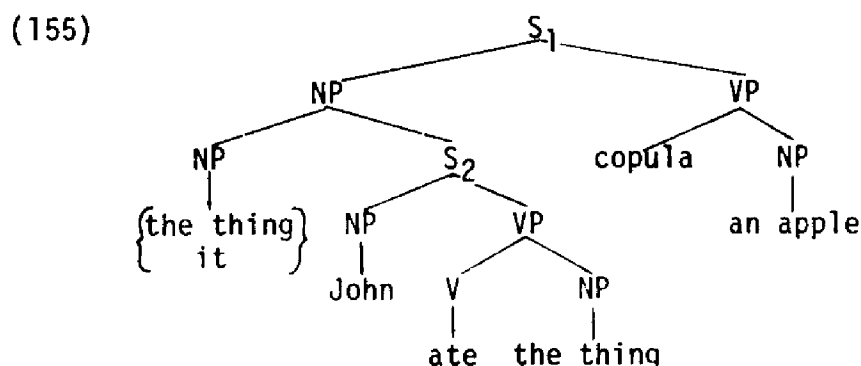
64. At least NP₁ is a complex NP (i.e., has an S immediate constituent which has a sister, lexical (filled) head noun) by the time any of the rules apply that must operate wholly within islands.

of the derivation is moved rightward over a variable. This explanation is not possible in analyses where the relevant verb and the focus do not form, at some stage, a continuous component.

The last two facts mentioned here also are explained naturally by (154), by the relative clause structure of the subject, and by this relative clause being embedded in an underlying copular construction.

Competing analyses of pseudo-clefts that I am aware of are not able to handle all of these facts, and thus do not seem like good choices for building an argument either for or against the noncyclicity argument (144) being evaluated here. I sketch here four recent alternative proposals.⁶⁵

1. Postal 1971:chap. 19, Akmajian 1970. These works suggest an underlying source for pseudo-clefts that closely resembles their surface form. Such an underlying structure is shown in (155), where Postal would postulate a lexical head coreferential with the object in S_2 , and Akmajian would have the dummy it for a head.



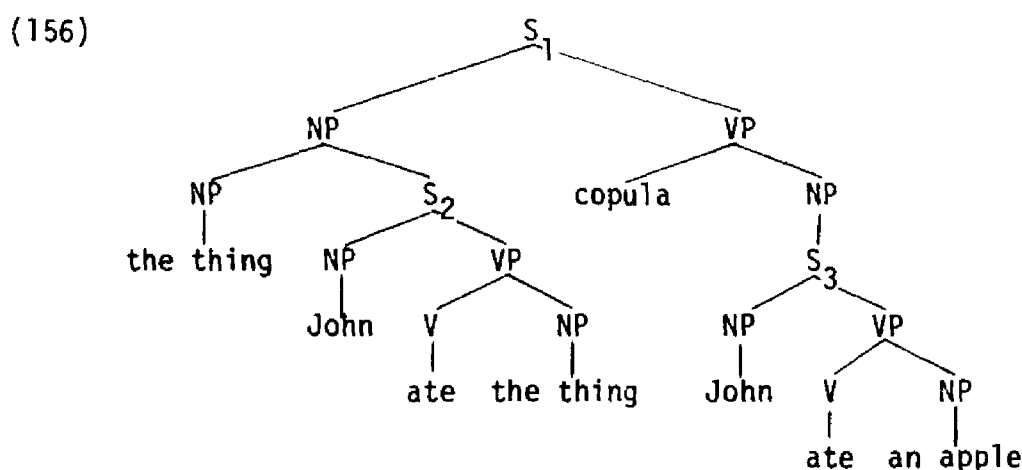
To (155) familiar rules would apply deriving What John ate was an apple.

While (155) is semantically accurate in relating the focus and the presupposed part of S_2 and allows for the necessary development of the

65. For ease of comparison, the sample underlying trees illustrating these various treatments have been regularized as much as possible.

copula to include modals, etc., and while other kinds of pseudo-clefts may be derived from this basic structure, this treatment is inadequate in not allowing explanation of the syntactic and selectional restrictions noted above (facts 1, 2, 4, and 5).⁶⁶

2. Ross 1972a:88-90. In Ross's treatment the two parts of the pseudo-cleft arise from two different underlying S's. The deep tree corresponding to (155) would be, for Ross, as in (156).



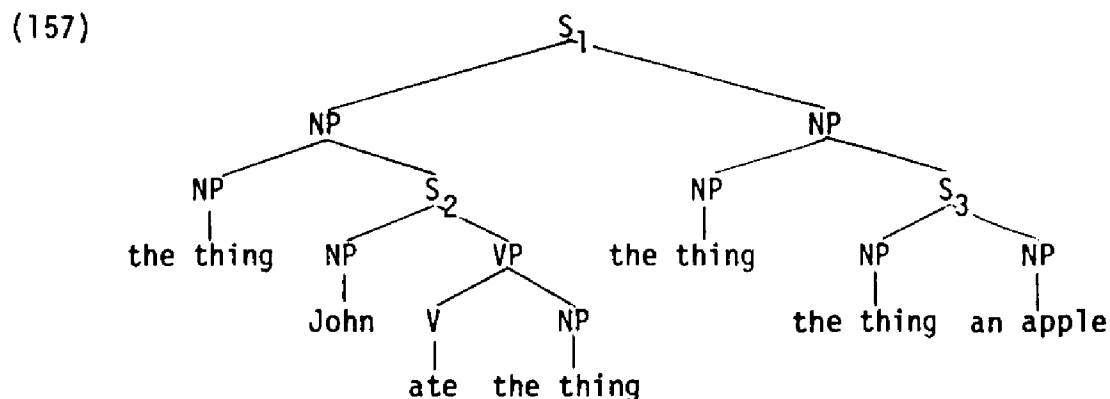
When $S_2 = S_3$ except for a single NP, then all of S_3 but the differing NP is deleted, and, after REL applies in S_2 , the sentence is generated.

This account is in some ways superior to Postal's and Akmajian's, and in other respects is inadequate. Deriving pseudo-clefts from a structure such as (156) does allow explanation of verb-focus selectional restrictions, and of the position of neutralized elements in surface structure. It is inadequate in that it offers no plausible characterization of the meaning of the sentence. As Grosu (p. 87) has commented, such an underlying structure presents the proposition 'John ate an apple'

66. The island nature of pseudo-clefts derived from (155) is partially explained in that the material that will appear first in the sentence is in a complex NP in underlying structure and thus protected from movement by the CNPC. However, no such explanation seems to exist for the impossibility of movement from the predicate.

as what it was that John ate, instead of the appropriate object 'an apple'. Further, this treatment, like that represented by (155), affords no explanation of S_3 as being a syntactic island; nor are the facts of point 5 on p. 144 above taken into account here.

3. Harries 1972. This Minnesota dissertation discusses cleft sentences in both English and German, and argues that the facts⁶⁷ are best handled in terms of an underlying (copula-less) structure with two relative clauses, from which surface pseudo-clefts and indeed "all contrastively stressed sentences as well as all questions and their answers" (p. 2) - and perhaps all statements whatsoever (p. 198) - are derived by a great variety of rules. Our example under Harries' analysis would have the underlying structure (157).



Now relativization (movement and deletion) rules must apply, as well as copula insertion.

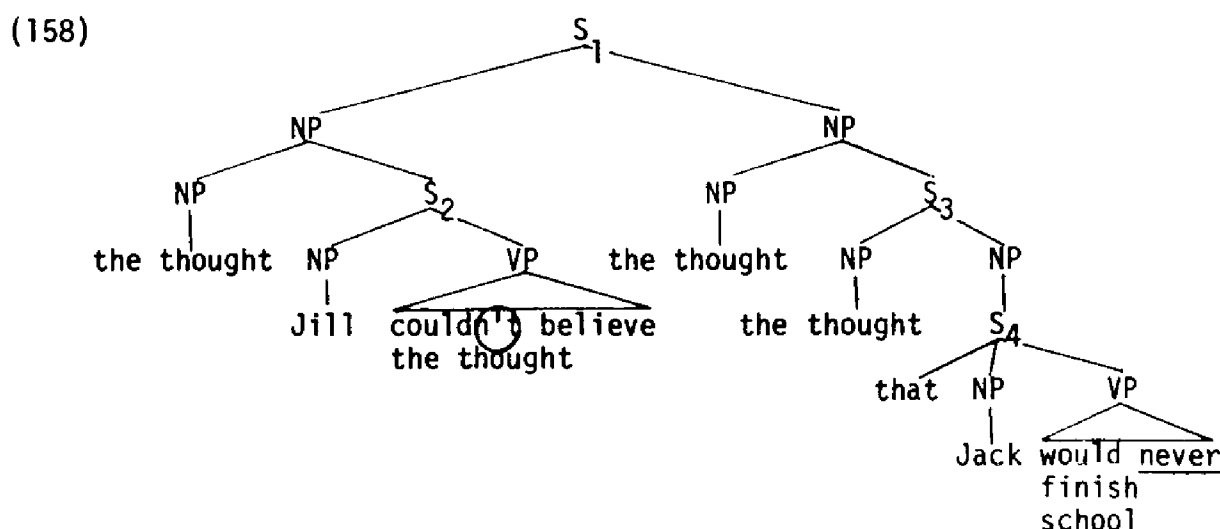
This proposal is adequate insofar as it presents the correct semantic relation between the pseudo-cleft subject and predicate. Further, it explains the island-like nature of both parts of pseudo-cleft sentences, for here they both derive from complex NPs. However, I see no explanation

67. In Harries 1972 the assumption is generally made that processes described in and rules postulated for one language are relevant in the other language. This interchangeability is assumed, for example, in discussing the rule Reflexivization below and in footnote 68.

of fact 5 above regarding the apparent rightward movement of the focused element, and I am not certain how the different possibilities of modals appearing with the copula would be handled in her system.

It appears that selectional restrictions may be handled in a general way (cf. her pp. 29-38): a well-formedness condition ensures that the head nouns appropriately agree. Agreement between the head and the relative NP in S_2 and S_3 is then governed by the same device necessary for ensuring that relative clauses must in fact have an NP coreferential with the head NP.

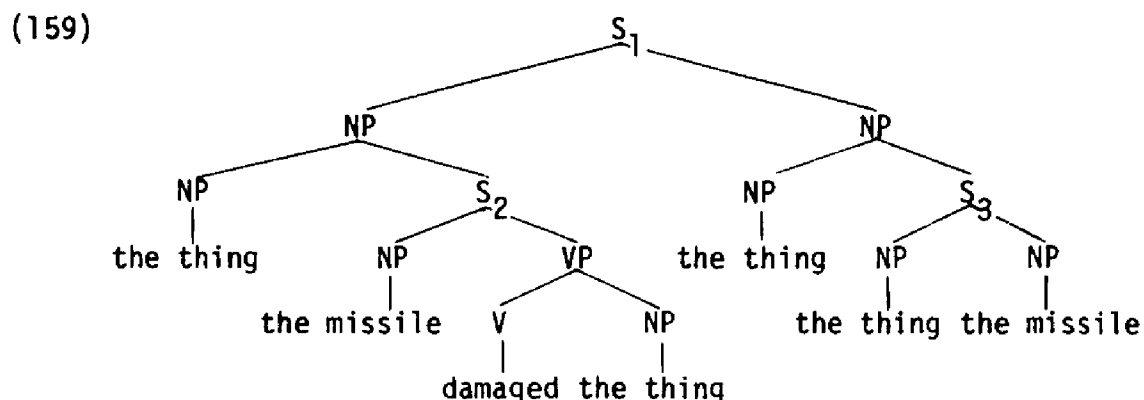
It is not so evident that the position of neutralizing and neutralized elements could be explained by a deep structure such as (157). Sentence (149b) would apparently have to originate in an underlying structure such as (158).



Some new rule of Indefinite Incorporation would then be necessary to change the never in S_4 to ever; the regular rule would be blocked by the affecting element (circled in (158)) being in a complex NP and thus prevented from triggering the change outside of its island domain.

Harries discusses (pp. 38-41) the problem of deriving reflexives in pseudo-clefts under her analysis, a problem in that the NP to be

reflexivized could not be a clause mate to the antecedent NP. Sentence (149d), for example, would arise from (159).



At no point in the derivation would the two occurrences of the missile be clause mates, and thus the rule of Reflexivization (REFL), normally thought to be restricted to applying only when the relevant NPs command each other, could never apply. Harries does mention two sentences which, she claims, show that REFL must in fact be allowed in some cases to cross sentence boundaries, but the examples do not seem to show convincingly the need for so amending REFL, nor do they represent the simple kind of reflexive sentence illustrated in (159) and (149d).⁶⁸

68. The two arguments in Harries 1972 for revising REFL so that it (at least sometimes) applies to NPs that are not clause mates are summarized below. In each case it appears that relevant facts have been ignored.

a. Harries considers sentence (i) and certain facts about the occurrence of the morpheme selbst 'self'.

(i) Derjenige, den John im Spiegel sah, war er selbst.

'The one who John saw in the mirror was he himself'.

In (i), John and er are coreferential only if selbst is present; this corresponds to the English version requiring himself for coreferentiality. What is not mentioned is that the presence of the reflexive (at least in English; I am not familiar with the relevant facts of German here) is necessary also for grammaticality. Harries points out two uses for selbst: (1) it may optionally appear with NPs as an emphasis particle, apparently much like the English emphatic reflexive; (2) it cooccurs with and adds emphasis to reflexives, appearing optionally when the antecedent of the reflexive is the subject in its clause, and obligatorily when the antecedent is not the subject. Given these facts regarding selbst, and given the interpretation of (i), Harries argues

4. Lundy 1973. The fourth alternative analysis summarized here is, like the other three already looked at, adequate in certain respects and inadequate in others, again in terms of the seven checkpoints

(continues fn. 68) that the selbst in (i) is not simply a nominal emphaser, but in fact is here a reflexive emphaser. This would mean that the domain of REFL would, for such sentences, have to be extended beyond the simplex sentence. The problem with this argument may be more easily seen by summarizing the steps involved.

- (ii) 1. Selbst occurs with (a) any NP, and (b) with reflexives, optionally if the antecedent is the subject of its clause, obligatorily if it is not the subject.
 2. Selbst appears in (i).
 3. In (i), the antecedent of the pronoun is not the subject of its clause.
 4. This is consistent with selbst occurring obligatorily with reflexives when the antecedent is not the subject.
 5. Therefore selbst occurs with a reflexive in (i).
 6. Therefore selbst in (i) is not simply an NP modifier.
 7. Therefore REFL must be modified to allow this (nonemphatic) reflexive to be generated; specifically, it must be allowed to cross sentence boundaries.

Argument (ii) fails because of the invalid conclusion in step 5. In fact selbst does not cooccur with a reflexive in (i), but with the (nonreflexive) pronominal form er. Given the two possibilities in step 1, the fact of step 4 is irrelevant in deciding the function of selbst here.

It is true that the absence of selbst and himself in (i) destroys coreferentiality. It is further true that selbst is required for grammaticality, for the pronouns er and he cannot stand alone in the focus position in (i), this being incompatible with their nature as elements capable only of representing presupposed information (viz., the identity of their coreferents), and not of making an assertion. The presence of selbst in (i) emphasizes and strengthens the semantic content of the pronoun, and thus allows it to appear in focused position. Selbst here thus only accidentally bears upon the reflexive meaning of (i).

b. The second argument concerns the sentence in (iii):

(iii) Hans sah den Reiter auf sich zukommen.

'Hans saw the rider come towards himself'.

Harries finds that the reflexive here may be coreferential with Hans. If this is so, then REFL must be able to apply more than just in simplex S's. It could not so apply indiscriminately, however, for (iv) is not acceptable.

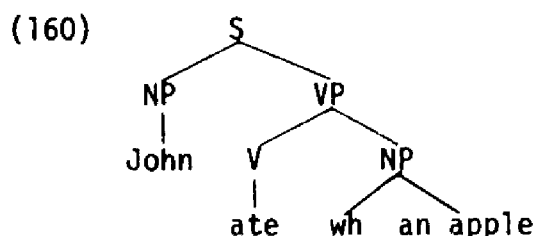
(iv) *Hans sah den Schaffner sich etwas zurufen.

*'Hans saw the conductor calling out to himself'.

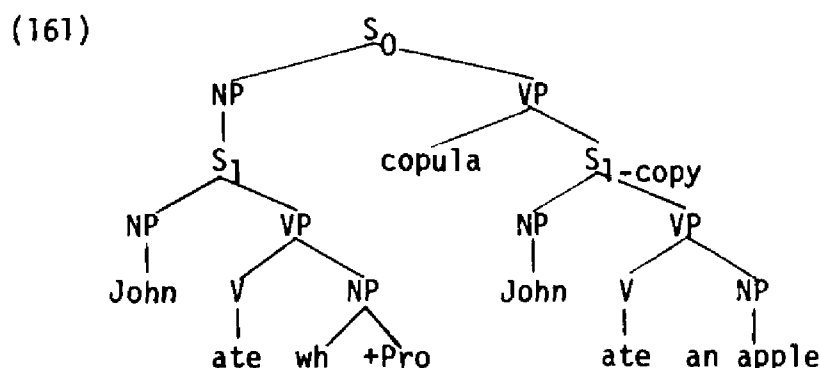
No characterization of the difference in grammaticality between (iii) and (iv) is attempted.

The matter would be clarified, I believe, by distinguishing the emphatic reflexives from those noncontrastively stressed. Speaking for the English example only, Hans and the reflexive can be coreferential only if the heaviest sentence accent falls on the reflexive. When

listed above. Lundy proposes a simplex S as the source of pseudo-clefts, with the element to appear in focused position being identified by a sister wh node. John ate an apple, for example, would originate from (160).



A copying rule now builds essentially the pseudo-cleft surface structure. (161) results from the application of this rule to (160).



A deletion rule very similar to that proposed in Ross 1972a applies to delete all but an apple of S₁-copy. The pronominalized wh-NP of S₁ is then fronted by a wh-fronting rule, resulting in the desired surface string.

(continues fn. 68) himself is not given heavy stress, then I take it that the sentence refers to some dream situation, where Hans imagines a horseman approaching a mirror. In (iv), a heavily stressed himself may perhaps refer back to Hans, although this is for some reason more difficult than the parallel reading in (iii). A nonstressed reflexive in (iv) yields a nonsensical sentence, for calling out is apparently an irreflexive activity.

From these two arguments, then, I see no basis, even for the two sentence-types considered, for supposing that the structural description of REFL needs to be broadened.

In such a treatment, verb-focus selectional restrictions and the occurrence of neutralized elements are adequately explained as are the facts that relate to the apparent rightward movement of the focused element. Further, interpreting the wh node as a marker of focus, the basic semantic reading of pseudo-clefts is described. Other facts about this construction are apparently less adequately handled, however. It is not clear how the possibilities of various auxiliary elements in the matrix S of pseudo-clefts may be guaranteed, nor is it obvious how other pseudo-cleft-like sentences may be generated by these same mechanisms. And, as this analysis stands, the island nature of the pseudo-cleft is not naturally accounted for.

The strengths and weaknesses of these various proposals, the four most recent analyses of pseudo-clefts that I am aware of, have been charted in (162) below. A 'yes' indicates that a given analysis affords a natural explanation of the relevant fact. In some cases it has not been possible to determine absolutely how a given treatment would handle certain facts of this construction; these are marked below with a question.

(162)	Postal 1971 Akmajian 1970	Ross 1972a	Harries 1972	Lundy 1973
1. V-focus selectional restrictions	no	yes	yes	yes
2. Distribution of neutralized elements	no	yes	no	yes
3. Basic semantic reading	yes	no	yes	yes
4. Island nature	no	no	yes	no?
5. Rightward movement facts	no	no	no	yes

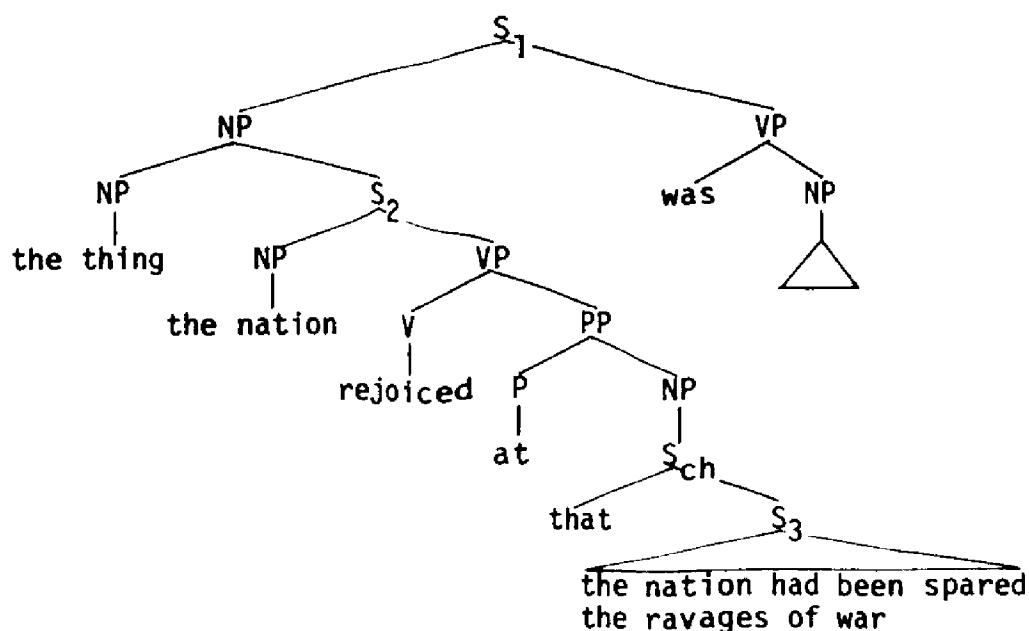
	Postal 1971 Akmajian 1970	Ross 1972a	Harries 1972	Lundy 1973
6. Other kinds of ps.- cleft constructions	yes	no?	yes	no
7. Auxiliary elements	yes	yes	no?	no

Compared to these analyses, then, Grosu's treatment as illustrated above in (154) seems clearly preferable; it handles all these facts naturally, with the single possible complication being the deep structure empty nodes.

Getting back now, finally, to the noncyclicity argument at hand, this is all to say that the rule PS-CLEFT apparently must indeed apply on an S higher than the S which would otherwise form the basis of the corresponding non-pseudo-cleft sentence. This means that the rule deleting prepositions before complements cannot apply cyclically, for if it did that would necessitate postulating an ad hoc preposition insertion rule to apply after PS-CLEFT to insert just those prepositions previously deleted by P-DEL. This may be illustrated by going through the derivation of (145d) with a remote structure and rules such as Grosu postulates.⁶⁹

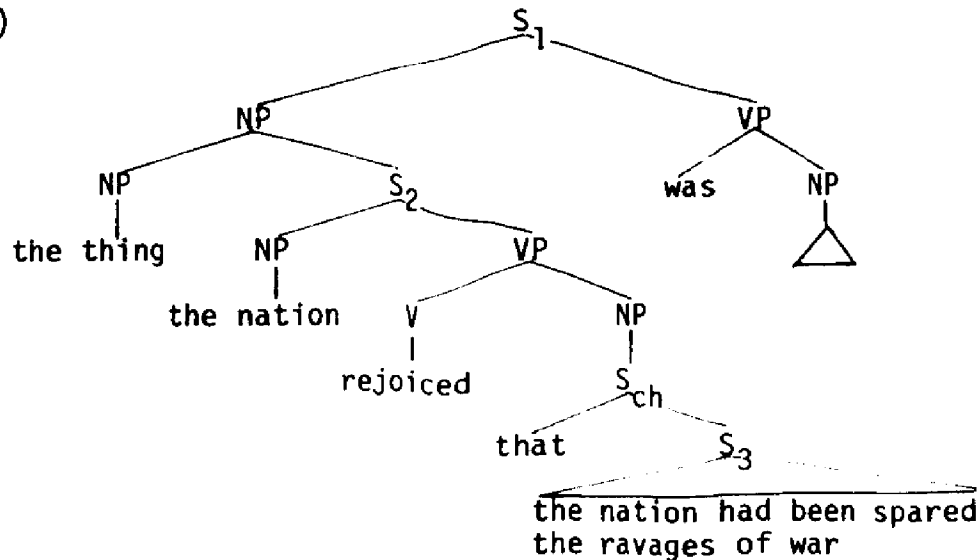
69. The trees and rules have been simplified here where this would not obscure the points at issue.

(163)



On the S_2 cycle, the complementizer that has been inserted into the string. On this same cycle, a cyclic P-DEL would have to apply, for the preposition immediately precedes that. This results in (164).

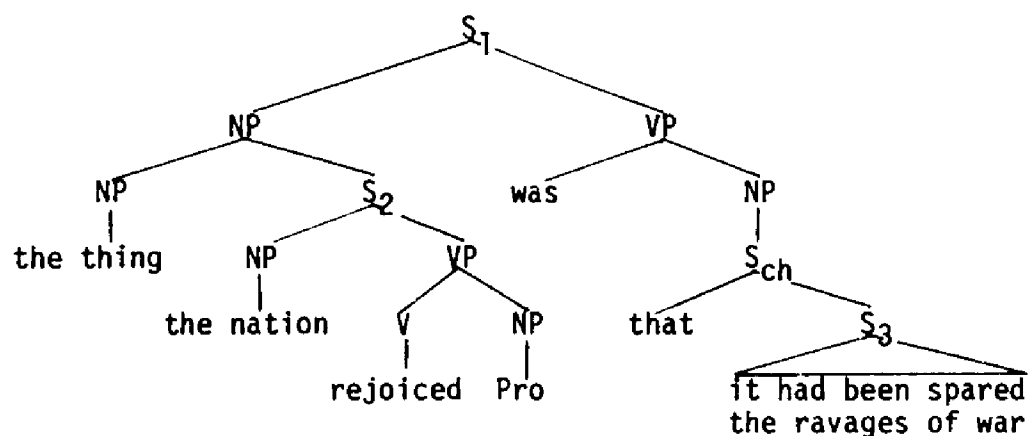
(164)



If S_2 were the highest S , the grammatical string (145c) would (after pronominalization) be generated.

Now on S_1 , PS-CLEFT (Grosu's "Focus Placement") applies to the appropriate element, leaving behind a pro-form. Structure (165) is derived.

(165)



After REL then applies on S_1 , and the unspecified head NP is deleted, the ungrammatical (166) results.

(166) *What the nation rejoiced was that it had been spared
the ravages of war.

Now at would somehow have to be inserted, something which there seems to be no motivated way of accomplishing.

In this case, then, the evidence seems to favor P-DEL being restricted to applying only after PS-CLEFT, assuming that both of these are to be stated in their intuitively most general formulation. As such, they both cannot be cyclic, but must be distinguished by their being assigned to two different sets of rules. If it should turn out that an analysis of pseudo-cleft similar to Postal's and Akmajian's or to Harries' is found to have additional support, and Grosu's is shown to be relatively more deficient, then argument (144) would be irrelevant, for in such systems the relative order of P-DEL and PS-CLEFT is not significant. Given presently known facts regarding pseudo-clefts, however, Grosu's treatment is superior; argument (144) to that extent is solid in concluding that P-DEL must be postcyclic.

II.A.7. Coordination Reductions.

Other kinds of rules involved in postcyclicity arguments are those that reduce conjuncts. I am aware of two arguments in the literature dealing with such rules; both of these appear in Koutsoudas 1971, one regarding Conjunction Reduction (CONJ-RED) and the other Gapping (GAP). In this paper Koutsoudas is concerned with showing that Ross's (1968) CONJ-RED and Ross's (1970a) GAP must be collapsed into a single rule, one Koutsoudas calls Coordinate-Deletion (COOR-DEL). He argues, as in (167), that CONJ-RED and GAP require mutual reduction:

- (167) 1. "(1) on factual grounds, because otherwise the fact that objects and verbs are either both reducible or else both nonreducible in any given language cannot be accounted for; and (2) on formal grounds, because they are rules that perform exactly the same operations and meet exactly the same conditions, i.e.
2. both delete identical elements,
 3. both of their deletions obey the same directionality relation,
 4. both are last-cyclic (or post-cyclic if the distinction between last- and post-cyclic rules is maintained in a grammar),
 5. both occur at approximately the same place among the sequence of syntactic rules in a grammar, and finally,
 6. because there is no rule which must be ordered so as to apply after one type of reduction but before the other"
- (p. 338).

For the first reason in (167), Koutsoudas reports facts from 32 languages showing that a language reduces either both verbs and objects,

or neither verbs nor objects. This fact would have no natural explanation, he argues, if the rule that reduced verbs (i.e., GAP) were different from the one that deleted identical objects (i.e., CONJ-RED). As it is, the single rule COOR-DEL may be postulated to reduce both kinds of constituents; in languages which do not allow reduction of verbs or objects, then, COOR-DEL will have a condition (the Immediate Dominance Principle) restricting its application to constituents immediately dominated by conjuncts.⁷⁰ With respect to the other reasons listed in (167), Koutsoudas argues that GAP and CONJ-RED are of the same rule-type and are not demonstrably separated in ordering. Their both being restricted by the same Directionality Constraint is further evidence that they are really two expressions of the same rule.

One of the requirements for collapsing these rules (or any set of rules) is that no part of the formulation of one be contradictory to that of the other. In the case of CONJ-RED and GAP, however, these differ in Ross's formulation in that CONJ-RED regroups constituents while GAP, applying only to identical verbs in conjuncts, does not. Koutsoudas therefore attempts to show that CONJ-RED in fact need not be required to regroup constituents after it has deleted an element of a conjunct. In the course of discussing regrouping and CONJ-RED, an argument is given that CONJ-RED must be postcyclic (pp. 355-67, especially p. 367). But if CONJ-RED must be postcyclic, then, if it is to be collapsed with GAP, it must be shown that GAP is also postcyclic. Such an argument is constructed (pp. 373-80, especially

70. Note that some further principle would be necessary to explain the facts of Mam, listed in Table II on p. 342. Assuming that the word order of this language is indeed VSO, it is not clear how verbs could be kept from reducing, since presumably they would be immediate constituents of conjuncts. The same problem would exist in explaining any other VSO or OSV language which did not allow verbs or objects to be reduced.

pp. 376-77), based upon the possibilities of gapping in different languages. We consider below each of these noncyclicity arguments in turn.

a. Conjunction Reduction. The argument for CONJ-RED being post-cyclic is tied in with a discussion of Ross's (1968:89) Coordinate Structure Constraint (CSC; cited in (168) below), and the use of this Constraint in governing movement transformations which may have a chance to apply to a structure after CONJ-RED has applied.

- (168) In a coordinate structure, no conjunct may be moved,
 nor may any element contained in a conjunct be moved
 out of that conjunct.

As Koutsoudas (1971:355-56) points out, one function of this CSC and of CONJ-RED being specified to regroup constituents (i.e., to create a coordinate structure for nonidentical corresponding constituents of the original conjunct) is that movement rules will be blocked from applying to structures both before and after CONJ-RED applies.

Koutsoudas shows, however, that the movement rules PASS, EXTRA, and REL may all apply before CONJ-RED with no loss of generality of statement and with all and only the necessary grammatical strings being generated, and suggests (p. 365) that the same is true of all other movement rules. This leaves the two possibilities of (169) regarding the relative order of application in derivations of CONJ-RED and movement rules.

- (169) 1. CONJ-RED applies sometimes after and sometimes before
 movement rules.

2. CONJ-RED applies only after all movement rules.

The two possibilities here cannot be evaluated empirically, so

long as the CSC exists as a metatheoretical constraint on grammars. In the case of (169.1), where CONJ-RED applies before a movement rule, then (assuming a regrouping), the CSC will block all inappropriate movements out of the conjunct. Where under case (169.1) CONJ-RED applies after a movement rule, then regrouping would be irrelevant here with respect to the CSC. The latter is true also under (169.2). Where the order of application in (169.2) is guaranteed, however, then "the Coordinate Structure Constraint is clearly superfluous with respect to reduced coordinations, for everything it is intended to account for in this regard can be accounted for simply by ordering Conjunction Reduction to apply only after the application of all movement rules" (pp. 366-67). But if this fixed order can be established, and if the CSC is not otherwise necessary in the grammar, then "the criterion of simplicity" (p. 367) would lead to such an ordering and to the concomitant elimination of the CSC.⁷¹

Koutsoudas then shows that this simplification of the grammar (i.e., the removal of the CSC, occasioned by ordering CONJ-RED after all movement rules) cannot be achieved merely by utilizing extrinsic ordering constraints. This leads to a conclusion of postcyclicity for CONJ-RED. The argument as a whole could be outlined as in (170).

(170) 1. CONJ-RED cannot be precyclic, last-cyclic, or anywhere.

(The arguments leading to this triple conclusion will not be reviewed here, but in each case the facts involved may be handled by CONJ-RED being cyclic.)

2. CONJ-RED must be made to apply after It Replacement (RAIS)

71. This assumes that the relative complexity of marking a rule to be noncyclic is less than the complexity of having a general principle such as the CSC in the metatheory. This assumption is not crucial in what follows, although it is not clear what this particular ranking could be said to follow from.

and PASS. Otherwise the CSC would have to be reinstated in the theory. With this ordering, however, it may be eliminated.

3. If CONJ-RED were cyclic, extrinsic ordering constraints could not be used to guarantee the desired order of application, for in some cases CONJ-RED would apply on a cycle lower than one on which RAIS and PASS apply.
4. If CONJ-RED were postcyclic, the desired order could be guaranteed by assigning these rules the following features (where it is assumed that RAIS is to be ordered before PASS):

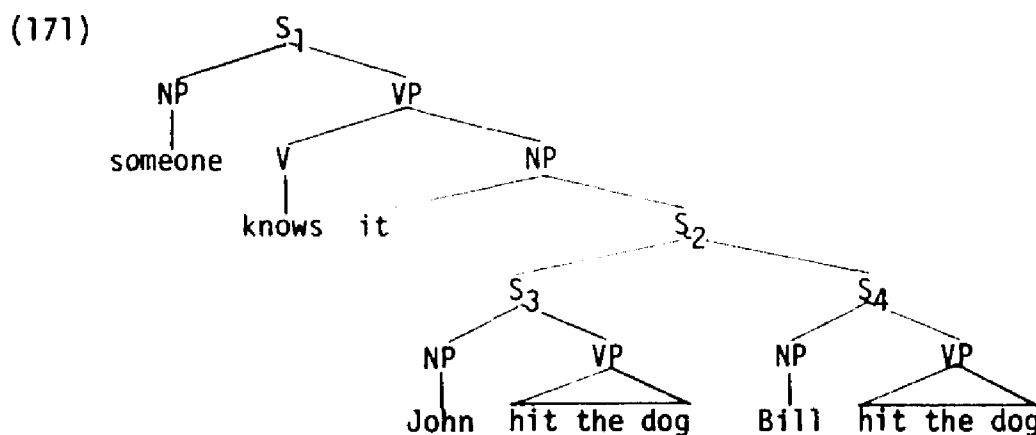
C, 1. RAIS

C, 2. PASS

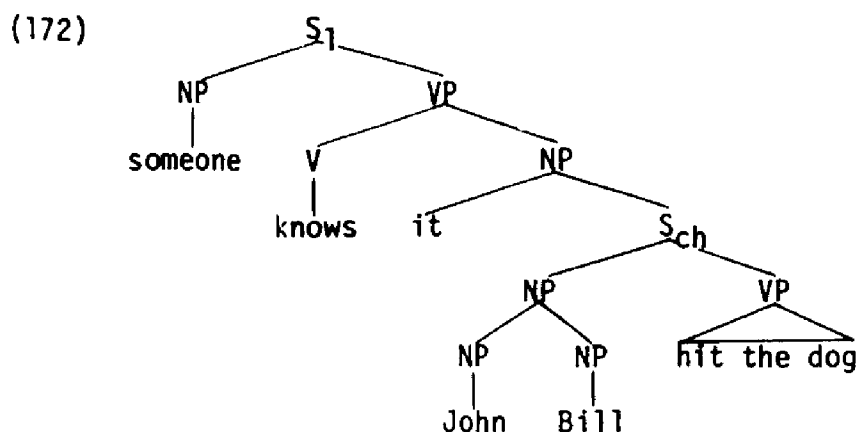
Po. CONJ-RED

5. Therefore CONJ-RED must be postcyclic.

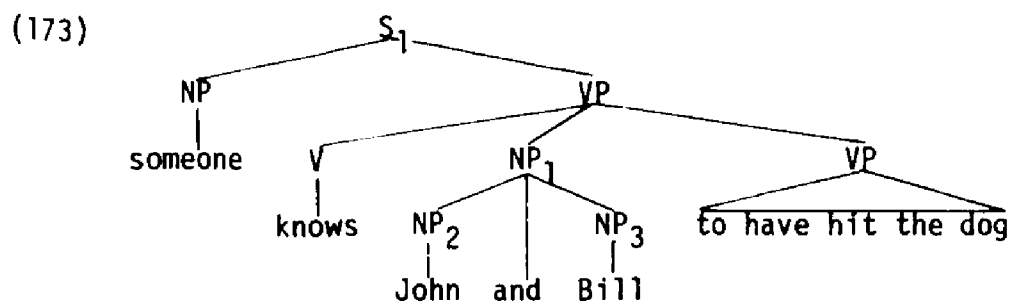
The fact referred to in step 3 is illustrated by Koutsoudas with the following example.



With the three rules under consideration all being cyclic, CONJ-RED would apply on S_2 before RAIS and PASS would have a chance to apply on S_1 . Structure (172) results from the application of CONJ-RED on this lower S.



After RAIS (and It Deletion) has applied on S_1 , the intermediate structure is as in (173).



Now PASS could apply to (173) in one of two ways. (Koutsoudas assumes no 'A-over-A' convention; see Koutsoudas 1968 for discussion.) If the rule analyzes the string so that it selects NP_1 as the object to be fronted, then after Agent Deletion applies, a good sentence (174a) results. If PASS selects NP_2 , then the ungrammatical (174b) would be generated.⁷²

(174) a. John and Bill are known to have hit the dog.

b. *John is known and Bill to have hit the dog.

72. In the derivation of (174b), Ross's Left Branch Condition would be relevant, blocking movement of the leftmost conjunct NP. Thus in this specific case there would be no basis for a postcyclicity argument regarding CONJ-RED. Presumably, parallel cases could be found involving the unacceptable movement of NP_3 for which no constraint has for independent reasons already been proposed, which would thus support the conclusion of (170).

If, on the other hand, CONJ-RED were postcyclic and thus could only apply after PASS and all other cyclic rules, only good sentences could be generated.

The conclusion to argument (170) does not seem valid, however. On the one hand, it is not clear that the assertion of step 2 is observationally correct regarding the relative order of application of CONJ-RED and movement rules, in particular, RAIS. The ordering of rules given in step 4 of the argument (with the addition of EXTRA) does guarantee the derivation of a good sentence, namely (175 = Koutsoudas' 79), shown here in its derivation from underlying string (175a = 171).

(175) a. Someone knows it [John hit the dog and Bill hit the dog].

↓↓ (C) PASS and Agent Deletion

b. It [John hit the dog and Bill hit the dog] is known.

↓↓ (C) EXTRA

c. It is known that [John hit the dog and Bill hit the dog].

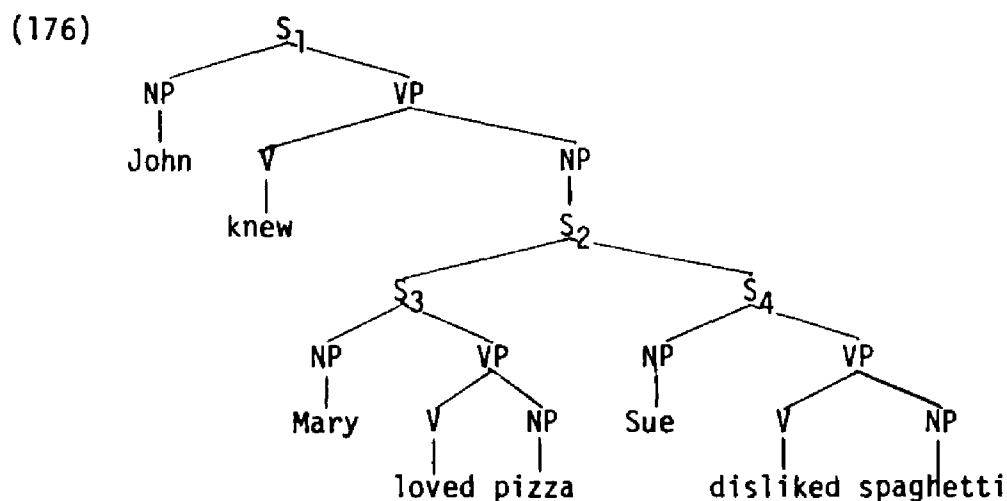
↓↓ (Po) CONJ-RED

d. It is known that John and Bill hit the dog.

What I cannot figure out is how to generate with such an ordering the equally good sentence (174a), one not mentioned by Koutsoudas. Where CONJ-RED applies only after RAIS, there seems to be no way to get the constituent John and Bill separated from its derived predicate.

On the other hand, it is not clear that the CSC may be dispensed with as easily as Koutsoudas suggests. Throughout his discussion, the suggestion that the CSC may be unnecessary is defended only in cases CONJ-RED may apply to a string. If underlying embedded coordinate S nodes are possible, as indeed the examples given presuppose, then in cases where this rule is not relevant (i.e., where no pairs of corresponding constituents in a coordinate structure are identical) there

must be some way to prevent inappropriate movement out of conjuncts. For example, in (176), the structural description of CONJ-RED will never be met, yet there must be something that will prevent the movement of NPs out of, say, S_3 , to which the examples of (177) attest.



(177) QUEST applied:

- a. *Who did John know loved pizza and Sue disliked spaghetti?
- b. *What did John know Mary loved and Sue disliked spaghetti?

TOPIC applied (no pause after loved):

- c. *Pizza John knew that Mary loved and Sue disliked spaghetti.
- d. *John knew that pizza Mary loved and Sue disliked spaghetti.

In Koutsoudas 1971 I see no way to block movement in such cases, and thus conclude that some kind of Coordinate Structure Constraint is required. Once such a constraint is back in the grammar, however, then it apparently could function in blocking sentences such as (174b). But then the original simplicity argument collapses, and there is thus no ground for restricting CONJ-RED so that it applies only after all movement rules. Given the problem mentioned above with generating (174a) when CONJ-RED applies only after RAIS and PASS, the evidence seems to favor the first alternative of (169), and to suggest that there is no

saving attached to eliminating the CSC. This means, simply, that there is no basis for an argument here that CONJ-RED must be postcyclic.⁷³

b. Gapping. The second postcyclicity argument in Koutsoudas 1971 concerns the rules GAP and Object Preposing (OBJ-PRE; this corresponds to Ross's (1970a) rule Scrambling). As mentioned above, this argument is given to show that GAP is of the same rule-type as CONJ-RED - i.e., both postcyclic - and that rule-type assignment thus represents no reason to keep these rules separate. Examination of the argument for the postcyclicity of CONJ-RED, however, revealed that this was not a convincing one. Before commenting on the significance of this with respect to the question of whether these two coordination reductions should be collapsed, let us first look at the argument for the postcyclicity of GAP and OBJ-PRE. This argument is a complex one, having at least the following eight steps.⁷⁴

- (178) 1. The rules GAP and OBJ-PRE must be able to apply in different orders in different derivations. Otherwise Ross's facts about the order of elements in verb-reduced conjunctions would not be explained.
2. These rules cannot both be cyclic (and unordered), for

73. Koutsoudas (1971:367) suggests that perhaps there does not need to be any underlying embedded coordination, in which case the CSC would be clearly irrelevant. In such a system CONJ-RED could have its structural description met only on the topmost S, and hence could be said to be intrinsically last-cyclic. See section II.B.2 below for a discussion of Tai's (1969) argument regarding the extrinsic noncyclicity of such a rule.

74. Any rule-type argument such as (178), where the conclusion is based on a rule not being able to be a member of a certain number of other rule-types, is weakened by the fact that there exists no general constraint on possible rule-types, as observed in footnote 22 in chapter I. Given this explanatory deficiency, there is no way to know a priori how many rule-types a rule must be shown to be incompatible with before making a positive conclusion regarding its rule-type.

then OBJ-PRE would always apply on a cycle lower than the one on which GAP applied. Certain facts which depend on OBJ-PRE applying after GAP would thus be unexplained.

3. GAP cannot be precyclic, and thus cannot be anywhere.
4. Therefore OBJ-PRE could not be precyclic either; if it were, it could never apply after GAP.
5. OBJ-PRE also cannot be anywhere, otherwise it could apply before and after GAP in a given derivation. But this order of application leads to impossible (unattested) sequences of elements.
6. GAP cannot be last-cyclic, for it must apply in embedded S's.
7. OBJ-PRE cannot be last-cyclic either, for it applies only in non-topmost S's.
8. Therefore, by elimination, GAP and OBJ-PRE must be marked with features indicating postcyclicity (but must be left unordered with respect to each other):

Po. GAP

Po. OBJ-PRE

The by now commonplace "gapping facts" may be briefly summarized as follows. Among the languages of the world only three of the four logically possible arrangements of unreduced (by GAP) conjuncts and order of elements within the unreduced conjunct have been reported. Considering structures with a subject, a verb, and an object, strings to which GAP has applied will manifest one of the first three forms of (179).

- (179) a. SVO + SO ... + SO
 b. SOV + SO ... + SO
 c. SO + SO ... + SOV
 d. *SO + SO ... + SVO

Further, only certain combinations of (179a,b,c) Ross found to exist. Specifically, Ross claimed that with respect to gapping possibilities, there are only four types of languages. These are illustrated in (180).

(180) Gapping possibilities realized (in terms of (179)):

- a. English - a only
 b. Japanese - c only
 c. Hindi - b,c only
 d. Russian - a,b,c
 e. * - b only; a,b only; a,c only

The problem is to explain the existence of the possible gapping patterns and combinations thereof, and to systematically prevent the impossible (nonrecorded) ones.

The explanation Ross (1970a) offers includes the following features:

- (181) a. SCRAM is a language-specific rule that optionally reorders certain elements within the clause.
 b. OBJ-PRE is a rule found in Hindi and other languages that obligatorily moves an object to the front of the VP.
 c. GAP is a universal rule, and is universally an anywhere rule. Specifically, it may apply before or after SCRAM.
 d. SCRAM must be restricted from applying both before and after GAP in the same derivation.

By (181d), the d pattern of gapped sentences (SO + SO ... + SVO) can never arise. The Russian pattern is due to an underlying SVO language having SCRAM. When an appropriate structure in such a language undergoes

GAP but not SCRAM, the a gapping pattern results; when SCRAM applies after GAP, then the b order is derived; the c arrangement comes from SCRAM applying before GAP. The two possibilities in a Hindi-type language stem from GAP applying either before or after OBJ-PRE. The unrecorded combinations of gapping patterns are explained by: *b - blocked by the directionality of GAP; *a,b and *a,c - blocked by GAP being able universally to apply before or after both SCRAM and OBJ-PRE.

Koutsoudas objects to this explanation on two grounds. In the first place, he points out that (181d) is an ad hoc restriction due only to SCRAM and OBJ-PRE not being collapsed. These two reordering rules differ, with respect to the facts of gapping, only in that OBJ-PRE must sometimes be obligatory and SCRAM optional. Since this difference is not itself sufficient to block collapsing the rules, and since doing so results in not requiring special applicational restriction (181d),⁷⁵ they must not be kept distinct. In the second place, Koutsoudas shows that GAP cannot be an anywhere rule. (See the discussion in section II.C.2 below.)

Given these two modifications of Ross's explanation, Koutsoudas shows that all the facts of (179) and (180) can be naturally handled by his GAP and OBJ-PRE, but only when these rules are both postcyclic and are left unordered with respect to each other. In Koutsoudas 1971, Ross's four language-types are described as in (182).

(182) a. English - no OBJ-PRE

SVO + SVO

↓ GAP

SVO + SO (179a)

75. When the rule is unidirectional only (unlike SCRAM), and applies to move only an object to the front of its verb phrase, there is then no way it can apply (nonvacuously) two times in a derivation.

b. Japanese - (vacuously) no OBJ-PRE

SOV + SOV
 \Downarrow GAP
 SO + SOV (179c)

c. Hindi - OBJ-PRE (obl.)⁷⁶

SV0 + SV0	SV0 + SV0
\Downarrow GAP	\Downarrow OBJ-PRE
SV0 + SO	SOV + SOV
\Downarrow OBJ-PRE	\Downarrow GAP
SOV + SO (179b)	SO + SOV (179c)

d. Russian - OBJ-PRE (opt.)

SV0 + SV0	SV0 + SV0	SV0 + SV0
\Downarrow GAP	\Downarrow GAP	\Downarrow OBJ-PRE
SV0 + SO (179a)	SV0 + SO	SOV + SOV
	\Downarrow OBJ-PRE	\Downarrow GAP
	SOV + SO (179b)	SO + SOV (179c)

Given that the languages under consideration are underlying either SV0 or SOV, and given that OBJ-PRE operates unidirectionally in rearranging items of the VP, then no other gapping pattern and no combination of gapping patterns other than these four is possible.

Assuming the adequacy of Koutsoudas' two-fold revision of Ross's explanation of the gapping facts, the conclusion of argument (178) seems unavoidable. The only way that these rules can be formulated as universal rules and allow generation of all the data is (a) if they are restricted to applying after at least some cyclic rules, (b) if they

76. In languages that have OBJ-PRE, GAP presumably applies only to strings in which both conjuncts have or have not undergone OBJ-PRE.

are unordered with respect to each other, and (c) if they are allowed to apply to an S wholly contained within some other cyclic node (i.e., if they are 'out of the cycle' in the sense of (12) in section I.B).

This argument for the postcyclicity of GAP, as indeed the major contention of Koutsoudas 1971 (viz., that GAP and CONJ-RED must be collapsed), is clearly dependent upon Ross's claim that GAP must be formulated as a bidirectional rule. Since Koutsoudas' article was written, however, facts have been reported from various languages that indicate that GAP cannot readily be formulated so that it combines both leftward and rightward deletion processes. From this it seems that the question of collapsing this with CONJ-RED, which apparently does require at least some bidirectionality, cannot seriously be considered. What this means for the argument for GAP (and OBJ-PRE) being postcyclic will be discussed shortly, but first I summarize the reasons that GAP cannot be a simple mirror image rule.

The clearest evidence for the uncollapsibility of Forward Gapping (f-GAP) and Backward Gapping (b-GAP) is presented in Hankamer 1972:201-5 and Maling 1972:106-8. Hankamer discusses three ways in which these two processes differ.

1. Conditions of application are different for f-GAP and b-GAP.

- 1a. Maling points out two differences in the application of these rules in subordinate clauses of German. While f-GAP is restricted from applying to auxiliary verbs, b-GAP is not so constrained. Either gapping rule may apply to delete a main verb in an embedded clause, as her example (183a) illustrates, but only b-GAP may apply to delete an auxiliary, as in her (183b). (Here and below, when two identical verbs are in parentheses in a string that undergoes GAP, an asterisk outside a parenthesis indicates that the rule cannot be allowed to delete that

verb. No asterisks in such a string means that either f-GAP or b-GAP is possible.)

(183) a. Weil Peter den Brief (las) und Heidi das Buch (las),
wurde keine Mathematik getan.

'Because Peter read the letter, and Heidi the book, no
math was done'.

b. Weil Peter den Brief schreiben (hat) und Heidi das
Buch gelesen *(hat), wurde keine Mathematik getan.

'Because Peter wrote the letter and Heidi read the book,
no math was done'.

A second difference is that b-GAP requires that the verb be in clause-final, not just constituent-final position, while for f-GAP, it is sufficient that the V be constituent-initial. Maling cites sentences such as (184a,b).⁷⁷

(184) a. Weil [ein Mann, den eine Taschenuhr trug, nach Rom (fuhr)]
und [eine Frau, die einen Pelzmantel trug, nach Paris
(fuhr)]....

'Because a man who wore a pocketwatch traveled to Rome,
and a woman who wore a fur coat ?(traveled) to Paris...'.
'

b. Weil [ein Mann nach Rom *(fuhr), der eine Taschenuhr trug]
und [eine Frau nach Paris (fuhr), die einen Pelzmantel
trug,]....

'Because a man traveled to Rome who wore a pocketwatch,
and a woman to Paris who wore a fur coat,...'.
'

Maling points out that the condition on b-GAP manifested in these examples is exactly that required for CONJ-RED, namely that the rule "can only

77. Here, as in (183), it is assumed that at the point when GAP applies the subordinate clauses may be in either SVO or SOV order.

apply to identical clause-final constituents" (p. 108).

1b. Hankamer discusses a 'like-adverb condition', and shows that if a language allows f-GAP then f-GAP is subject to this, but that b-GAP is never restricted by this. He illustrates the contrast between these two gapping processes with sentences from Turkish, a language which under Ross's analysis may have clauses of either SVO or SOV structure at the point when GAP applies. (185) displays this asymmetry.

(185) Ahmet çabuk suyu (içti), Mehmet yavaşça şarabı *(içti).

'Ahmet *(drank) the water quickly and Mehmet *(drank) the wine slowly'.

Hankamer mentions the following languages that allow f-GAP: English, French, German (main clause), Turkish, Russian, Persian. In all of these f-GAP is restricted by the like-adverb condition. Of the languages he cites that have b-GAP - Japanese, Korean, Turkish, Russian, Persian - none restrict b-GAP in this way.

2. The derived structures of f-GAP and b-GAP are different.

Hankamer argues that the derived structure of b-GAP is the same as the output of CONJ-RED as this would apply to the corresponding constituents, and not a structure where simply a V has been deleted. Evidence supporting this comes from Turkish, Japanese, and Korean, where certain facts about nominalization of reduced structures are easily explained if b-GAP operates much like CONJ-RED, but not if it works in a way parallel to f-GAP.

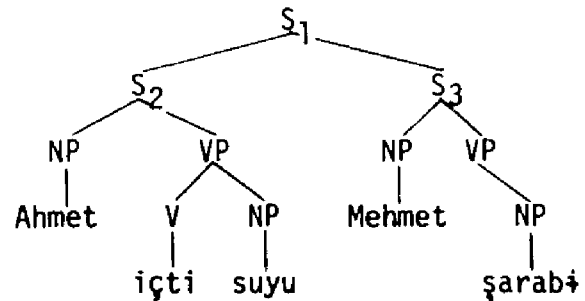
In Turkish, for example, a matrix sentence V governs the nominalization process (NOM), which makes the lower subject NP genitive and the lower verb a nominal. As (186) shows, NOM is possible only if b-GAP but not f-GAP has applied.

(186) Hasan, Ahmedin suyu (içmesini) Mehmedin şarabı *(içmesini) istiyor.

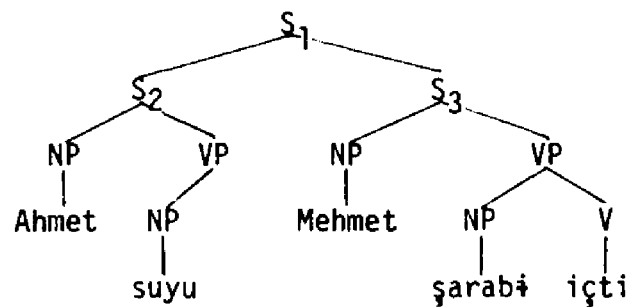
'Hasan wants Ahmet to drink the water and Mehmet the wine'.

In (187) are shown the outputs of f-GAP, b-GAP applying as a true gapping rule, and b-GAP applying as it would if it were really Ross's CONJ-RED, as these three would apply on the embedded S in (186).

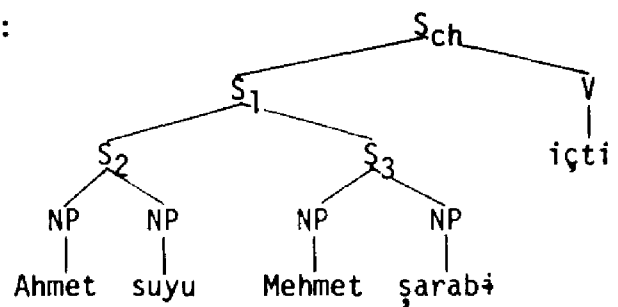
(187) a. f-GAP applied:



b. b-GAP (gapping-type):



c. b-GAP (CONJ-RED-type):



Nominalization is not possible with a structure which has undergone Forward Gapping, such as (187a). This could be blocked naturally by the Coordinate Structure Constraint (CSC), for in order for NOM to apply it would have to make crucial reference to the lower verb (içti). The possibility of NOM applying to backward gapped structures is explained

if the output of b-GAP is a structure such as (187c), but not if b-GAP simply deletes the verb, as in (187b); the CSC does not interfere with the operation of NOM on igti of (187c) as it would in (187b).⁷⁸

3. The ordering of f-GAP and b-GAP is different. Hankamer points out that Ross's ad hoc constraint (181d) relating GAP and SCRAM is nothing more than an ordering restriction which has the effect of splitting up GAP into two rules. That is, in order to explain the absence of (179d) - *SO + SV0 - Ross, by his special restriction on the application of SCRAM, and by his assumption that any language that has SCRAM is underlyingly SV0, in effect requires the order:

- (188) 1. f-GAP
2. SCRAM
3. b-GAP

Hankamer focuses on the strangeness of this:

Thus, although gapping is formulated in Ross's hypothesis as a mirror-image anywhere rule, it in fact never gets a chance to apply forward except before scrambling and never gets a chance to apply backward except after scrambling in any language that has scrambling.

This appears to be a queer accident under Ross's hypothesis; the whole point of making gapping an anywhere rule is to allow its application both before and after scrambling. There is no reason whatever to expect that some independent factor should restrict the application of forward and backward gapping in this manner. (P. 205)

For Hankamer and Maling, and incidentally also for Ross (1973b:419), facts such as these show only that f-GAP and b-GAP cannot be identified as mirror operations of the same rule. Hankamer goes on to argue that CONJ-RED also cannot be considered to be a mirror image rule, but these arguments seem to me less clear, and in any case are not important to

78. While formulating b-GAP to produce structures like (187c) would, by appeal to the CSC, explain the ungrammaticality of forward gapping and the possibility of backward gapping in (186), it would remain to be shown how the attachment of [+Genitive] to the embedded subject would not violate the CSC.

considerations of the rule-type of the rules necessary to account for the gapping facts Ross cites. Both Maling and Hankamer find that b-GAP should not be distinguished from CONJ-RED. What is left of GAP, then - Forward Gapping - operates in one direction only, deleting the second occurrence of an identical V, regardless of whether the verbs are on right or left branches. CONJ-RED is bidirectional, applying, as per Ross's (1968:220) formulation, to identical constituents only when these are clause-initial or clause-final.

It would be appropriate at this point to review the reasons originally cited by Koutsoudas for collapsing GAP and CONJ-RED, to see if any of these bear strongly against an analysis of verb-reduced coordinations making use of the distinct transformations f-GAP and CONJ-RED. In (167) above, Koutsoudas argued that considering the facts from 32 languages, a generalization would be missed if GAP and CONJ-RED had to be marked individually as to whether or not they obeyed the Immediate Dominance Principle (IDP), for in every case a language so marks either both rules or neither.

It seems, however, that it would involve little or no complication in the grammars of languages that obey the IDP if this principle were stated as a general constraint in the language restricting all coordination reduction rules, and not as a part of the structural description of particular rules deleting items in conjuncts. In a footnote (p. 337), Koutsoudas acknowledges many other kinds of conjunction reductions that his single rule COOR-DEL does not necessarily account for: "the so-called 'respectively' and 'each other' coordination reductions...anaphoric reductions with too, also, even, do, etc....[and] reductions of interrogative, disjunctive or adversative coordinations." If all or some of these reductions have to be handled by different rules, and if these

rules also obey the IDP in the relevant languages, then this principle must certainly be a general condition on any rule applying to a coordinate structure, and not built into each different conjunction rule. In this respect, it would be similar to a language- but not rule-specific condition such as Ross's Left Branch Condition. The applicability of the IDP to other types of conjunction reductions in various languages, or the possibility of reducing all these kinds of conjunction rules to a single rule cannot be investigated here, but for now it seems in no way unnatural or complicating to consider the IDP to be stated generally in each relevant grammar, and not rule-specifically. But when this is possible, then the fact that different conjunction reduction rules in a single language all observe the same restriction is not something strange or unexplained.

As for reasons 2-6 in (167), these do not seem to constitute strong arguments against the alternative explanation advanced here. Reason 2 is somewhat hard to evaluate, for other rules (and presumably, any other conjunction rules necessary) delete constituents under identity - EQUI, for example - yet these presumably are not to be collapsed with conjunction rules.⁷⁹ Next, as the evidence has shown, GAP (i.e., f-GAP) and CONJ-RED do not both obey the same directionality relation. As for the rule-type of these rules (reason 4), CONJ-RED has been shown to be fully consistent with a strictly cyclic application; the rule-type of the unidirectional GAP will be discussed anon. Finally, with respect to questions of ordering (reasons 5 and 6 in (167)), there is no evidence from the facts being considered here that GAP and CONJ-RED require any extrinsic ordering restrictions. If, following Koutsoudas, we do not

79. Maling (1972:104) cites data from German which indicate that GAP cannot be collapsed, for example, with a rule deleting identical NPs.

assume that rules are linearly ordered, then the absence of ordering constraints will not be significant in determining when rules can be collapsed.

Thus the reasons advanced in (167) do not seem to impinge strongly one way or the other on the decision to treat f-GAP and CONJ-RED as separate transformations. Given the evidence that suggests that GAP must be separated into two processes, then, with one of these being identified with CONJ-RED, it remains now to illustrate how the gapping facts at issue are handled by these rules.

A given language may or may not have the rules GAP (below, this will mean only f-GAP) and OBJ-PRE, where, following Koutsoudas 1971, if a language has OBJ-PRE it may be obligatory or optional. Also, all languages have CONJ-RED, with or without the IDP. The four language-types characterized by Ross (1970a) derive the surface form(s) of their verb-reduced coordinations as in (189).

(189) a. English - GAP, no OBJ-PRE

SV0 + SV0

↓↓ GAP

SV0 + S0

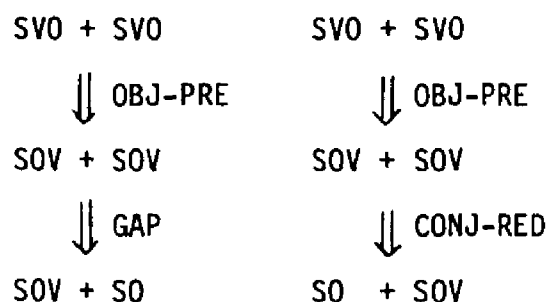
b. Japanese - no GAP, no OBJ-PRE

SOV + SOV

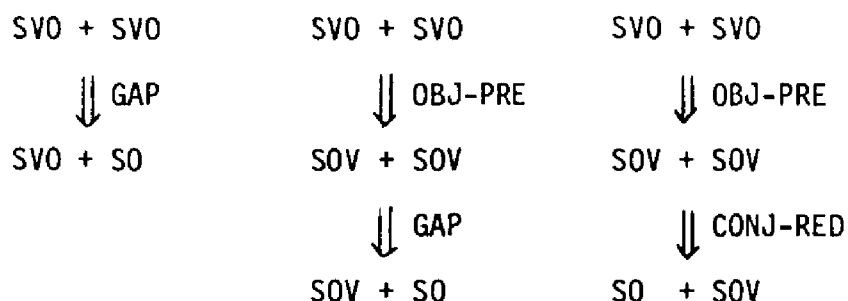
↓↓ CONJ-RED

S0 + SOV

c. Hindi - GAP, OBJ-PRE (obl.)



d. Russian - GAP, OBJ-PRE (opt.)



Notice that there is no need for any explicit marking of rules, either for extrinsic ordering or for differential rule-type assignment. All of the rules may be considered unordered with respect to each other in each cyclic domain, and all apply strictly cyclically.⁸⁰ On the

80. Maling (1972:105) in fact has the rules here extrinsically ordered as in (i).

- (i) 1. SCRAM
2. CONJ-RED
3. GAP

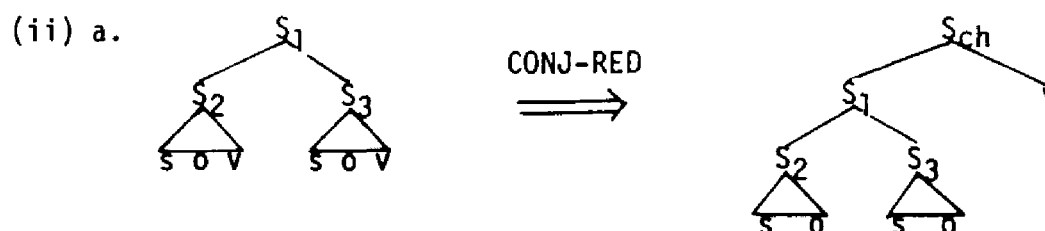
The ordering of SCRAM before CONJ-RED is necessary, she claims, for only after SCRAM puts verbs last in their clause could CONJ-RED apply. Insofar as all these rules are optional, this can constitute no argument for the necessity of this ordering constraint; rules in a feeding relationship require no rule-specific statement requiring them to apply in the only relative order they could possibly apply in anyway. (Note, also, that this ordering is irrelevant when all these rules are cyclic, since SCRAM will always apply on a cycle lower than the one on which CONJ-RED (or GAP) applies.) As for the ordering of CONJ-RED before GAP, Maling cites arguments that "for Gapping, the second VP can have only one unlike constituent, and all like constituents must delete" (*idem*), which have been used to justify this restriction. Householder (1972:26) cites cases that tend to falsify this generalization, and which therefore cast doubt on the ordering relation in question. Maling presents no arguments for SCRAM having to be ordered before GAP.

Notice that the substitution of SCRAM for OBJ-PRE in (189) in no

cycles of the conjunct S, OBJ-PRE will apply, as relevant. On the higher, or coordinate S, then CONJ-RED may apply; alternatively, if the language has GAP, that may be chosen for application. GAP and CONJ-RED bleed each other, and thus only one will apply in a given derivation. The application of each results in a grammatical string, which means that, similar to Koutsoudas' (1971) system with its unordered GAP and OBJ-PRE, these two rules must not be strictly ordered with respect to each other.

The conclusion of this long discussion about the rule-type of GAP, then, is that when facts are taken into consideration beyond those discussed in Koutsoudas 1971, specifically, when it is shown that GAP cannot be a mirror image process, then there is reason for keeping this distinct from (bidirectional) CONJ-RED. When this is done, then all the relevant facts may be accounted for by rules that apply in a strictly cyclic fashion. In section a above it was argued that CONJ-RED may apply 'in the cycle'. Here also in considering GAP, it can be seen that none of the rules involved are required to be anything other than cyclic. Any further attempt at combining these processes may (at least given the facts that these rules handle here) being with the knowledge that at

(continues fn. 80) way affects the claim that all the rules here are completely free of any extrinsic marking for guaranteeing proper order. In particular, note that for languages that have SCRAM the impossible order *SO + SVO is blocked by the formulation of this rule and CONJ-RED. In Hindi and Russian-type languages CONJ-RED applies to intermediate structure (iia), deriving (iib).



To derive the unattested order, SCRAM would have to apply now to (iib), interchanging v and o. But SCRAM cannot apply in such a manner, for only within a single S may it rearrange items (see Ross 1968:24).

the very least they are not incompatible with respect to the factor of rule-type assignment.

II.A.8. Verb rules.

Several rules involving English verbals that have been (or could be) argued to be postcyclic are considered in this section, the final one in the present survey of postcyclicity arguments. These include an argument regarding Number Agreement in Borkin 1972, and several others that have not been explicitly developed in print. These latter arguments concern rules guaranteeing the correct positioning and composition of auxiliaries - Subject Auxiliary Inversion, Affix Hopping, Do Support - as well as Negative Contraction, Ross's (1972a) 'Do Gobbling', and a rule I shall call 'Subject Verbs Inversion'.

a. Number Agreement. One rule involved in the derivation of correct verbal forms in English is Number Agreement (NUMB). The only argument proposed that this rule cannot be cyclic that I know of is found in Borkin 1972:68-69. As mentioned above in discussing argument (52) for the postcyclicity of EX-NP, in Borkin 1972 it is assumed that extrinsic ordering constraints cannot be employed in grammars. The argument for NUMB being postcyclic involves its alleged interrelation with RAIS, and is summarized in (190).

- (190) 1. Under a verb-first analysis of English underlying structure, and a higher-verb analysis of PASS, the grammar must contain an explicit guarantee that RAIS apply before NUMB. Otherwise ungrammatical sentences could be generated.
2. If NUMB were cyclic, the desired order could not be ensured by an extrinsic ordering constraint; such restrictions

are assumed not to be available to grammars.

3. If NUMB were postcyclic, the desired order could be guaranteed by assigning these rules the following rule-type features:

C. RAIS

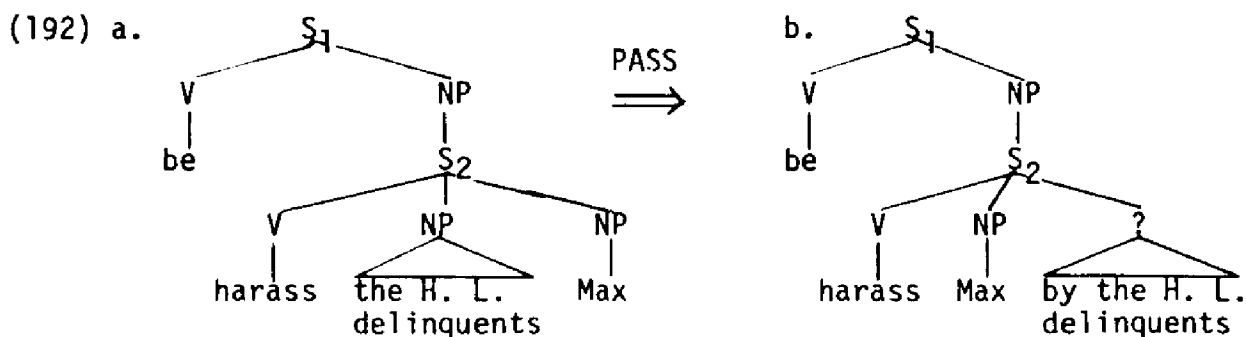
Po. NUMB

4. Therefore NUMB must be postcyclic (and, for other reasons, must have a global condition).

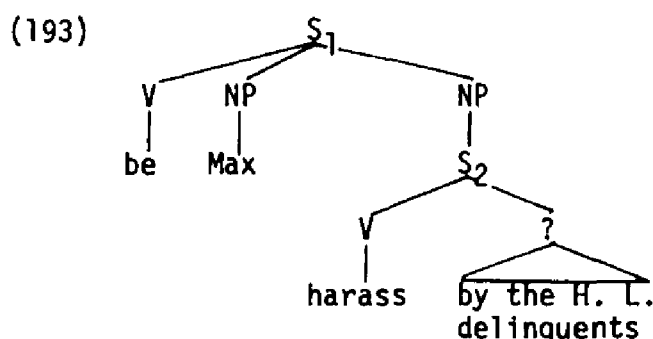
The trouble with this particular argument is that it is not at all clear from the example given by Borkin (p. 68) that there is any need to restrict the order of application of RAIS and NUMB. The sentence to be blocked is (191).

(191) *Max were harassed by the Hickory Lane delinquents.

The relevant underlying structure in Borkin's system would be (192a), to which PASS applies on S_2 (cf. Borkin 1972:61) deriving (192b).



Now, ignoring NUMB for the moment, RAIS will apply when the cycle moves up to S_1 . The output of RAIS applying to (192b) is shown in (193).



To (193), other rules would have to apply to front Max and to add -ed to the lower verb.

Assuming, contra (190), that NUMB applies strictly cyclically, I can find no way in which the ungrammatical (191) could be generated by the rules in Borkin 1972. First, the relative order of application of NUMB on S_2 of (192) is irrelevant.⁸¹ Whether NUMB applies before or after PASS on this cycle makes no difference, for it is the verb in S_1 , be, that will reflect number agreement; harass will carry no tense or number on the surface. Second, on the upper cycle, no matter how RAIS and NUMB apply the ungrammatical (191) is impossible. If NUMB could somehow apply on S_1 before RAIS, i.e., to the S_1 in (192b), it is hard

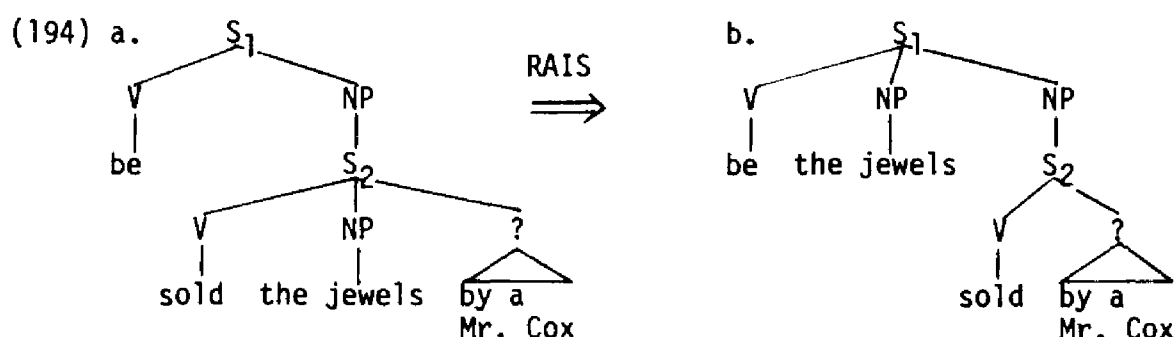
⁸¹. I assume that Borkin intends a formulation of NUMB basically as in (i).

(i)	X	S[V	NP	Y	
			[αsg]		
	1	2	3	4	⇒
	1	2	3	4	
		[αsg]			

The rule would presumably be defined on the NP immediately to the right of the verb (and not on an NP in the same S immediately to the left), for in yes-no questions the sentence-initial V at no stage in the derivation has an NP to its left. Also, Borkin 1972 argues for auxiliaries being treated as main verbs (pp. 1-18), thus generating all possible number-bearing verbals as clause-initial elements. It is not clear whether a rule describing agreement is intended (as in (i)), or one formulated as a copying process (e.g., as in Kimball and Aissen 1971:242, where the rule is a little misleadingly termed "agreement").

to see how be could get the feature [-sing] from its complex NP sister. When NUMB applies after RAIS, that is, after Max has been inserted into S_1 as in (193), then be can only be marked correctly with [+sing]. After verb-subject inversion, a correct surface structure results.

Perhaps the argument that the writers here had in mind involved a sentence where a plural NP is raised. If we assume for the purpose of the operation of NUMB that complex noun phrases are [+sing], then NUMB must be sure to apply after RAIS in order to allow the verb to agree with its derived subject. This is illustrated in (194).



If NUMB applies only to (194a), be could be marked [+sing], and would lead to the ungrammatical (195).

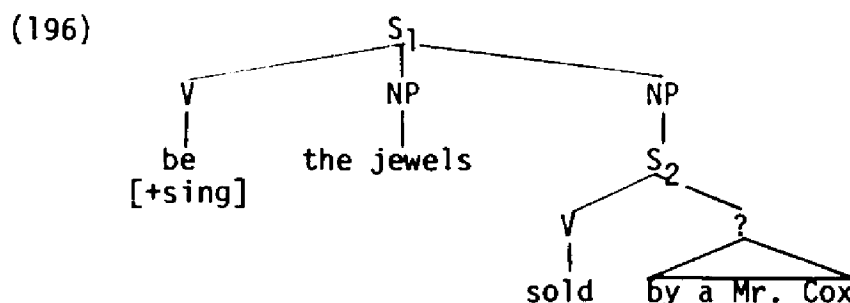
(195) *The jewels was sold by a Mr. Cox.

Where NUMB applies to (194b), then be is correctly marked as plural.

In a system which assumed that rules were linearly ordered, clearly RAIS here would have to be extrinsically ordered before NUMB. In Borkin 1972, however, such a linear ordering is not accepted. While the conventions necessary for governing the application of rules within a given cyclic domain are there not elaborated, one obvious candidate is that rules apply at the point when their structural description is satisfied.⁸² Thus if two or more obligatory rules properly analyze a

82. This has been advanced, for example, in Koutsoudas et al. 1971.

given tree, they apply simultaneously to this tree; when no more rules are applicable, then the derivation (at least, that cycle of the derivation) terminates. For example, the structural description of RAIS and NUMB are both satisfied in (194a) on the S_1 cycle. With no extrinsic ordering of rules, and under the conventions sketched here for rule application in such a system, both rules would apply, resulting in (196).



Now NUMB is (nonvacuously) applicable and, being an obligatory rule, would apply to (196), marking be with the feature [-sing]. No other relevant rules apply, and a grammatical string would result.⁸³

Assuming, then, a formulation of Number Agreement as an agreement rule (as in footnote 81), and, assuming with Borkin 1972 that transformations are not strictly ordered, argument (190) shows no need for marking NUMB and RAIS for membership in different rule-types.⁸⁴

83. A similar example involving PASS and a reapplying NUMB is mentioned in Noll 1972:33, again in the context of showing the non-necessity of extrinsic ordering. In both of these cases, the iteration of NUMB is compatible with a principle proposed by Catherine Ringen (1973:8) for governing reapplication of rules within a given cycle, namely that a rule is scanned for application and applied only as long as all the applications are consecutive.

84. David Perlmutter has suggested (Indiana University Linguistics Club lecture, 19 February 1974) that the order of application of rules within a given cycle may be governed by general principle (i):

- (i) In a given cycle, rules are applied in two blocks:
 - a. first, all cyclic rules that create new grammatical terms (i.e., that create new subjects, objects, or indirect objects, as, for example, RAIS and PASS);
 - b. then, all cyclic rules that do not create grammatical terms (e.g., NUMB, REFL).

b. Subject Auxiliary Inversion. We consider here and in two of the following subsections rules that have figured prominently in transformational analyses of the English verb system from Syntactic Structures to the present time - Subject Auxiliary Inversion (SAI), Do Support (DO-SUP), and Affix Hopping (AF-HOP). Here the evidence points rather clearly to these rules being postcyclic, although for the most part they have not been included in discussions of English noncyclic transformations.

The rule-type of SAI is discussed in Stockwell et al. 1968:923, and in a brief note by P. Matthews (1970). Matthews points out that a rule SAI applying strictly cyclically would not naturally be blocked from operating in embedded questions. He suggests that assigning SAI (and DO-SUP and AF-HOP) to a "second, or post-cyclical, series" of rules (p. 116) - in the terminology adopted here, marking SAI as last-cyclic - would be the best way to restrict SAI to applying on topmost S's only. In Stockwell et al. 1968:311,923, SAI is written to apply (obligatorily) in questions and in sentences that have a preposed negative constituent, and is marked explicitly as last-cyclic.

Before discussing in more detail the argument that SAI cannot be cyclic, it will be helpful to distinguish three classes of inversion processes, and to consider separately their respective applicational restrictions. One kind of inversion is that found in questions, abbreviated here as 'SAI-q'. This inverts the subject NP and the first auxiliary verb, if any; where only Tns and the main verb (other than be) are present, do appears as a dummy auxiliary. This rule is obligatory, and in standard dialects applies only on the cycle of the

(continues fn. 84) If such a system is correct, then NUMB would be guaranteed to apply only after RAIS, and again no argument such as (190) could be made for the postcyclicality of NUMB.

highest nonperformative. The sentences in (197) may be taken as typical illustrations of these restrictions.

(197) SAI-q obligatory:

- a. Can that clock over there keep time?
- b. *Paul will pay his taxes?⁸⁵
- c. When does the mailman come?
- d. *What Babe Ruth's lifetime average was?

SAI-q only in direct questions:

- e. *Joe wondered whether would it rain.
- f. *Merv asked what did Jim bring.
- g. *Do I ask you, where is John?

A second kind of inversion process again involves first auxiliaries (or, as relevant, the empty do) and subjects, but is more or less optional, and is not restricted to applying to topmost S's as SAI-q is. This inversion is triggered by certain elements that have been fronted in the clause, and will be abbreviated here as 'SAI-fr'. Examples of this rule operating in many different contexts are given in Poutsma 1928 and especially in Live 1967. In (198) below we list the more important environments for this inversion, illustrating both the optionality of SAI-fr, and its ability to apply in (at least some) embedded clauses.

85. This sentence is marked ungrammatical as a request for information. It is acceptable, of course, as an 'echo question', where the speaker has just been informed of the taxpaying, but expresses surprise or incredulity about part or all of the event reported. Under a higher verb analysis of questions, the application of SAI-q in echo questions could be blocked by specifying more fully the kind of question intended by the utterance.

(198) a. Preposed negative constituent:

1. Rarely had so many fans turned out to see the game.
2. Only once he gave half an hour to foreign affairs.
(Poutsma 1928:394)⁸⁶
3. It appears that not a single dime will Jones be able to contribute.

b. Preposed stressed adverbial:

1. Almost unanimously did the House pass the emergency measure.
2. In vain he tried to break open the lock.
3. I discovered that especially did Peter like rhubarb pie.

c. Preposed so phrase:

1. So softly did he speak that only a few understood his message.
2. So threatening the weather appeared that no one ventured out of the harbor.
3. We realized that so expensive would a new car be that we decided to keep our old one.

d. Exclamative:

1. Such/(?)what indignities did he suffer!
2. Such/what a time the Smith's had!
3. I saw that such/*what power did he have that no one would be able to stop him.

86. The application of SAI-fr in clauses with preposed negatives is often held to be obligatory (Live 1967:34, Stockwell et al. 1968:923); in (198a.1,3), for example, inversion is required. However, Poutsma (1928:394-95) gives many other examples similar to (198a.2) where SAI-fr has not operated. We will not be able here to explore questions of when this rule must or may apply in such environments, but note only that on this score it differs from SAI-q, which is apparently always required.

While there are other structures that show what Live (1967) calls "periphrastic inversion" (e.g., counter-to-fact conditions - had we known...), these will be sufficient for examining a noncyclicity argument that can be constructed for this kind of inversion rule.⁸⁷

The third kind of verb inversion process to be identified here is one I will call 'Subject Verbs Inversion' - SVI. This is Live's (1967) "total inversion," and involves switching a nonpronominal subject NP with all the auxiliaries (if any) plus main verb.⁸⁸ Live (1967) and Hooper and Thompson (1973) mention several cases where this rule applies, some of which are outlined below; as with SAI-fr, so here it is the preposing of the various elements that triggers SVI. As in (198), the first example under each letter shows SVI having applied (obligatorily when be is the main verb, optionally otherwise); the second is a sentence where the rule has not been chosen for application (and where the string would be grammatical if it had applied); the third illustrates fronting and inversion in a subordinate sentence.

87. I am aware of no careful study of the respective conditions of application for SAI-fr in the four environments of (198); it is conceivable that more than a single rule SAI-fr needs to be elaborated here. However, in what follows I will assume that the processes should best be formulated as a single phenomenon, that even though argument (203) below is based mostly on examples such as those in (198a) with a fronted negative element, it holds also for the rule as it applies with other kinds of preposed constituents.

88. SVI most commonly occurs when the verb phrase contains only a simple present or simple past (whence Emonds' (1970:12) name for this rule, "Subject-Simple Verb Inversion"). As seen from the sentences in (199), however, the rule cannot, as suggested by Emonds (*ibid.*) and Live (1967:38), be blocked in any general way when modals and/or aspectuals (have, be) are also present. Further examples of this rule having applied to more than a single verb may be cited from Poutsma 1928:415.

- (i) a. At the head of the preponderating party in the India House had long stood a powerful, able, and ambitious director of the name of Sullivan.
- b. Dear is bought the honey that is licked off the thorn.

(199) a. Preposed directional phrase:

1. In will stroll the bride and groom.
2. Down the home stretch the horses streaked.
3. I realized that out of the stump would fly the angry bees.

b. Preposed locative phrase:

1. Théré stood the President.
2. On the wall two old clocks will be hanging.
3. Al saw that under the table was sleeping an old tomcat.

c. Preposed temporal phrase:

1. On the Fourth of July will be chosen Miss Patriot.
2. A few minutes later the mushroom cloud appeared.
3. After a few easy questions, the students feared that then would come the hard part.

d. Preposed participial phrase:

1. Cutting the ribbon was the mayor of Busytown.
2. *Grinning from ear to ear the proud father stood/was.
3. We were surprised to discover that sitting on the flagpole was F. Fosdick.

e. Preposed predicate adjectival phrase:

1. Black was the color of her hair.
2. *On the list John's name was.
3. Davidson knew that absolutely irrelevant were the speaker's arguments against slave labor.

Live (1967:38) restricts inversion with directional, locative, and temporal phrases to sentences where the main verb is be or one of a set of "largely monosyllabic native (Old English) intransitives associated with position or change of position (i.e., motion): come, go, stand, sit,

lie, hang, rush, fly, leap, jump, follow, float, appear, and a few others." This condition on SVI seems correct, and represents another structural difference from the SAI rules, which are not so restricted.

A further point of contrast is that SVI may (sometimes only marginally) involve inversion of the first (full) verbal only, but generally neither SAI-q nor SAI-fr may ever permute the subject NP with more than the first (finite) auxiliary. The sentences of (200) illustrate this.

(200) SVI - one full verbal only moved:

- a. In will the bride and groom march.
- b. ?On the wall was that rare portrait hanging.
- c. ?In 1942 could the whole continent have been occupied.
- d. *At noon do the chimes ring.

SAI - more than tense and first auxiliary moved:

- e. *Could be lying Peter?
- f. *What debated the men?⁸⁹
- g. *Only at noon ring the chimes.
- h. *Immediately could tell Bill that he had overextended himself.

Finally, SVI differs from the auxiliary inversions in that it cannot apply when the subject NP is a pronoun. For example:

- (201) a. Down went the bubble swimming pools.
- b. *Down went they.
 - c. Lurking in the bushes were three hooligans.
 - d. *Lurking in the bushes were they/we.

89. The question words whence and whither seem to be exceptions to the generalization regarding questions and SAI-q. In 'archaic English' these wh-words may trigger SVI, and not only SAI-q.

(i) a. Whence arose all this debauchery?
 b. Whither flew the lonely sparrow?

These facts perhaps could be accounted for in terms of a general constraint against unstressable elements (e.g., the pronouns in (201b,d)) appearing in positions that must receive heavy stress.

These various points of contrast and similarity between SAI-q, SAI-fr, and SVI illustrated above may be summarized as in (202).

(202)	<u>SAI-q</u>	<u>SAI-fr</u>	<u>SVI</u>
1. obligatory/optional	obl.	sometimes obl., sometimes opt.	obl. with <u>be</u> , generally opt. with other V's
2. moves first auxiliary only	yes	yes	no
3. dummy auxiliary (do) added where no full auxiliary present	yes	yes	no
4. applies if subject NP is a pronoun	yes	yes	no
5. restricted to applying in clause with certain V's	no	no	yes
6. domain of application	highest [-Perf] S only	certain top- most and em- bedded S's	certain top- most and em- bedded S's

Given these various differences in the three inversion processes described here, we will for the present consider them to be three separate rules, and will discuss separately the arguments that have been or could be made for assigning each of these to some noncyclic rule-type.

As noted above, it has been suggested at least a couple of places in the literature that SAI-q must be last-cyclic. I am not aware of any evidence that could be used to argue that this rule must be post-cyclic, so discussion of the noncyclicity of SAI-q will be deferred until section II.B, where all the last-cyclicity arguments will be studied.⁹⁰

90. Also deferred until the section dealing with last-cyclicity

For SAI-fr, however, an argument for postcyclicity may be constructed. This would run as in (203).

- (203) 1. It must be guaranteed that SAI-fr be able to apply after preposing rules. This is because SAI-fr is triggered by elements appearing in pre-subject position in the clause.
2. If SAI-fr were cyclic, then it could apply only before preposing rules. This is because such rules make crucial reference to the verb in the next higher clause, and would thus apply only after SAI-fr has had a chance to apply in the lower clause.
3. If SAI-fr were postcyclic, then it would be able to be fed by the (cyclic) preposing rules, and thus could apply after these latter have fronted an element.
4. Therefore SAI-fr must be postcyclic.

Step 1 of this argument, the fact that SAI-fr is triggered by certain preposed elements, has been illustrated in (198) above. Further, SAI-fr is possible only if the relevant preposing rules have actually applied, as the sentences in (204) indicate.

- (204) a. *Had so many fans rarely turned out to see the game.
- b. *It appears that will Jones be able to contribute not a single dime.
- c. *Did the House pass the emergency measure almost unanimously.
- d. *I discovered that did Peter especially like rhubarb pie.

(continues fn. 90) arguments will be McCawley's (1970:294) argument that V-NP Inversion must be postcyclic. This rule is intended to be the converse of SAI-q and, even though it is argued to be postcyclic, it will be simplest to discuss this and SAI-q in the same place.

The second step, referring to the preposing rules being governed, is based on observations made by Hooper and Thompson (1973:473 *passim*). The authors discuss many preposing rules (mostly those triggering SVI, but also one triggering SAI-fr, viz., Negative Constituent Preposing), and show that the possibility of fronting in subordinate sentences corresponds quite closely with the verb in the next higher clause being a verb of assertion. For Negative Constituent Preposing (NEG-PRE) they give the following examples of this rule having applied in a subordinate clause.⁹¹

- (205) a. I exclaimed that never in my life had I seen such a crowd.
 b. I found out that never before had he had to borrow money.
 c. *It's likely that seldom did he drive that car.
 d. *He was surprised that never in my life had I seen a hippopotamus.

In each case the possibility of NEG-PRE in a lower clause is directly related to whether the main verb represents an assertion. This correlation seems to hold true also for other fronting processes that trigger SAI-fr, as shown in (206).

- (206) a. *Joan doubted/was sorry/was surprised that especially well could Max read Russian. (cf. (198b.3))
 b. *It was strange/interesting/unlikely that so tired would he be that he would be physically unable to climb out of the pit. (cf. (198c.3))

Hooper and Thompson show that the main verbs in (198a.3, b.3, c.3, d.3),

91. The examples cited by Hooper and Thompson here and below are subject to certain dialectal variation, as they admit. While I agree with their judgments on (205a,b,c), for example, (205d) strikes me as very close to grammatical. As mentioned in the following footnote, however, what is important here is the fact that NEG-PRE must be considered to be governed by the nature of the (presently inadequately characterized) higher verb.

and (205a,b) are members of classes of verbs which may embody an assertion, but that the main verbs in (205c,d) and (206) are members of classes of verbs which do not. From these facts, then, it seems clear that these rules that front a given constituent must not be allowed to apply freely within a given S, but must instead be 'two-story' rules, governed by the class of the verb in the next highest sentence.⁹²

From these two steps, and from the formulation of the rules assumed, the conclusion of (203) follows validly. Where the triggering element for a cyclic rule is put in the triggering position only by a rule applying at some higher cycle, this means that the cyclic rule in question would never get a chance to apply.

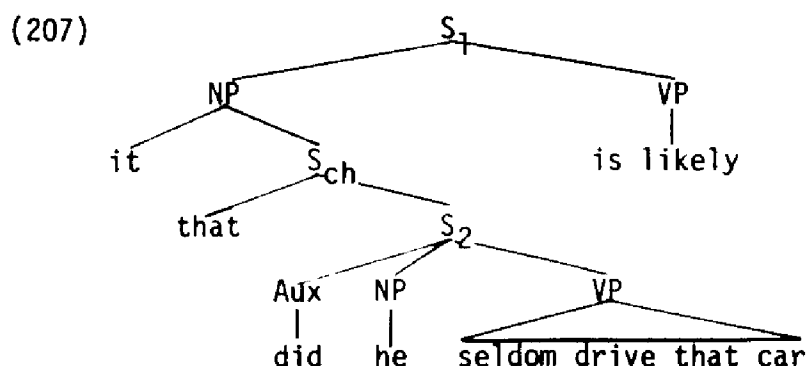
Several other arguments discussed in this second chapter have been of a similar form, and have been countered by arguing for some reformulation of the rules involved; it thus might be thought that the conclusion here may be avoided by a similar route. In this case, however, this does not seem possible.

In the first place, there seems to be no motivation for rewriting SAI-fr so that it refer to some element of the next higher cycle and thus be able to apply on the same cycle as the preposing rules. The most likely element that such a rule of SAI-fr could refer to would be the verb; it perhaps could be proposed that, beside the fronting rules, the rule SAI-fr should also refer to a certain semantic class of higher verbs. This might work if the preposing rules were all obligatory, if

92. Georgia Green (Indiana University Linguistics Club lecture, 22 January 1974) has argued that Hooper and Thompson's characterization of the verbs allowing preposing (and other rules sometimes felt to be restricted to topmost S's) in their embedded complements is inaccurate in some respects; besides assertion, the element of speaker support is relevant in some way, Green contends. For present purposes, a precise characterization of the verbs that govern preposing rules is not necessary; it is relevant to note only that some features of the higher verb must be referred to in any adequate definition of these rules.

the presence of a certain kind of verb necessarily triggered both fronting and inversion. Such is not the case, however. As we have seen, the preposing rules describe generally optional movement. What matters for SAI-fr is not whether a certain class of verb is present on the higher cycle (which then may or may not trigger a fronting process), but only whether or not a constituent has in fact been fronted.

Second, I see no ready way to build into each preposing rule the structure necessary to accomodate the information of whether or not SAI-fr has applied in the lower clause. Where SAI-fr is allowed to apply optionally in the lower clause before any preposing has taken place on the next higher cycle, complications arise. First, if SAI-fr has applied on the constituent sentence and if the verb of the matrix sentence is not a member of the class that permits preposing, then some ad hoc constraint would be required to mark the derivation as ungrammatical. This may be illustrated by an example involving NEG-PRE. If SAI-fr applies freely in a lower clause, (207) could result at the end of the S_2 cycle.



But NEG-PRE cannot apply on the S_1 cycle and SAI-fr should not have applied on S_2 , as the sentences of (208) (where EXTRA has applied on S_1) attest.

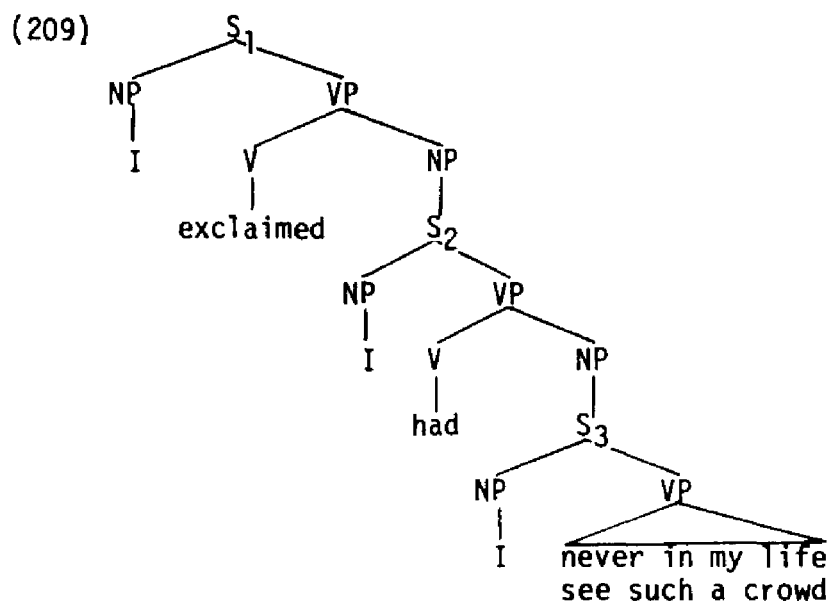
(208) a. *It's likely that seldom did he drive that car.

b. *It's likely that did he seldom drive that car.

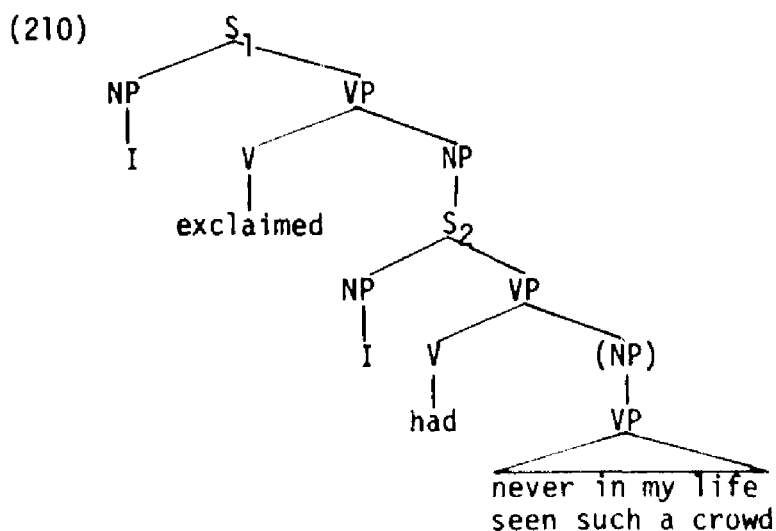
Such an extra device, needed to throw out strings such as those in (208), is unnecessary when SAI-fr is postcyclic and applies only when the appropriate element is actually in the triggering position.

And then, in cases where the verb of the higher S is of the appropriate class, each preposing rule would have to be complicated by writing it so that it refers specifically to an Aux being necessarily (in those cases which require inversion) or optionally (where either inverted or regular order is allowed) present at the head of the embedded clause. That is, parallel complications would have to be built into several different rules. The similarity of the complications would be necessary to express the interrelationship of the preposing processes and of SAI-fr. Such an applicational interdependence is, in terms of the structural descriptions of the rules, statable in a maximally general way only under the formulations of the rules possible when SAI-fr is postcyclic.

Notice that the argument here is unaffected by an analysis of auxiliaries as main verbs (as argued, for example, in Ross 1969c, 1972b, or Peterson 1974), or by considering the underlying structure of the clause to be VSO (as argued in McCawley 1970) or SOV (as argued in Ross 1973b) instead of SV0. Where auxiliaries are main verbs, sentence (205a) would have a simplified underlying structure roughly as in (209).



At the end of the S_2 cycle, after EQUI has applied and the -en 'complementizer' associated with had has been properly inserted, the structure would be as in (210).



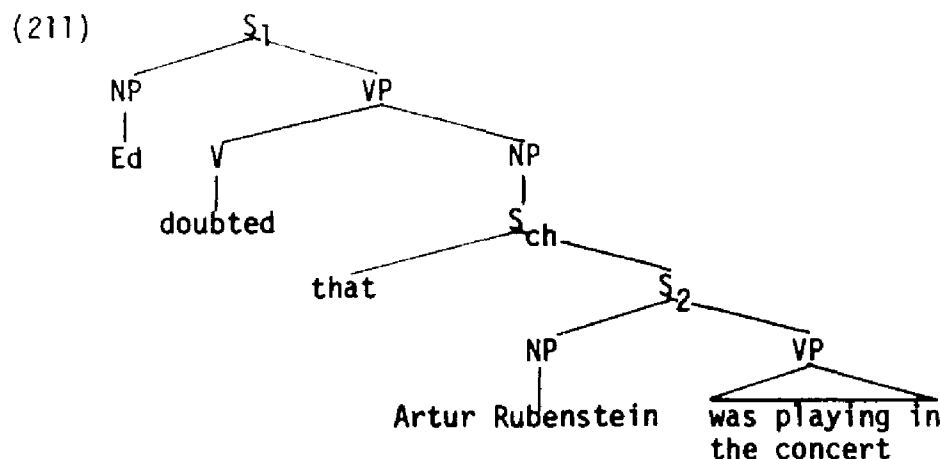
The negative constituent never in my life can be fronted only when the cycle is at S_1 . But once it has been preposed to the front of S_2 , then SAI-fr must somehow apply. Clearly it cannot apply on the S_1 cycle if it is to apply only in a strictly cyclic fashion.

It perhaps will not require diagrammed examples to see that having

a verb-first or verb-last underlying order would leave the argument intact. No matter what the order of constituents, as long as preposing is governed by a verb on a higher cycle, and as long as it is the fronted element that is the appropriate trigger of SAI-fr, this means that SAI-fr will have to apply to a cyclic domain that has been passed in the derivation. That is, it must apply 'out of the cycle' - specifically, postcyclically.

I therefore see no ready way of avoiding the conclusion of (203) above, and will take SAI-fr to be a postcyclic transformation.

c. Subject Verbs Inversion. This variety of inversion process, illustrated in (199) above, and compared with both SAI-q and SAI-fr in (202), must also apply postcyclically. The argument that can be constructed is identical to (203) above for the postcyclicity of SAI-fr and need not be repeated here. It again is based on the inversion process (SVI) being triggered by one of a certain set of constituents in pre-subject position, and on observations such as those of Hooper and Thompson's (1973) that preposability is a function of the governing verb. We may illustrate this with a sentence involving Participle Preposing (PTCP-PRE).



Nothing would block an optional SVI from applying in S_2 of (211). But then, whether PTCP-PRE applied on S_1 or not, an unacceptable sentence results.

(212) a. *Ed doubted that playing in the concert was Artur Rubenstein.

b. *Ed doubted that was Artur Rubenstein playing in the concert.

As with SAI-fr, there is apparently no natural way to rewrite SVI so that it is sensitive to a higher verb and thus perhaps able to be extrinsically ordered with respect to PTCP-PRE as this applies on the higher cycle. Nor is there any obvious way to build into all the rules that trigger SVI the possibility of the verbs in the lower S having been switched with their subject.

Argument (203) thus holds with respect to SVI as well; I conclude, then, that this is another rule involving English verbals that must be guaranteed to apply only postcyclically.

d. Do Support. An argument very similar to (203) above may be made for DO-SUP being postcyclic. Broadly, if this rule which inserts the empty morpheme do as a carrier of tense and negation must apply cyclically, then generalizations will be lost with respect to the description of processes that are triggered by elements in higher clauses but which affect the structure of the auxiliary in lower sentences. As with the discussion of SAI-fr and SVI, so here the directionality of the process (i.e., whether the occurrence of these empty do's is governed by DO-SUP, or by a complementary rule Do Delete as in Peterson 1974) and the order of constituents in underlying structure are irrelevant to the argument.

Referring, because of possibly greater familiarity, to a Syntactic Structures-style rule DO-SUP, then, the following noncyclicity argument

could be drawn up.

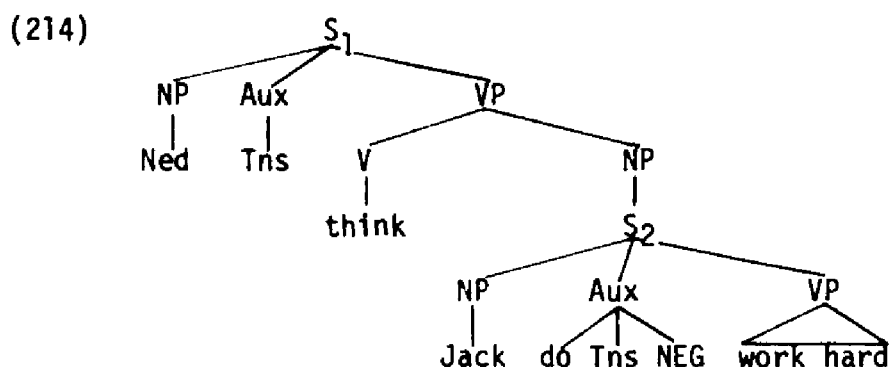
- (213) 1. DO-SUP must be guaranteed to apply after such rules as Negative Raising (NEG-RAIS), Tag Question Formation (TAG), and VP Deletion (VP-DEL). If DO-SUP could apply before these rules, extra and otherwise unnecessary rules would have to be added to the grammar.
2. If DO-SUP were cyclic, then there would be no way to hold off its application until after NEG-RAIS, TAG, or VP-DEL had applied. This is because rules such as these latter three apply only on higher cycles.
3. If DO-SUP were postcyclic, then these rules would apply in the correct order relative to each other by their being marked:

C. NEG-RAIS, TAG, VP-DEL

Po. DO-SUP

4. Therefore DO-SUP must be postcyclic.

The ordering restriction mentioned in step 1 may be illustrated by considering the relation of DO-SUP and NEG-RAIS. Were DO-SUP allowed to apply cyclically, then nothing would stop it from forming in some lower cycle the auxiliary structure of a well-formed surface sentence. This is illustrated in (214), where at the end of the S_2 cycle such a cyclic DO-SUP has finished applying.

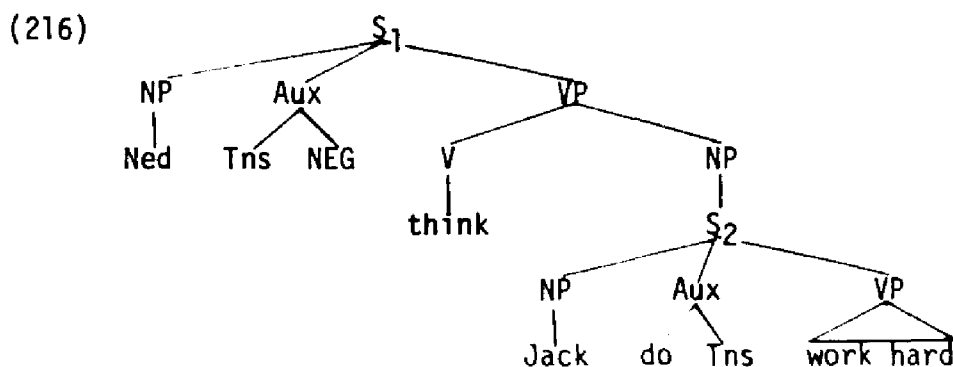


If NEG-RAIS does not apply on the S_1 cycle, then (215a) results; if it is chosen for application on the higher cycle, (215b) must be the output.

(215) a. Ned thinks that Jack doesn't work hard.

b. Ned doesn't think that Jack works hard.

Where the higher verb is a member of the class of verbs that governs NEG-RAIS, as in (214), then on the higher cycle the rule may apply, moving a NEG from a lower to a higher clause. The output of NEG-RAIS applying to (214) is (216).



On the upper cycle, then, DO-SUP is the only rule relevant, and it applies without complication. The auxiliary structure of the lower sentence, however, is incorrect; if no other relevant rules apply, the ungrammatical (217) will result.

(217) *Ned doesn't think that Jack does work hard.

Structure (216) now requires at least two ad hoc rules to patch it up

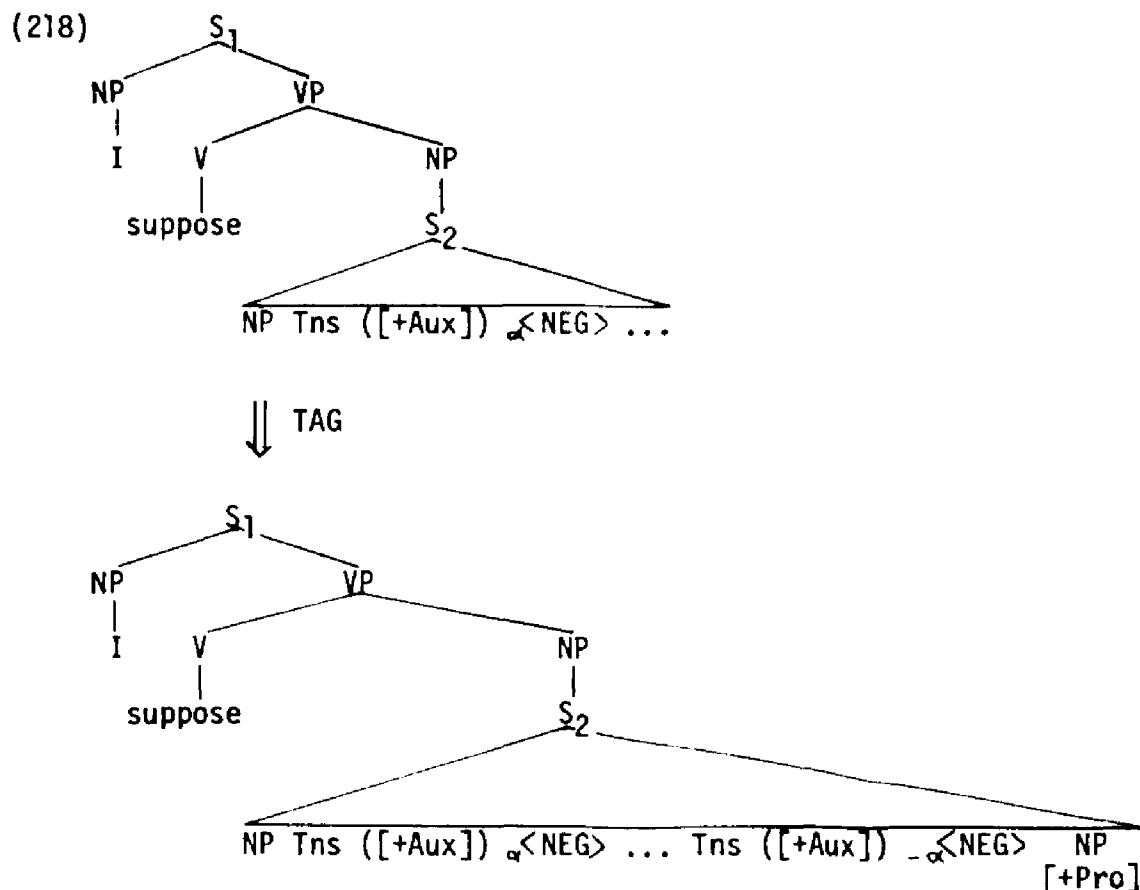
before (215b) may be derived. On the one hand, a special rule of Do Deletion would have to be contrived to get rid of the now superfluous tense-holding do in S_2 . On the other hand, a rule looking very much like AF-HOP would be required to move the Tns morpheme to its correct place in the VP. And both of these special rules, considered only in an attempt to save DO-SUP from applying postcyclically, would themselves have to operate postcyclically!

If one were determined to have a cyclic DO-SUP, the 'alternative' to adding these two extra rules would be to complicate NEG-RAIS in a way that would be equivalent to postulating special rules to delete do and move Tns. That is, to preserve the cyclicity of DO-SUP, NEG-RAIS would have to (a) raise NEG into the higher auxiliary, (b) delete any empty do's present in the lower auxiliary, and (c) put Tns in the proper place in the lower predicate. Either way of arguing against (213) - overtly adding ad hoc rules or covertly incorporating these same rules into an already necessary rule - clearly is possible only if grossly distorted treatments of the phenomenon in question are tolerated. As far as facts related to NEG-RAIS are concerned, DO-SUP must be a postcyclic rule.⁹³

The same argument could be made for DO-SUP and TAG. As discussed by R. Lakoff (1969b:143-44) and Grinder (1972:106-9), TAG must be restricted to applying on a cycle that has a performative verb (both agree that the performative should mean something like 'suppose'), copying to the right of the next lower clause the Tns and first auxiliary (if any) and a pronominal copy of the subject of this constituent

93. A further way of avoiding the conclusion of (213) might be to mark NEG-RAIS as precyclic, thereby guaranteeing that at the time a cyclic DO-SUP was considered for application all NEG's would be in their surface position. This would not seem to be a promising alternative, however, given that there is apparently some evidence that NEG-RAIS must be cyclic (see R. Lakoff 1969b) and that there is further evidence (considered immediately below) that DO-SUP cannot be cyclic.

sentence. Also, the 'tag' and the embedded S will have opposite values for negativity. Schematically, the application of TAG could be represented roughly as in (218).⁹⁴

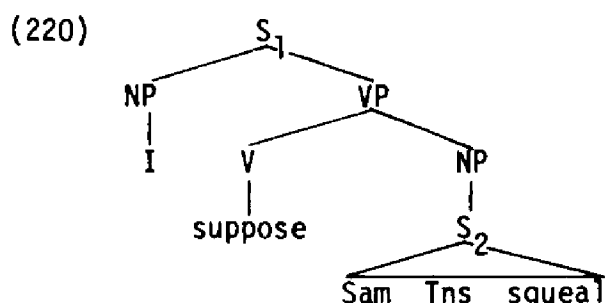


In cases where S₂ has no auxiliary verb and no NEG, then there seems to be no natural way to insert a do into the tag by a cyclic process. At the end of the lower cycle in the derivation of (219), the

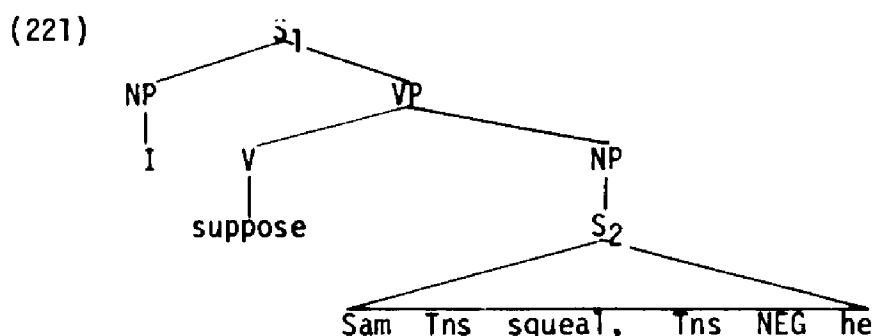
94. For present purposes it does not matter whether the elements of the tag question are daughter-adjoined to S₂ (as in Burt 1971:19) or Chomsky-adjoined (as in Emonds 1970:9-10); whether only the tag is copied or, as in Emonds' analysis, a full S is copied and then all but the subject and appropriate elements of the auxiliary deleted by a second rule; or whether tags originate from simplex sentences or from underlying conjoined S's via deletion processes (as in an alternative suggested in Stockwell et al. 1968:647). In every analysis of TAG that I know of, there is no natural way to explain the presence of all the do's if DO-SUP must apply cyclically.

tree will be as in (220).⁹⁵

(219) I suppose Sam squealed, didn't he?



Now on the S_1 cycle, since the verb is of the proper class (constituted by guess, imagine, believe, think, reckon, and a few others), TAG may apply. The result of its applying to (220) is (221).



At this point some kind of Do Addition rule would have to go down into S_2 , applying to the Tns in the tag since this is not followed by a verbal. That is, the cost of having DO-SUP apply cyclically is a second rule of DO-SUP that must apply postcyclically.

As with NEG-RAIS, so here an alternative to having two rules that both add do's is to write TAG so that it not only makes a copy of the tense and (optional) first auxiliary, but also inserts a do in the case where Tns immediately precedes the main verb of the lower sentence. This

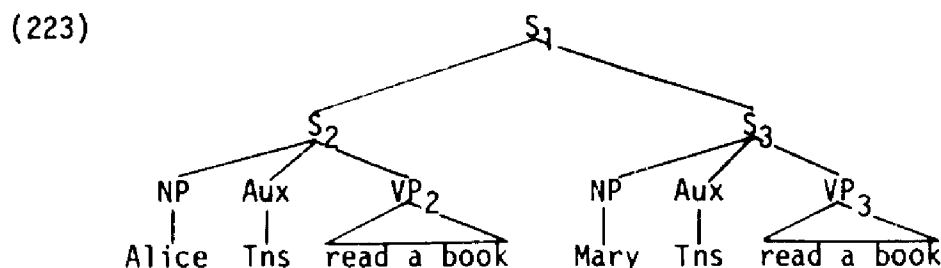
95. I assume here that AF-HOP is postcyclic, that Tns will be moved into its correct position with respect to squeal at some point after the cycle has passed S_2 . Arguments for the postcyclicality of AF-HOP will be discussed in the following subsection.

would be unsatisfactory in that such a complication of TAG would duplicate exactly the generalization that DO-SUP was formulated to capture (viz., when Tns is not attached to a 'full' verbal, whether auxiliary or main verb, then it is manifested on the dummy verb do). The evidence from TAG, then, is also that DO-SUP must apply postcyclically.

Finally, note that Ross's (1969c:77) rule VP-DEL provides yet another example of the need to allow DO-SUP to apply postcyclically. VP-DEL is involved in generating sentences such as those in (222), applying on a coordinate S to delete the verb phrase of the second conjunct, where the conjuncts are identical except for their subjects.

- (222) a. The Mets can hit, and the Pirates can too.
 b. Alex is thinking of spending three weeks in Spain
 next summer, and Dick is too.
 c. Alice read a book, and Mary did too.

Where DO-SUP is cyclic, (222c) will have the structure shown in (223) before the start of the S_1 cycle.



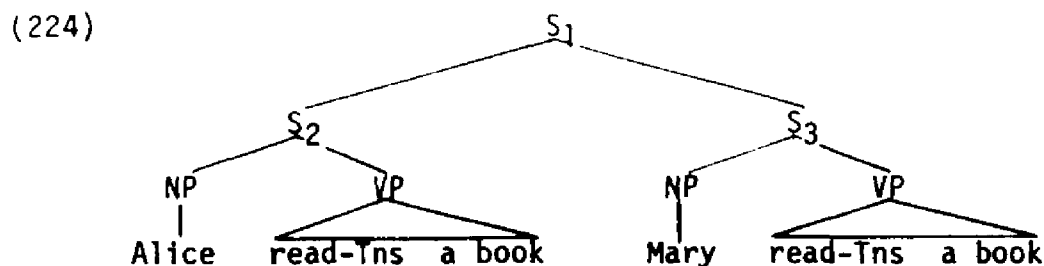
In order to derive (222c), VP-DEL applying on S_1 of (223) would have to perform not only its regular deletion of VP_3 and insertion of too, but also would have to insert a do in front of Tns in S_3 . This again would be a case of an unexplained similarity to DO-SUP and an otherwise unmotivated complication of a rule.

From the interaction of DO-SUP with NEG-RAIS, TAG, and VP-DEL, and

perhaps with other similar rules not considered here, it seems clear that the rule placing (or deleting) do's on otherwise unattached tense morphemes must be restricted from applying until other rules that alter auxiliary structures have operated. Under the alternatives for governing rule application being considered in this study, this means that DO-SUP must be postcyclic.

e. Affix Hopping. The case for the noncyclicity of AF-HOP is the same as that for DO-SUP: some rules refer to the verbs of lower cycles; if AF-HOP has previously applied in such lower cyclic domains then these other rules must take into account the different positions of the affixes, particularly the tense affix, and thus cannot be stated in their maximally general form. This, presumably, represents the grounds Fillmore (1963:224) had in mind for assigning this rule to the category of "final simple transformations," a rule-type corresponding to the postcycle in an Aspects-based framework.

Tom Peterson (personal communication) first called my attention to this with respect to VP-DEL. If AF-HOP were cyclic, then sentence (222c) above would have the following structure at the end of the conjunct S cycles.

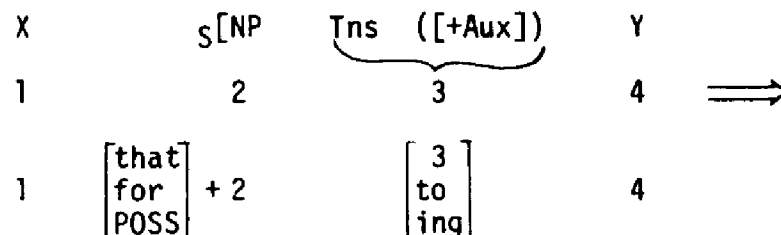


Now, when VP-DEL applies on the S₁ cycle, it cannot delete simply a VP, but must specify deletion for all constituents of the VP that appear

before and after an optionally occurring Tns morpheme.

Another example of the complication resulting from AF-HOP already having applied in a cycle which must be operated on later by some higher-cyclic rule is the case of Complementizer Placement (COMP-PL). Where complementizers originate via such a rule and where AF-HOP has not yet been allowed to apply on the embedded S, then this insertion may be formulated reasonably generally. In (225) a considerably simplified version of the rule postulated by Burt (1971:111) is presented, one where the postcyclicity of AF-HOP is assumed.⁹⁶

(225) COMP-PL (with postcyclic AF-HOP):

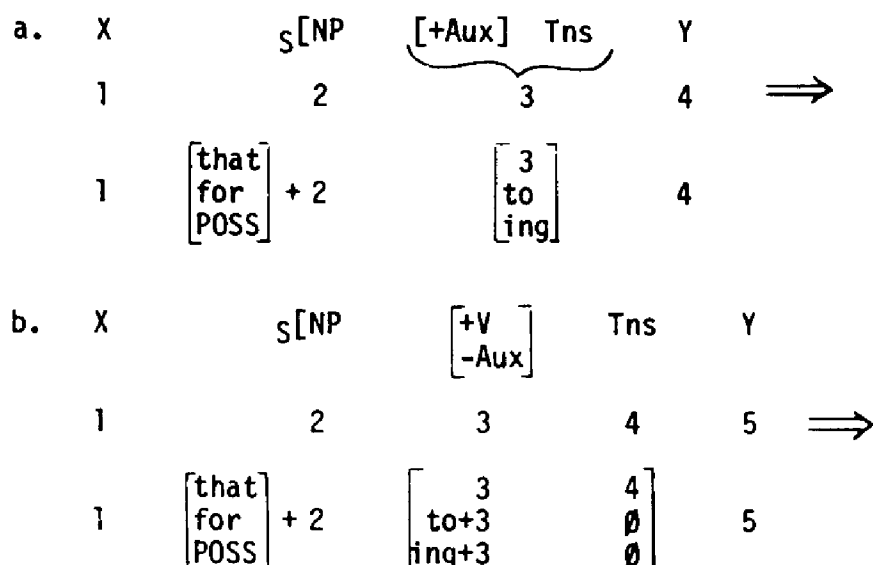


If complements must be inserted into clauses which have already undergone AF-HOP, however, then COMP-PL must have two subcases - one for strings with some auxiliary verb (an modal, or an aspectual), which would be parallel to (225), and a second one for strings that have only a main verb. These two apparently uncollapsible subcases are shown in (226).

96. In Burt 1971 no suggestion is ever explicitly made that any transformation is other than cyclic. As Langendoen (1973:722) has pointed out, however, in her examples Burt consistently applies AF-HOP and a few other rules only postcyclically.

Note that in the formulations of COMP-PL below, we follow Burt in omitting reference to the governing verb in the matrix sentence; where complementizers originate via transformation, then a fuller statement of the process would indicate explicitly the selectional role played by the higher verb.

(226) COMP-PL (with cyclic AF-HOP):



Subrule (226b) in effect undoes the result of AF-HOP having applied in the embedded S, for instead of simply replacing Tns with the appropriate complementizer it must delete Tns in its derived position after the main verb and then separately add the relevant elements.

There are perhaps other examples of the complicating effect of AF-HOP applying cyclically. As in the cases discussed above with SAI-fr, SVI, and DO-SUP, there seems to be no satisfactory way of rewriting the relevant rules so that all the processes are cyclic. On the one hand, there is no basis for writing AF-HOP so that it makes reference to some element in a higher clause, for it is in no way governed by any higher element, but simply attaches suffixes on adjacent verbs.⁹⁷ On the other hand, the rules applying in higher clauses could possibly be written to take into account the exact location of the Tns morpheme, but in each case this could be done only at the expense of stating the rule in what is

97. Where auxiliaries are treated as verbs in their right, as in Ross 1969c, the correct positioning of the suffixes -en and -ing presumably could be a function of COMP-PL and not AF-HOP. A rule similar to AF-HOP would be required for putting the tense morpheme in the proper place, however, and would be liable to the postcyclicity argument advanced here for an Aspects-style AF-HOP rule.

its intuitively most general formulation. The evidence thus tends to support SAI-fr, SVI, DO-SUP, and AF-HOP as all having to apply post-cyclically.

f. Negative Contraction. A rule which does not directly involve traditional English verbs but which is closely tied to the processes that arrange verbal elements in correct surface order is Negative Contraction (NEG-CNTR). I am not aware of anyone having proposed in print that NEG-CNTR must be noncyclic, yet an implicit argument for the postcyclicity of this rule is present in Stockwell et al. 1968:923-27. This is outlined in (227) below.

- (227) 1. For a variety of reasons, it must be guaranteed that
NEG-CNTR apply after SAI, AF-HOP, and DO-SUP.
2. If NEG-CNTR were cyclic, there would be no way to have
this apply before these three rules. This is because
SAI, AF-HOP, and DO-SUP are postcyclic.
3. If NEG-CNTR were postcyclic, then marking all the rules
as follows would ensure a proper order of application
in derivations:
- Po, 1. SAI, AF-HOP, DO-SUP
- Po, 2. NEG-CNTR
4. Therefore NEG-CNTR must be postcyclic.

As has been shown in preceding subsections, there are good reasons for taking SAI (at least SAI-fr, a special case of the rule SAI proposed by Stockwell et al.), AF-HOP, and DO-SUP to be postcyclic rules. To that extent, then, step 2 of (227) is sound. The ordering restrictions postulated in the first step of the argument, however, do not seem correct, from which it follows that the conclusion in (227) cannot

be validly drawn. These purported restrictions may be discussed individually.

1. SAI before NEG-CNTR. The basis for this ordering in Stockwell et al. 1968 is the formulation of NEG-CNTR so that it operates in environments created by SAI (p. 923). NEG-CNTR (p. 927) is written as in (228) (here somewhat simplified).

(228)	X	Tns	NEG	$\left\{ \begin{array}{c} [+V] \\ NP \end{array} \right\}$	Y	
	1	2	3	4	5	\Rightarrow
	1	2	3	4	5	
			[+Cntr]			

condition: obligatory if 4 = NP; optional otherwise

Before SAI has a chance to apply, NEG (considering only the environments accounted for by Stockwell et al.) will be followed only by a [+V] constituent; at this point the rule is otherwise free to apply or not apply. If SAI applies, it obligatorily moves Tns and optionally any NEG present to the front of the string, where NEG now is followed by the subject NP.⁹⁸ Given the facts in (229), it is clear that something must require the negative to be contracted when in such a position.⁹⁹

(229) a. He is not going. (neither rule applied)

b. He isn't going. (NEG-CNTR)

98. Although it is not altogether clear, I assume that the formulation of SAI in Stockwell et al. 1968 is meant to allow any NEG present not to be fronted with the Tns morpheme. Only by interpreting the rule in this way could (229c) below (and (ic) in footnote 99) be generated.

99. The examples in (229) illustrate not SAI-fr, but SAI-q, the rule-type of which has not yet been discussed. Similar facts obtain for at least some of the environments in which SAI-fr applies, however, as shown in (i).

- (i) a. Only once he could not open the trunk of his car.
- b. Only once he couldn't open the trunk of his car.
- c. Only once could he not open the trunk of his car.
- d. *Only once could not he open the trunk of his car.
- e. Only once couldn't he open the trunk of his car.

Below I will illustrate the argument under consideration with examples involving SAI-q, inasmuch as this allows a simpler presentation.

- c. Is he not going? (SAI with NEG not moved)
- d. *Is not he going? (SAI with NEG moved)
- e. Isn't he going? (SAI, NEG-CNTR)

Sentences such as (229d) are excluded by the rather ungainly curly brackets in (228), and by the special condition attached to the rule.

This ordering of SAI before NEG-CNTR is the ordering given in the final listing of the rules in Integration of Transformational Theories on English Syntax (pp. 851-930). A much more reasonable one is suggested on p. 315 but, as far as I can determine, not followed up elsewhere. This is that NEG-CNTR instead precede SAI, and that SAI be defined so that it is fed by NEG-CNTR. The rules then could be formulated roughly as in (230).

(230) a. NEG-CNTR:	X	Tns	NEG	Y	
	1	2	3	4	⇒
	1	2	3	4	
			[+Cntr]		

b. SAI:	X	NP	Tns ([+Aux])	(NEG)	Y
				[+Cntr]	
	1	2		3	4 ⇒
	1	3+2		∅	4

Here inversion is complicated only by specifying more fully the nature of the NEG constituent that can be moved with the Tns and auxiliary.¹⁰⁰ Intuitively much more than offsetting this is the simplification possible

100. Fred Householder (personal communication) has pointed out that such a formulation of SAI fails to account for inversion in at least certain questions where the subject NP is not pronominal.

- (i) a. Has not John seen the ocean?
- b. (?)Will not Peter tell the truth?
- c. ??Do not the Pirates play in Tampa?

We cannot now investigate the full range of possibilities of this sentence-type, but note only that incorporating these facts into these rules (assuming this can reasonably be done) would not seem to affect the analysis of the ordering argument here under analysis.

in NEG-CNTR: now not only may the curly braces of term 4 be eliminated, but also the need to specify any constituent at all to the right of NEG. Further, the ad hoc condition specifying obligatoriness and optionality is also unnecessary now. The resulting rule looks very much like the formulation of NEG-CNTR in Klima 1964:320.

There is one additional factor which points toward NEG-CNTR and SAI of (230) as being the correct formulation of these rules, and, derivatively, as the ordering NEG-CNTR before SAI as the correct one. This is that any rule NEG-CNTR which is designed to apply after SAI and thus required to be sensitive to the kind of constituent that follows NEG, must specify more than simply "NP", as in (228), in order to designate unambiguously a subject NP. That is, (228) as stated will apparently apply obligatorily to the string underlying (231a), making it impossible to derive (231b), where NEG-CNTR has not applied.

(231) a. That man isn't a doctor.

b. That man is not a doctor.

However predicate nominals are to be distinguished from subjects for the purpose of determining when NEG-CNTR is obligatory, it certainly must mean that the fourth term of any rule such as (228) will be even more complicated, and will thus appear even more unnatural in comparison a rule such as (230a), which does not even have a fourth nonvariable term.

Given these facts, then, there can be little motivation for requiring SAI to apply before NEG-CNTR. As in Klima 1964 and Baker 1971, so in the system of Stockwell et al. 1968 it seems preferable to have contraction apply before inversion.

2. AF-HOP before NEG-CNTR. This ordering is held to be necessary (p. 925) because NEG-CNTR (as in (228)) is formulated with the constituent

Tns immediately to the left of NEG. If AF-HOP could apply first, then the contraction rule would have its second term complicated, along the lines of (232).

$$\begin{array}{ccccccc}
 (232) & X & \left\{ \begin{array}{l} [+Aux] \\ Tns \end{array} \right\} & NEG & Y & & \\
 & 1 & 2 & 3 & 4 & \Rightarrow & \\
 & 1 & 2 & 3 & 4 & & \\
 & & & [+Cntr] & & &
 \end{array}$$

This is because before AF-HOP applies, the NEG constituent will follow either Tns or the first auxiliary (M, have, or be); where NEG-CNTR applies only after AF-HOP, however, then NEG could only follow Tns in the string.

This argument from simplicity is brought into question, however, by the analysis proposed by Ross (1969c, 1972b:83-85), McCawley (1971a), and others for auxiliaries as being main verbs. McCawley (1971a), in particular, shows that an explanation of the facts of the cooccurrence of English auxiliaries is possible only when Tns in underlying structure is treated as a verbal constituent in its own right. Under such a treatment of tense, it is clear that the structural description of (232) becomes simplified to that in (233).

$$(233) \quad X \quad [+Aux] \quad NEG \quad Y$$

But now there is no argument for NEG-CNTR having to apply only after AF-HOP; with either ordering, NEG-CNTR is statable in an equally general manner.

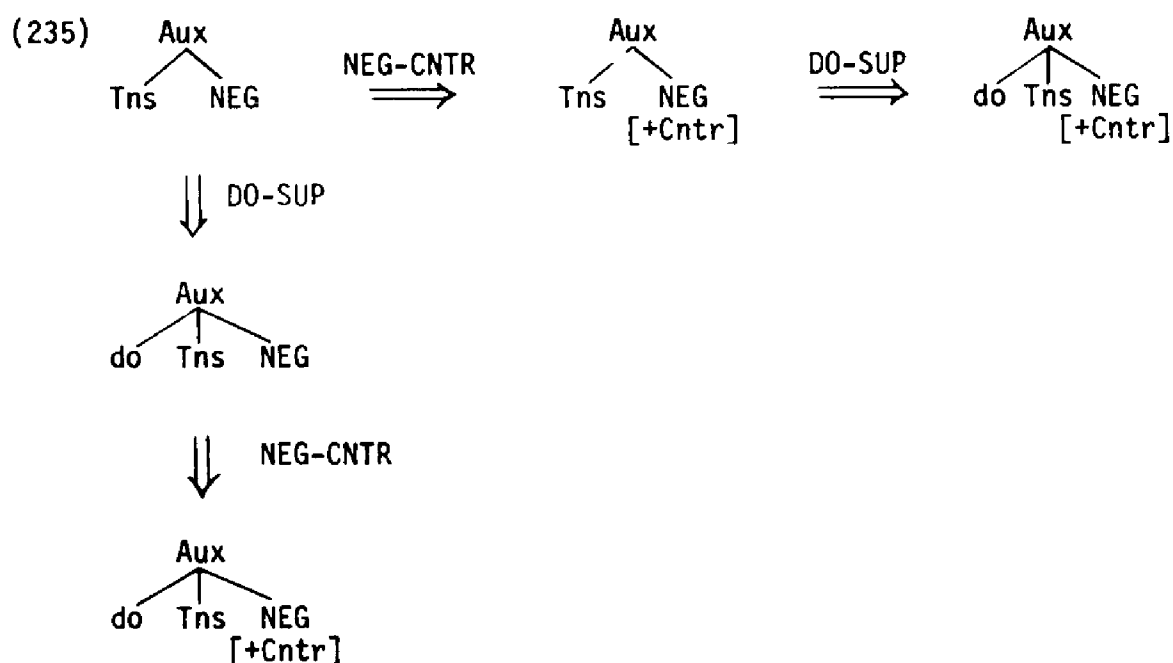
Even in a Syntactic Structures-type analysis of auxiliaries, it still is not clear that a formulation more complicated than that in (230a) or (233) is necessary. The structural description in (234), for example, expresses the generalization that NEG must be immediately next to a [+Verb] for NEG-CNTR to apply.

(234) X [+Verb] NEG Y *

Before AF-HOP has operated, NEG will be either followed by the main verb of the string, or be preceded by have or be. A mirror image formulation of the rule is therefore fully as general as any statements of NEG-CNTR designed to apply to strings after AF-HOP.

The conclusion, then, is that there is no clear evidence requiring the ordering AF-HOP before NEG-CNTR. This means that argument (227) for the postcyclicity of NEG-CNTR is to that extent further weakened.

3. DO-SUP before NEG-CNTR. About this restriction Stockwell et al. say only: DO-SUP "must precede [NEG-CNTR] for obvious reasons" (p. 926). I only wish the "obvious" here were a little clearer, for as far as I can determine these two rules are mutually non-affecting - they can apply sequentially in either order, or simultaneously, with no change in the outputs derived, and no change necessary in the formulations of the rules. This is illustrated in (235), which assumes the authors' formulation of the rules in question, and shows their application in both orders.



The underlying structure in (235) is the one relevant just before either of these rules apply. Apparently neither rule in any way feeds or bleeds the other, and thus the proposed ordering restriction is quite unnecessary.

Thus, upon examination, the ordering restrictions referred to in step 1 of (227) are seen to be incorrect, or at best superfluous. This means then that there is no reason for NEG-CNTR to be marked as in any way noncyclic, for all the desired outputs may be derived and the rules stated in a maximally general way where NEG-CNTR applies strictly cyclically.¹⁰¹

101. At first glance, an argument similar to the one proposed here for the postcyclicity of NEG-CNTR could be made for the rule Auxiliary Shift (AUX-SHIFT), as this is discussed by Baker (1971). This rule moves a finite auxiliary leftward over a variety of preverbal elements; outputs include strings such as those in (i).

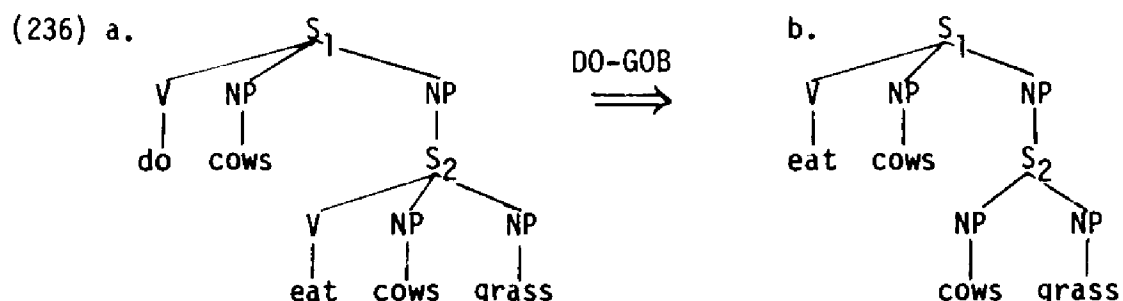
- (i) a. John has seldom been so happy.
- b. The queen will undoubtedly ask for his head.
- c. They were all singing merrily.

It could be claimed that since AUX-SHIFT must apply after postcyclic rules such as AF-HOP and DO-SUP (as in Baker 1971:173) it, too, must be postcyclic.

The complication here is that, as Baker formulates the rule, AUX-SHIFT is not only postcyclic, but also intrinsically postsyntactic. This is because it can be most generally stated only if it refers to information regarding stress (pp. 171-73). In this study I have been assuming a rather strict separation between the syntax and the phonology, and thus will not try to assign AUX-SHIFT or any other such rules to one of the rule-types defined in section I B. (Note that if Ross's (1970b) ALL-MOVE, discussed in section II.A.5 above, is to be collapsed with Baker's AUX-SHIFT, then it also would properly fall outside the bounds of this study.)

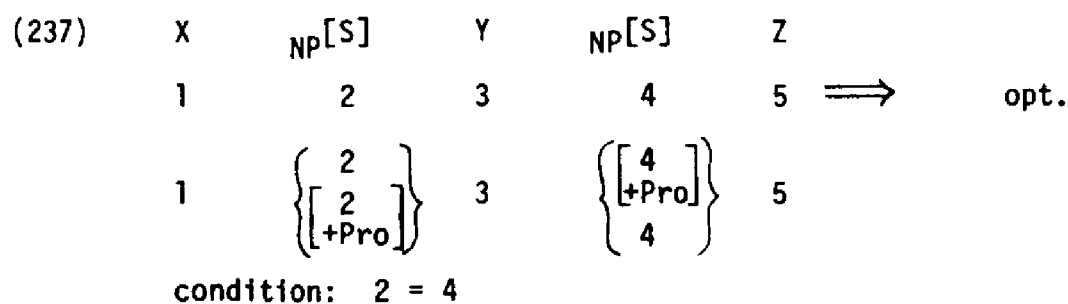
However, if other cases come to light that suggest that classes of rules usually held to be disjoint sets (PS rules, syntactic transformations, adjustment rules, phonological rules) actually have their rules intermixed in terms of the order of application in derivations, then obviously some principles of application more general than, say, the transformational cycle (as this is defined, respectively, as operating strictly within the syntactic or phonological components) will need to be elaborated. In this regard it will be interesting to test the adequacy of the various proposals of universal principles for governing rule application (e.g., those outlined in Koutsoudas et al. 1971, Iverson 1973) as these operate across the various sets of rules in a grammar.

g. Do Gobbling. In this final subsection we mention briefly a rule proposed by Ross (1972a) to explain certain occurrences of the nonstative pro-verb do. Ross argues that all simplex action clauses arise from an underlying complex structure, the matrix sentence of which has the main verb do. An obligatory rule Do Gobbling (DO-GOB) applies on the higher cycle, replacing do with the verb of the lower sentence; the application of this rule is illustrated in (236).



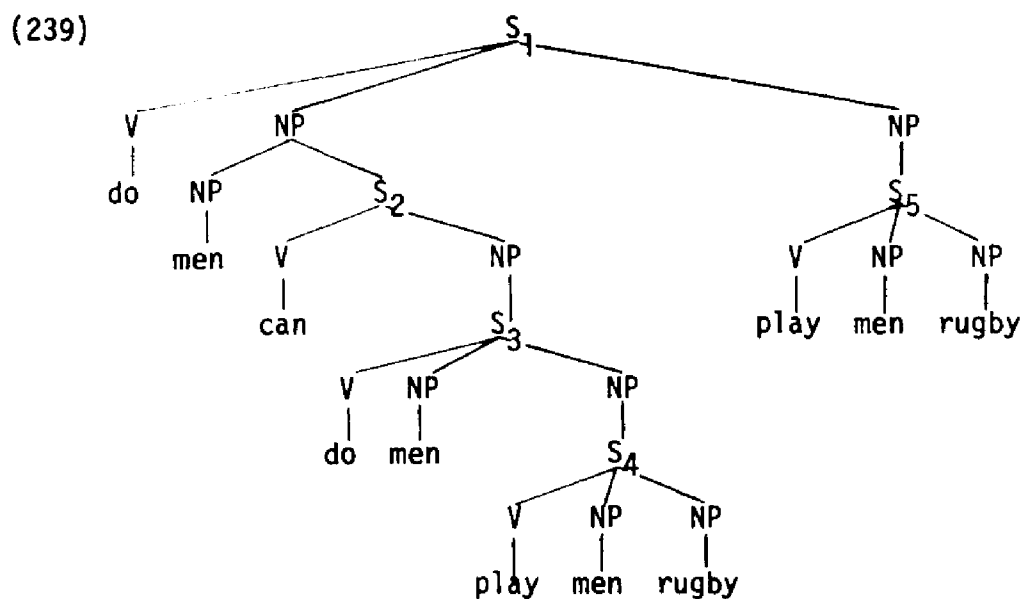
To (236b) EQUI will apply deleting the lower occurrence of cows, and after pruning, grass will again become a clause mate of eat and cows.

Ross considers eight rules of English, and shows that if these rules can apply to underlying structures that have do as a higher verb of nonstative clauses, then the occurrence of do in strings that apparently have undergone these rules can be explained. Although he nowhere discusses the rule-type of DO-GOB, in fact the evidence with respect to its relation to all eight rules is that it can only apply postcyclically. This may be demonstrated by referring to its relation with S Deletion (S-DEL), a rule Ross defines (p. 78) as in (237).

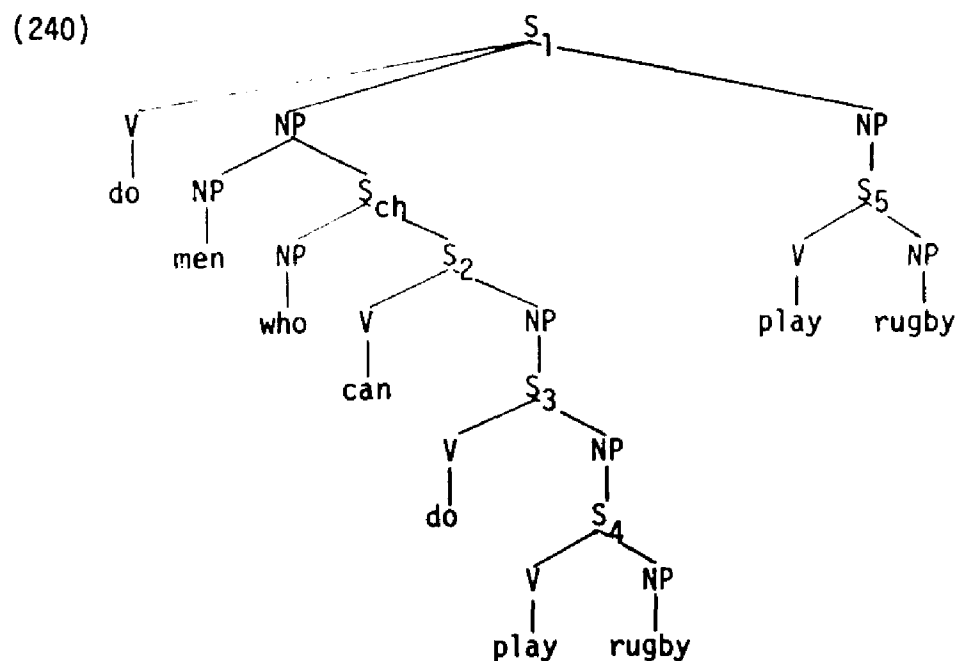


The do in a sentence such as (238), then, Ross proposes to derive from underlying structure (239), where S_4 is the constituent that eventually will be pronominalized by the application of (237).

(238) Men who can do it, play rugby.

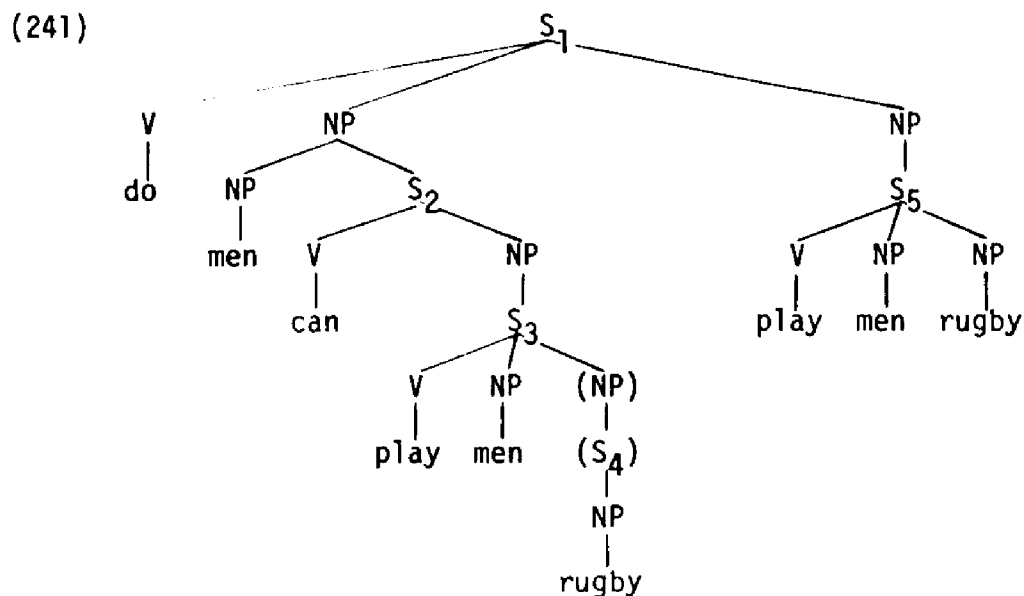


After the application of EQUI on the S_3 and S_1 cycles, and Relativization on S_1 , (240) is derived.



On the S_1 cycle, then, and only on this cycle, S-DEL gets a chance to apply. Where it operates backwards, adding the feature [+Pro] to S_4 , then DO-GOB will be unable to apply in S_3 to replace do with play, and sentence (238) will eventually be derived. If the underlying structure had no such do, then either S-DEL would have to be modified in some ad hoc way or some new rule postulated in order to account for the presence of do in (238).

It should be clear that DO-GOB cannot apply cyclically to a tree such as (239) and there still be an explanation for do in the surface string, in the way Ross intends. If the rule applies in this manner, then at the end of the S_3 cycle, (239) would be transformed into (241).



Now do would have to be inserted by some rule, and the fact that this added do would be identical to the main verb do in English with respect to all selectional restrictions and phonological properties would go unexplained.

Thus, to preserve the explanatory value of postulating underlying higher verb do's, Ross must require that DO-GOB not apply until after

at least certain rules that apply on higher cycles. Since there seems to be no motivation for writing DO-GOB to make reference to some higher trigger, this means that it will have to 'look down' and apply in a cyclic domain already passed in the upward movement of the cycle. That is, it must be postcyclic.

As the reader may verify for himself, similar arguments can be made for the postcyclicity of DO-GOB from facts of its application relative to the seven other rules considered by Ross in his section I - So-Insertion, Swooping [forms appositive clauses], Equative Deletion, a rule deleting elements after but and other than, Pseudo-cleft Formation, Topicalization, and Tough Movement. In each case if DO-GOB applies cyclically it removes the do's that must be present for the desired operation of these other rules. Assuming that (236a) is justified on semantic grounds, the conclusion must be that DO-GOB is postcyclic. Only with DO-GOB being noncyclic in this way may the syntactic benefits of such underlying structures - which, in Ross's (1972a) telling, are many - be realized.¹⁰²

102. Toward the end of his paper, Ross suggests that DO-GOB may be only a special case of McCawley's (1968b) rule Predicate Raising (PRED-RAIS), an optional rule that adjoins a predicate from a lower clause to the predicate of a higher one. This would affect only slightly the case for Ross's do's being operated on postcyclically. With respect to the relation of PRED-RAIS and Topicalization and Tough Movement, the fact that PRED-RAIS was optional would guarantee that the relevant surface do's would not be affected by the rule. For sentences accounted for by means of the other six rules discussed by Ross, however, PRED-RAIS, at least insofar as it would absorb the operation of DO-GOB, would have to apply postcyclically.

Note that rule-type considerations may represent a reason for not combining DO-GOB and PRED-RAIS, in spite of Ross's suggestion here. Specifically, while DO-GOB must be postcyclic, it has been frequently asserted (but nowhere argued, that I know of) that PRED-RAIS must be cyclic (see McCawley 1968b, 1970, 1971c).

II.B. Arguments for transformations being last-cyclic or root-cyclic.

The arguments considered in this section deal with rules which have been thought to be generally restricted to applying on the topmost S. In most cases, however, the arguments have not included the behavior of the rules in question in coordinate clauses of the topmost S, or in the context of the reported material of direct discourse. When these additional environments are brought into consideration, then the argument strictly speaking becomes one for root-cyclicity and not last-cyclicity. For the most part I use these terms here somewhat interchangeably, for there are no cases of a rule being able to apply on a topmost S but being restricted from applying in a conjunct immediately dominated by a highest S.

Overall there is not the general reliance on rule ordering arguments here that was seen in our review of the arguments for postcyclicity. In the five subsections below, a conclusion of having to explicitly mark a rule for last- (root-)cyclicity is usually drawn rather directly from observations about what cycles the rule may or may not apply on. In many cases it will be shown that the initial generalization drawn about the range of domains of application possible is incorrect, and that elaborating a rule to mention specifically a certain verbal trigger accounts in the most general way for its applicational restrictions. Also, reference to the higher performative verb will often be relevant in evaluating the rule-type argument.

As in section II.A, the rules considered here are grouped together insofar as the similarity of the processes they describe warrants.

II.B.1. Topicalization.

The rule Y-Movement, or Topicalization (TOPIC), has been argued to

be necessarily last-cyclic. This rule, usually taken to be optional, fronts an NP from either a matrix or a constituent sentence. An argument for overtly marking TOPIC for last-cyclicity is found in Postal 1971:188, where it is asserted: "[TOPIC] is obviously not a cyclical rule; in fact it can never even apply in embedded clauses."¹⁰³ Although Postal here does not spell out in detail the basis for his conclusion as to noncyclicity, the argument is similar in spirit to his Preposition Dangle argument (see section II.A.1 above). If TOPIC is optional and applies cyclically, moving NPs up the tree one clause at a time, then this would mean that where the rule was chosen not to apply on some cycle, topicalized NPs would be left at the front of some intermediate sentence. If Postal's claim is correct that TOPIC can apply only in topmost S's, i.e., that the NP moved by this rule must end up at the front of only the highest sentence, then clearly the rule must be marked in some way to prevent its applying cycle by cycle. Marking TOPIC as a last-cyclic rule would be the most direct way to guarantee that it was only to absolute sentence-initial position that an NP could be fronted.

The details of topicalization, however, are not as simple as Postal 1971 has them. Postal himself, in fact, in a later article (1972c) implicitly admits this, citing the sentences in (242) as examples of TOPIC applying in at least some embedded clauses (pp. 220-21). (Grammaticality judgments here and in subsequent examples are due to the respective authors.)

- (242) a. Harry said that Max, Joan would never be willing to marry.
 b. Harry said that Max, Joan realized I hated.
 c. *Joan realized that Max, I hated.

103. A similar generalization regarding TOPIC is asserted in Emonds 1970:18 and in Chomsky 1971:55.

The generalization that Postal sees here is that TOPIC is triggered by "a certain kind of higher verb, probably one involving verbal expression" (1972c:220).

Lakoff also has discussed TOPIC applying in embedded sentences, citing (1970b:168) the following examples.

- (243) a. John says that egg creams, he likes.
- b. *The fact that egg creams, he likes bothers John.
- c. *John dreamed that egg creams, he liked.

His statement about the applicability of TOPIC is similar to what Postal (1972c) concluded: "[243a] shows that the rule must be able to occur inside the objects of verbs of saying. However, as [243b] and [243c] show, this rule does not generally apply inside complement constructions, either subject complements or object complements. It is limited to the objects of verbs of saying" (ibid.).

From these facts and the conclusions drawn by Postal and Lakoff, it is clear that TOPIC could not simply be marked as last-cyclic. It would have to be defined with some higher trigger, and, like QUEST and REL, be an unbounded rule that applied only when on the cycle that contained the appropriate trigger. With such a formulation, TOPIC would require no marks for noncyclicity; a strictly cyclic application would yield all and only the grammatical strings.

In Lakoff 1970b, the author argues that the restrictions on the application of TOPIC are explainable in a uniform way only if performative verbs are assumed in underlying structure, pointing out that otherwise TOPIC would have to apply in two unrelated environments - in main declarative sentences, and in complements of "verbs of saying." In the course of a critique of Ross 1970b, Fraser (1971) comments on Lakoff's article, in particular on the latter's arguments for a higher

performative verb, including the evidence Lakoff adduces from topicalized sentences. Fraser cites examples which tend to discredit Lakoff's (and Postal's) generalization about when TOPIC may apply, pointing out that "verbs of saying" is simply not an adequate statement of the environment for TOPIC applying in embedded sentences. On the one hand, Fraser finds some 'saying' verbs do not allow TOPIC, citing the sentences in (244).

- (244) a. *John reported that egg rolls, I gave to Mary.
 b. *I deny that ice cream, I eat for dinner.
 c. *He agreed that wheat germ, he has enough of.

On the other hand, TOPIC is not restricted to such verbs; he cites the examples in (245).

- (245) a. I expect that ice cream she likes.
 b. We know that rhubarb they can't eat.
 c. I request that all electric wires you leave alone.
 d. We guessed that even modern music he would dig.

Fraser offers no characterization of the topicalization process, beyond the comment that "verbs of saying don't play a significant role" (p. 22).

From sentences such as those cited by Fraser, judgments as to the acceptability of which I generally agree with, it is clear that Postal's and Lakoff's simple characterization is inadequate. Fraser's facts here, however, in no way affect the conclusion reached above, namely, that there is no basis for marking TOPIC to apply noncyclically. Where TOPIC can apply in the complements of some verbs but not of others, then clearly its application is dependent on the nature of the higher verb and is not uniquely tied to the highest S in the tree, as would be implied if the rule were to be marked as last-cyclic. In the face of Lakoff's and Postal's generalization regarding applicability in constituent strings, the examples in (244) and (245) simply have the effect of emphasizing

the fact that the exact shape of the trigger is unclear.

The nature of this trigger is put into reasonably clear focus by Hooper and Thompson (1973). They distinguish five classes of complement-taking verbs in terms of various semantic and syntactic criteria, and show that TOPIC (like many other of Emonds' root-cyclic rules) is possible with certain of these classes and not with others. These verb classes may be illustrated in (246) with Hooper and Thompson's examples.

(246) Non-factives

A: say, report, be certain, ...

The inspector explained that each part he had examined very carefully.

B: suppose, guess, it seems, ...

It appears that this book he read thoroughly.

C: doubt, be (un)likely, be (improbable), ...

*It was impossible that each part he had examined carefully.

Factives

D: regret, bother, be odd, ...

*I resent the fact that each part he had to examine carefully.

E: realize, learn, know, ...

We saw that each part he had examined carefully.

Broadly, Hooper and Thompson conclude that it is only in asserted clauses that a rule such as TOPIC may operate, and that only three of the verb classes (A, B, and E) allow a reading where the complement is asserted. They discuss other environments, and show that the factor of assertion is apparently always involved when TOPIC-type rules apply in embedded clauses. The formulation of TOPIC, then, taking advantage of

the distinctions outlined by Hooper and Thompson, could be schematically represented as in (247).

(247)	X	V [+Assertion]	Y	S[Z	NP	W	
	1	2	3	4	5	6	⇒
	1	2	3	5 # 4	∅	6	

As it turns out, most of the examples cited earlier of TOPIC in embedded clauses are consistent with such a rule.¹⁰⁴ I would not be surprised if there is less than 100% agreement about the possibility of TOPIC applying or not applying in terms of the exact categories enumerated by Hooper and Thompson, for there is still much to sort out in describing the cooccurrence of the various degrees of speaker assertion and presupposition and the various structures permitted in subordinate clauses. It does seem, however, that these authors have made a significant start in defining the environment for the application of TOPIC.

As the trigger necessary for the correct specification of the rule TOPIC becomes increasingly well-defined, it becomes all the clearer that the application of this transformation is not governed by having to apply on any fixed S in the upward cycle, or by having to apply either before or after the cycle as a whole. Very much like QUEST, TOPIC applies only insofar as the appropriate trigger is present in a

104. The examples in (242)-(245) may be sorted according to verb class, as far as determination is possible. In (i), the number of sentences marked ungrammatical by their author is prefixed with an asterisk; examples which conflict with rule (247) are underlined.

(i) A: (242a), (242b), (243a) - *(244a)
 B: (245a), (245d)
 C: *(244b)
 D: *(243b)
 E: (245b) - *(242c)
 Unclassified: *(243c), *(244c), (245c)

Also note that five of the six examples cited by Emonds (1970:18) as demonstrating the impossibility of TOPIC applying in embedded clauses are predicted to be ungrammatical by Hooper and Thompson 1973, at least where their facts are incorporated into a performative analysis.

given S. Given this fact, its application is completely consistent with a strictly cyclic application.

II.B.2. Coordination Reduction.

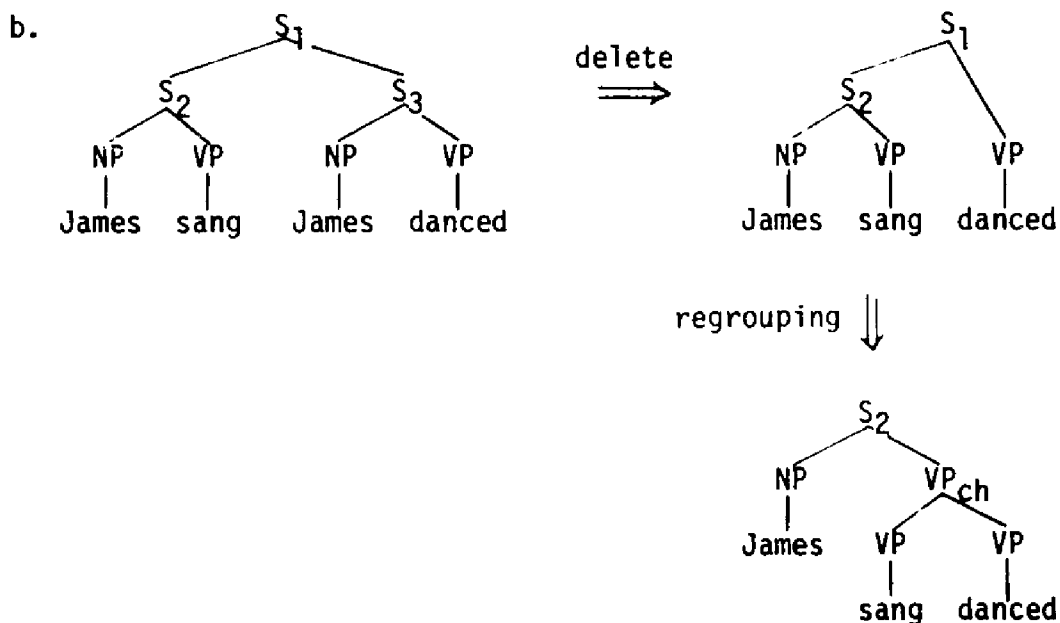
Another argument for last-cyclicity is found in Tai 1969:128-29, one involving his rule Coordination Reduction (COOR-RED). Before looking at this argument, however, it will be helpful to outline briefly the overall treatment of coordination adopted by Tai.

Tai contrasts (pp. 2-12) what he calls the 'Phrase Structure Rule Hypothesis' regarding coordinate structures with the 'Transformational Hypothesis', the former generating some or most conjoined constituents by means of a generalized PS rule (e.g., $X \rightarrow \{\text{and, or}\} X^n$) and some, or at least a few, conjunctions via transformation(s), and the latter allowing only very specific base coordinations with a correspondingly greater place given to transformations in deriving coordinate structures. He shows that the Phrase Structure Rule Hypothesis is inadequate in that it always involves an overlap in function of the PS rule(s) and the also necessary transformation(s), but that this is avoided under the Transformational Hypothesis. Tai outlines a single process COOR-RED which accounts for four kinds of coordinations - gapped sentences, respectively and each other constructions, and the structures generated by a rule such as Ross's (1968) rule Conjunction Reduction - and shows (pp. 95-110) how all underlying coordinations in the grammar may be restricted to coordinations of S nodes. Further, following the same reasoning that led to adopting a transformational instead of a phrase structural treatment of coordinates, Tai shows (pp. 124-28) that underlying conjunctions must not be allowed in embedded sentences.

The arguments supporting these positions on the derivation of

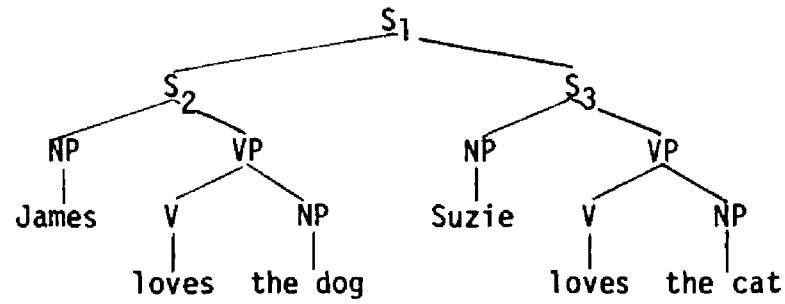
conjunctions cannot be reviewed here, but the overall treatment may be summarized: Tai's base rules generate coordinate S's at the topmost S only; the rule COOR-RED "deletes one of the two highest identical constituents in the pair of conjuncts under consideration according to the [directionality] principle" (p. 41) - deletion forward if identical constituents are left branches, backward if right branches. After deletion, the coordinate structure is regrouped by Chomsky-adjoining "the remaining highest constituents of the reduced conjunct...onto the corresponding constituents of the unreduced conjunct. This process [i.e., regrouping] is optional if the reduced conjunct is still branching" (ibid.). This is illustrated below, where the a sentences in (248)-(250) are derived in b as shown via the identity deletion and regrouping processes; other rules not discussed above are responsible for the correct insertion of and and respectively.

(248) a. James sang and danced.

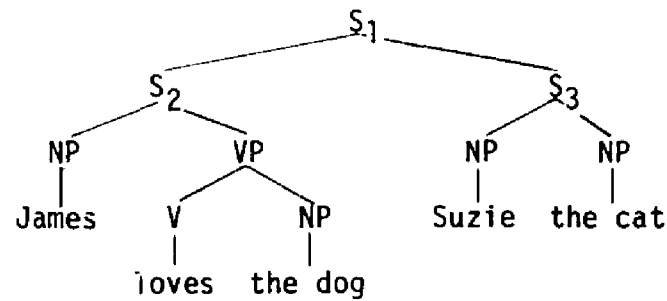


(249) a. James loves the dog and Suzie the cat.

b.

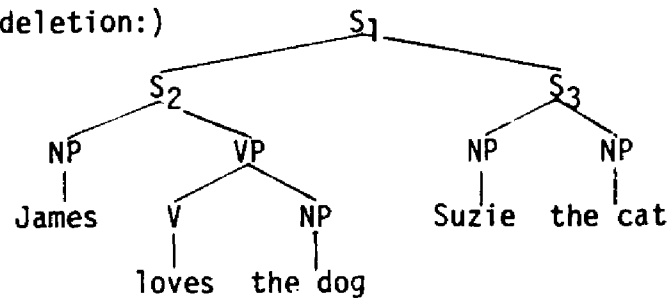


↓ delete

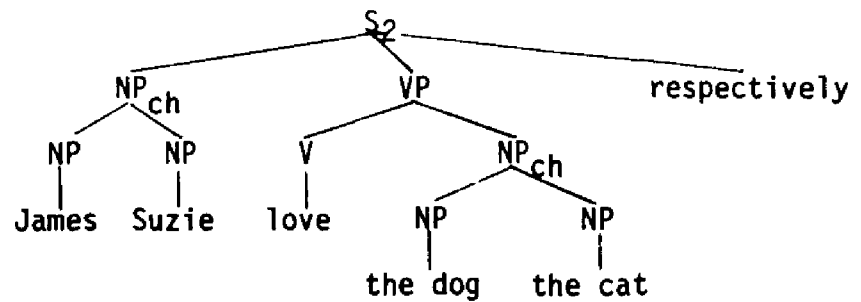


(250) a. James and Suzie love the dog and the cat respectively.

b. (after deletion:)



↓ regrouping



This perhaps is sufficient introduction to the base structures and coordination rule in Tai 1969 to summarize the last-cyclicity argument.

- (251) 1. COOR-RED cannot be cyclic. "In our framework, it does not make sense to say that Coordination Reduction applies cyclically, for there are no conjoined embedded sentences" (p. 128).
2. Therefore COOR-RED cannot be an anywhere rule. This is because "if a rule is an anywhere rule, it must be able to apply precyclically, cyclically, and last-cyclically" (ibid).
3. COOR-RED cannot be precyclic, for it must apply after PASS, a cyclic rule.
4. Therefore, by elimination, COOR-RED must be last-cyclic.

The problem with (251) is that it confuses the rule-type of a transformation with the domains in which it happens to apply. Obviously, given Tai's base structures which can never have embedded conjunctions, the chance will never arise for COOR-RED to apply on any but the topmost cycle in any derivation. This is an example of what I would call an intrinsically last-cyclic rule, one which by virtue of its structural description alone, apart from any marking requiring that it apply non-cyclically, will in fact operate only when the cycle has reached the top of the tree. There is no evidence here that COOR-RED must be extrinsically last-cyclic, that it cannot apply strictly cyclically.

II.B.3. Question and imperative rules.

In this section are discussed various transformations that have been postulated to account for facts of English interrogatives and imperatives, and which have been at least implicitly claimed to be extrinsically

last-cyclic. We first consider inversion in questions, showing that the performative analysis provides a natural trigger for the operation of this process where auxiliaries follow the subject in underlying structure. McCawley (1970) presents an argument that inversion in a verb-first system must be postcyclic; this is examined in subsection a below.

Other rules generally restricted to topmost clauses are the rule deleting whether in 'yes-no' questions, and at least two rules discussed by Stockwell et al. (1968) for the generation of imperatives. Again, taking into account the nature of the higher verb is relevant to describing the restrictions in application shared by these rules.

a. Subject Auxiliary Inversion in question. Various restrictions on the application of this rule, SAI-q, were outlined above in section II.A.8.b, where it was distinguished from a rule SAI-fr which inverts auxiliaries in the presence of various fronted elements. Unlike this latter rule, SAI-q is obligatory, and is restricted to applying in the topmost S (see (202)). We have mentioned that P. Matthews (1970) has commented that on the basis of this fact SAI-q must apparently be marked in some way as not applying strictly cyclically, for otherwise its application in subordinate clauses would not be blocked in any natural way. Matthews' comment is based on a Katz and Postal (1964)-style analysis of questions, where a marker 'Q' in a clause indicates the questioning of that clause. In this framework it is clear that with any reasonable formulation of SAI-q, auxiliaries would be inverted in both direct and indirect questions.

Matthews does mention two alternatives to a noncyclic SAI-q, yet as he points out, neither of these has much to recommend it. One is to let SAI-q apply optionally throughout and to "rely on the filtering

effect of the transformational component" (p. 116) to throw out all cases where it has applied in embedded S's and not in highest S's. In the framework of Chomsky 1965 this would mean tying its application in with the deletion of some # boundaries (or some other filtering devices) and/or revising other rules to be sensitive to such markers. Ignoring the problems inherent in Chomsky's use of such filters (primarily, the arbitrariness of determining which rules will have deletion of which filter assigned to them), this 'solution' certainly does violence to the correct characterization of the inversion process.

The other alternative is to complicate the formulation of the rule by making explicit reference to variables before and after the S in which inversion will occur, and by adding a condition to the effect that these variables must both be null; this is equivalent to writing SAI-q to refer to the next higher clause, allowing it to apply only when this 'higher clause' is in fact null. Assuming that this dubious device of obligatorily null end variables will guarantee that SAI-q apply only on topmost S's, objection may still be made that, as Matthews says (p. 117), it has "a somewhat ad hoc appearance"; there is no obvious relation between adding null variables to the structural description of the rule and the fact that it must apply only on a given S in the tree.

The solution Matthews prefers is to assign SAI-q (also DO-SUP and AF-HOP) to a noncyclic set of rules, one restricted to applying only on the highest S. In the terminology employed here, this would mean having SAI-q be last-cyclic.

The need to restrict SAI-q to some noncyclic mode of application is obviated, however, by taking performatives into account. When, following Ross (1970b) and many others, an explicit performative verb is postulated in the underlying structure, then the application of SAI-q may be

triggered in a natural way by its referring to a verb marked [+Performative, +Interrogative] in the next highest S. This will usually mean that SAI-q will have applied in the highest surface S, as in (252).

(252) a. (I ask you) has the dog been fed yet?

b. (I ask you) what did the telegram say?

This rule also applies in appropriate clauses where direct discourse is reported, as exemplified in (253).

(253) a. (I tell you) Bob thought Betty asked, "Could the dogs sleep outside tonight?"

b. (I tell you) Joe wondered whether Pete had said, "Where did Sally go?"

The operation of SAI-q in both (252) and (253) may be accounted for by only a minimal change in either the rule itself or the set of features assigned to underlying verbs: define the trigger of SAI-q as a verb in the next higher clause that is a quotative or performative interrogative, or let the trigger be stated as suggested above and let the feature [+Performative] comprise something like the subdivisions [+Illocution] and [+Quotation].

In any case it is clear that when the trigger for SAI-q is defined on a higher verb instead of on the abstract morpheme Q, then no explicit additional marking of the rule is necessary to guarantee that it apply only in the required clauses. This solution is similar to the second alternative Matthews (1970) suggested, wherein SAI-q would have obligatorily null variables assigned to its structural description, in that it makes SAI-q into a 'two-story' rule. It is unlike the variable-adding 'solution' in that the shape of the trigger is not ad hoc (such as are end variables that abbreviate only null strings) but is useful on other grounds.

With this treatment of higher verbs, then, SAI-q may be written simply to apply whenever its structural description is satisfied, and requires in addition no special marking restricting it to applying only in certain cycles. Just as with QUEST and REL, both defined on an appropriate higher trigger and being completely consistent with strictly cyclic applications, so here SAI-q, defined in terms of a higher [+Performative, +Interrogative] verb, requires no marking for noncyclicity whatsoever in order to apply on all and only the correct cyclic domains.

We may turn, now, to consideration of an argument involving the converse of SAI-q: Verb-NP Inversion (VNPI). This rule is discussed by McCawley (1970:294), who asserts that it corresponds exactly to SAI (at least to SAI-q; McCawley considers only inversion in questions) and that it must be a postcyclic rule. His argument is based on rule simplicity and may be summarized below as in (254).

(254) 1. VNPI must be made to apply after There Insertion (THERE).

Otherwise THERE would have to be more complicated.

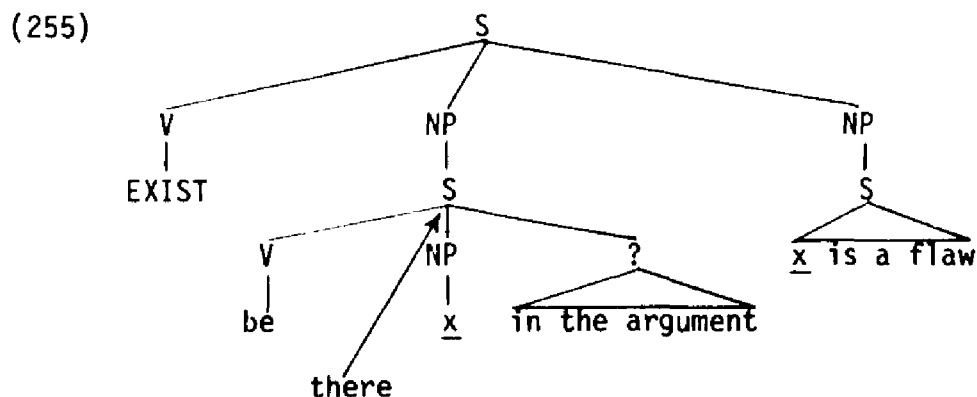
2. If VNPI were cyclic, the desired order could not be guaranteed merely by ordering it after THERE. This is because THERE, a cyclic rule, must make reference to the verb in the next higher sentence, while VNPI need not. VNPI would thus apply before THERE, regardless of how they were ordered.
3. If VNPI were postcyclic, then the desired order could be guaranteed by assigning these rules to different rule-types:

C. THERE

Po. VNPI

4. Therefore VNPI must be postcyclic.

The complication of THERE McCawley refers to in step 1 is the relatively more complicated formulation necessary for the rule if it must apply to a string which has the verb in second position. When THERE applies before VNPI, that is, when THERE can be formulated so it applies only to a verb-first string, then it has only to insert there after the verb, as illustrated in (255),¹⁰⁵

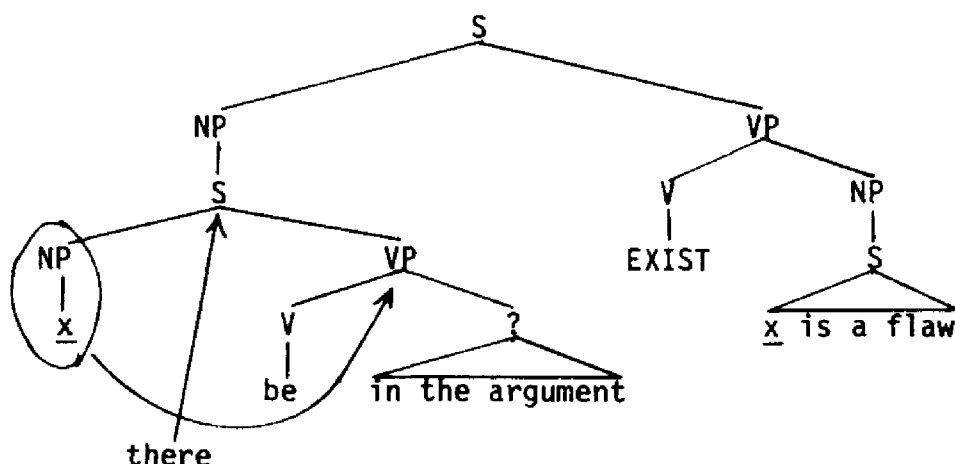


(256) There is a flaw in the argument.

If the underlying order is SV0, or if THERE applies after VNPI has shifted the verb to second position, then it must both move the subject NP to the right of be and also insert there in subject position. This is exemplified in (257).

105. Tree (255) conforms to McCawley's (1970:294) representation of the underlying structure of a sentence with the dummy there. In particular, McCawley argues that the there-clause must originate embedded in an S with an existential quantifier, a claim that represents the basis for argument (254), and one which will not be disputed here. (See footnote 51 above for examples that suggest a higher verb (or verbs) broader than simply 'EXIST' is necessary.)

(257)



This relative simplicity of THERE as it applies to a verb-first string is sufficient saving, McCawley is claiming, to warrant having VNPI as a postcyclic rule.

It is clear that, assuming an underlying VSO order, THERE may be more simply stated if it applies only to predicate-first structures. To that extent argument (254) is correct that VNPI must be postcyclic. With respect to facts concerning THERE and inversion, however, there seems to be no clear case for a verb-first and not a verb-second underlying order. That is, while THERE may be formulated relatively simpler in a VSO analysis with VNPI applying postcyclically, this gain in simplicity is perhaps more than offset by having to formulate an inversion process that moves an auxiliary rightward instead of the more traditional SAI. But if there is no overall gain in having underlying VSO - in other terms, if step 1 in (254) is misleadingly incomplete, being silent about complications that arise in the statement of the inversion process where this is defined on underlying verb-second structures - then there is no postcyclicality argument here.

McCawley is aware of this possible direction of counter-argument and takes pains to assert (1970:294,297) that the rule necessary for a verb-first analysis and for (254), VNPI, is no more costly than SAI;

"what are usually stated as conditions for the application of a rule of NP-V inversion can just as easily be stated as conditions for the non-application of a rule of V-NP inversion" (p. 294).¹⁰⁶ Postal (1972d:133) reasserts this same opinion in his answer to Newmeyer (1971), who had argued that VNPI was really more complicated than SAI.

This may seem to settle the matter. If VNPI in a verb-first analysis is really just the complement of SAI, necessary in a verb-second analysis, then the simpler rule of THERE McCawley describes is a significant saving, and perhaps would be representative of other savings to be gained by a verb-first treatment.

While we will not here consider all of McCawley's arguments for underlying VSO order in English, it may be shown that at least on the basis of the relative formulations of THERE and inversion, no choice may be made between SVO and VSO. Specifically, the conditions for applying SAI and VNPI are not strictly complementary; when the various environments in which the respective inversion rules operate are taken into account, then SAI is found to have a considerably more general statement than VNPI.¹⁰⁷ We compare here, then, the application of these two rules in performative sentences, in topmost nonperformative clauses, and in more deeply embedded sentences.

1. On the topmost cycle (i.e., the cycle with the performative)¹⁰⁸

106. Although not mentioned in McCawley 1970, such a claim about the complementarity of SAI and VNPI implies adopting Ross's (1969c) treatment of auxiliaries as main verbs. This will be assumed in the following discussion of VNPI.

107. As in McCawley 1970, we consider below only facts relating to questions and inversion. Taking into account inversion (or non-inversion) in other environments would apparently not affect the conclusions drawn here regarding SAI and VNPI.

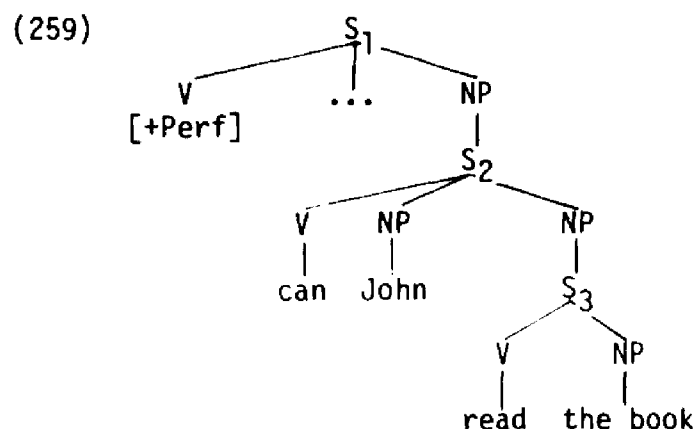
108. McCawley apparently adopts such an analysis with higher performative verbs. (See, for example, McCawley 1968a:155-61.)

VNPI must apply, as is evident from sentences such as those in (258) where Performative Deletion has not operated.

- (258) a. *Tell I you, the Yankees will never win again.
 b. I tell you, the Yankees will never win again.
 c. *Ask I you, have you considered your decision carefully?
 d. I ask you, have you considered your decision carefully?

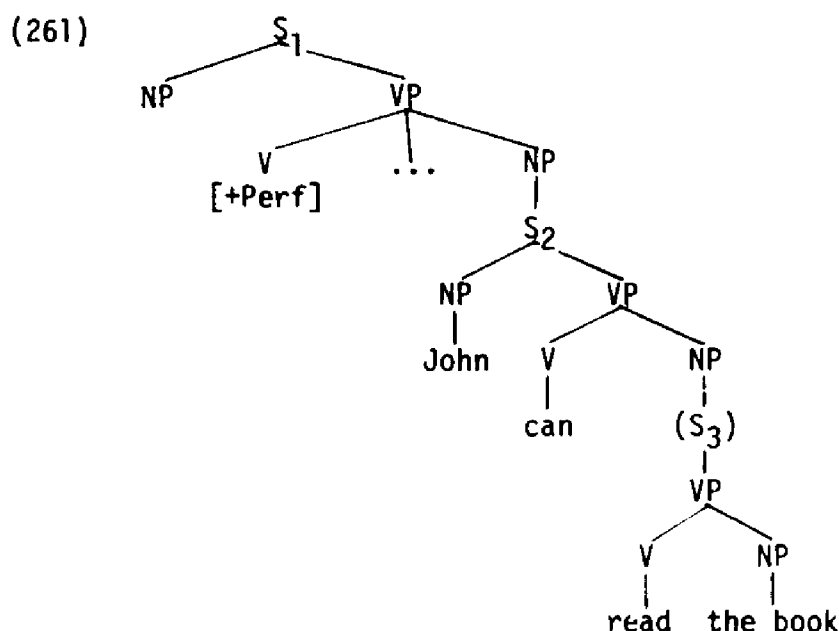
With the verb second and a rule SAI, no movement of performative subjects or verbs is necessary.

2. In the highest nonperformative clause (i.e., the topmost S in strings where Performative Deletion has applied) a sentence-initial verb must be moved by VNPI when the performative is non-Interrogative. For example, in (259), a string to which RAIS has applied to move John up into S₂, VNPI applies on the S₁ cycle reversing can and John if the performative is [-Inter] (whence (260a)), but does not operate where the performative is interrogative.



- (260) a. John can read the book.
 b. Can John read the book?

Corresponding to (259) is the verb-second analysis shown in (261), where EQUI has already applied on the S₂ cycle deleting the occurrence of John in S₃.



If the verb in S_1 is [+Inter], SAI switches elements in S_2 to derive (260b); otherwise the rule does not apply.

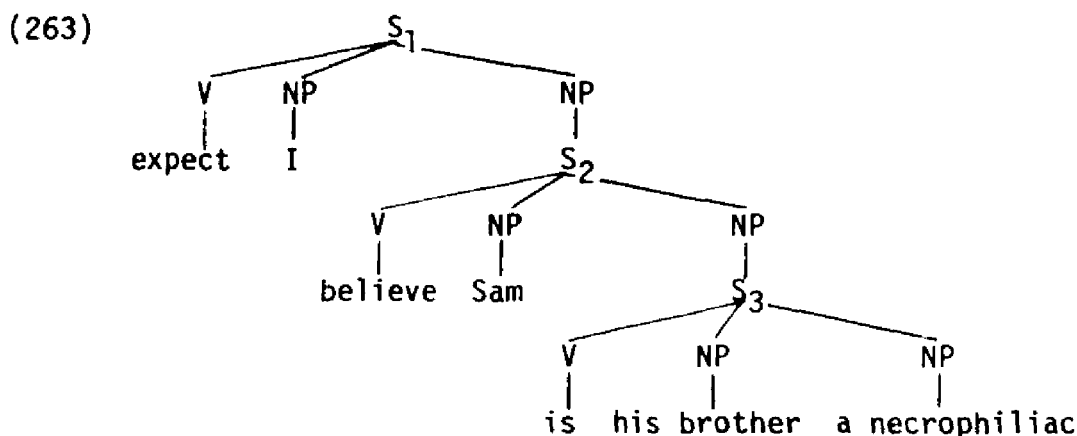
So far, then, the environments of application for SAI and VNPI are entirely complementary.

3. In embedded S's (here taken to mean S's embedded in nonperformative clauses), however, the situation is more complicated. On the one hand, in a verb-second analysis SAI never applies; only in direct questions (i.e., only in the highest nonperformative clause) must the subject and auxiliary shift. On the other hand, VNPI must apply in some embedded strings but not in others, its application being governed by whether or not the NP next to the verb is an underlying subject.

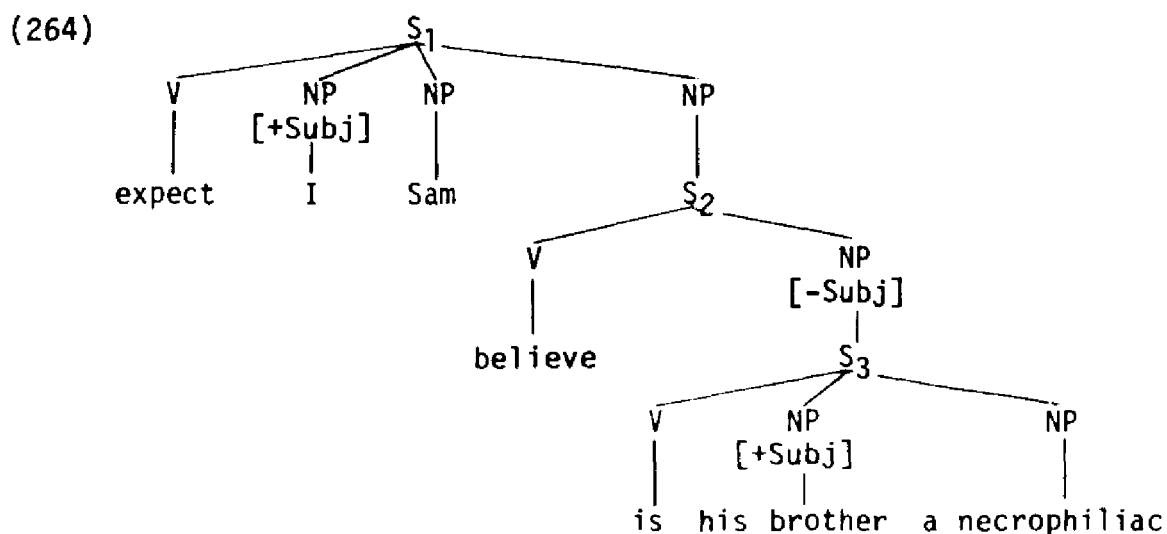
For example, in deriving sentence (262), based on McCawley's example (10a), VNPI must apply in two S's of the tree but not in a third; the difference corresponds exactly to whether the NP next to the verb at the time of application is an underlying subject or not (indicated here by the diacritics [+Subj] and [-Subj]). Underlying (262) is structure (263), where, for ease of presentation, performatives and auxiliaries

have been omitted.

(262) I expect Sam to believe that his brother is a necrophiliac.



Before (postcyclic) VNPI applies, RAIS will apply on the S₁ cycle; RAIS, however, as McCawley infers (p. 294), will not move his brother. No other relevant rules apply, so that (264) represents the input to VNPI.



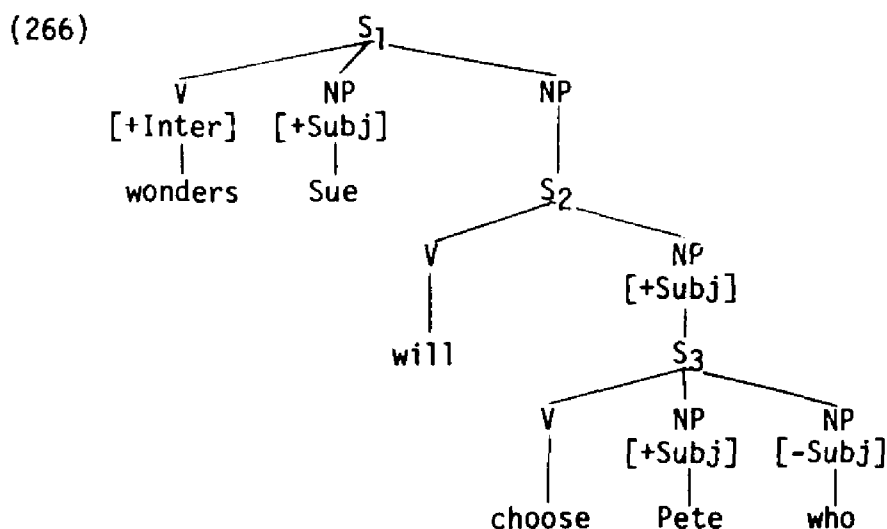
VNPI, then, being appropriately guided by the mark on the NP immediately to the right of the verb, will apply in S₁ and S₃ only, correctly deriving (262).

Consider now a pair of sentences which further show the need to have VNPI sensitive to a feature such as [+Subj] indicating underlying

subjecthood. To derive (265), VNPI must apply on two S's, in both cases where the crucial NP is [+Subj].

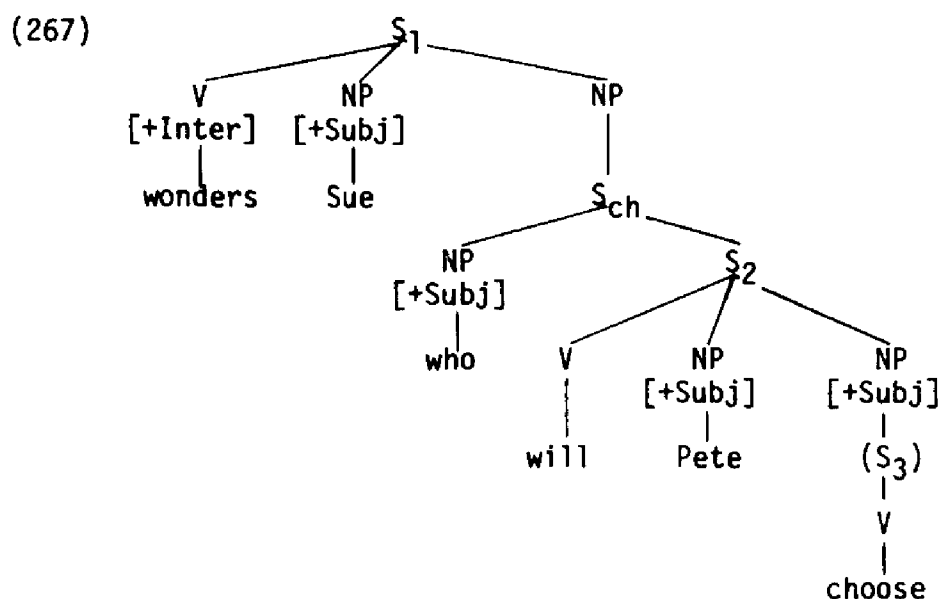
(265) Sue wonders who Pete will choose.

This sentence has (266) as an underlying structure (omitting the performative cycle and the highest auxiliary).



Since auxiliaries obligatorily trigger RAIS, Pete will be moved into S₂. And, triggered by the interrogative wonder, QUEST applies on S₁, moving who out of the lowest cycle.¹⁰⁹ The output of these rules applying to (266) is (267).

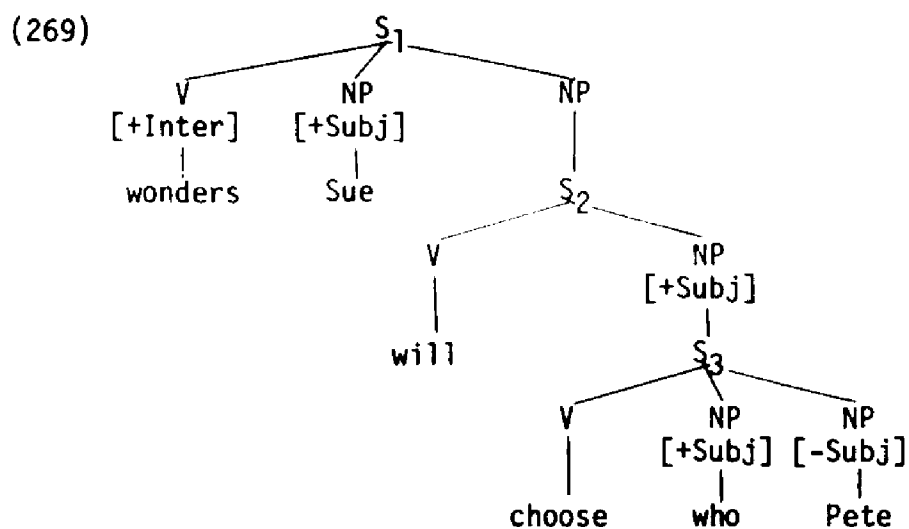
109. QUEST, following Ross (1968:103) and Postal (1972d:134-35), I take to involve Chomsky- and not daughter-adjunction. Notice that if who is attached as an immediate constituent of S₂ in (267), the rule VNPI will have to be complicated, for it would then have to be formulated with an optional NP to the left of the verb. With QUEST attaching questioned NPs only by Chomsky-adjunction, VNPI will not require this complication.



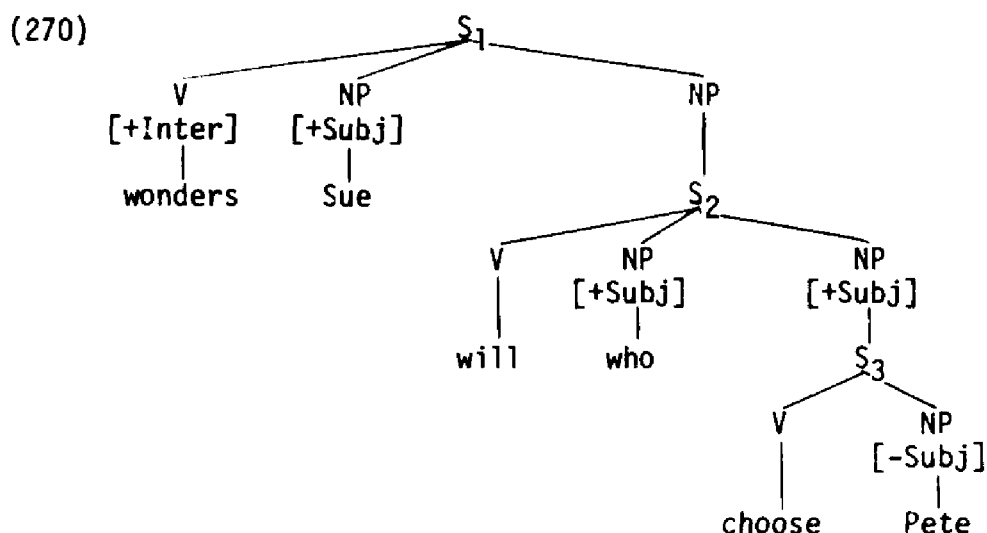
Now VNPI is the only relevant rule left to apply. In (267) it operates in both the S_1 and S_2 domains, interchanging V and NP[+Subj] to derive the grammatical (265).

A sentence similar to (265), but with the grammatical functions of Pete and the questioned NP reversed, is (268), the underlying structure of which is (269).

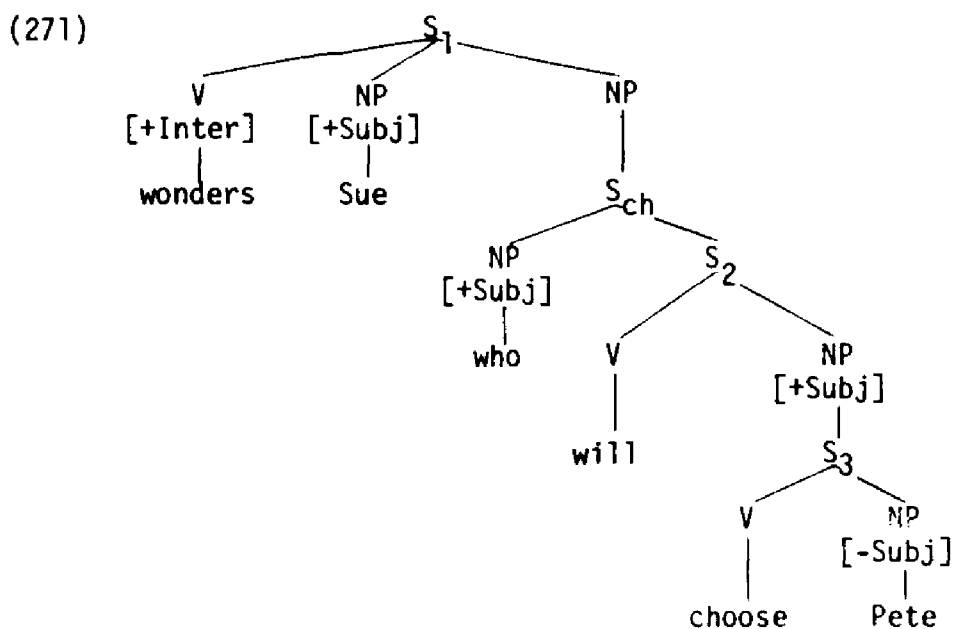
(268) Sue wonders who will choose Pete.



As before, RAIS applies on the S_2 cycle; this results in (270).



On the next higher cycle, S_1 , QUEST is triggered by the interrogative verb and Chomsky-adjoins who to S_2 .



When VNPI applies, then, it will invert wonders and Sue, but must not move the elements in S_3 . VNPI is blocked in this latter case by the NP, Pete, being an underlying nonsubject. Thus (268) is correctly derived.¹¹⁰

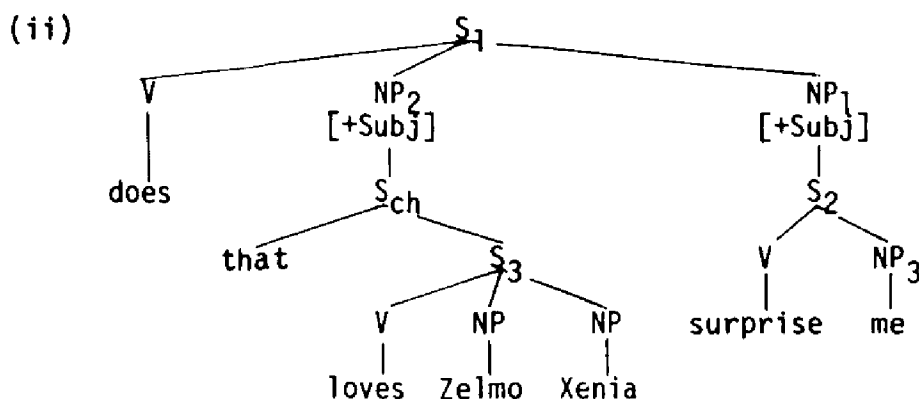
¹¹⁰ "Correctly" only insofar as some way is found to block the application of VNPI on the S_2 domain in (271). Notice that it is not possible to restrict VNPI to applying only to noncomplex NPs. For example, one stage in the derivation of (i) is (ii), a structure to which RAIS

We may summarize here the various environments where these two inversion rules apply. As is evident, the ranges of application of these rules are very nearly, although not quite complementary. (A plus indicates an environment where the rule must apply.)

(272)	SAI	VNPI
a. Performative S	-	+
b. Topmost nonperformative S		
performative is [+Inter]	+	-
performative is [-Inter]	-	+
c. Embedded S		
first NP is [+Subj]	-	+
first NP is [-Subj]	-	-

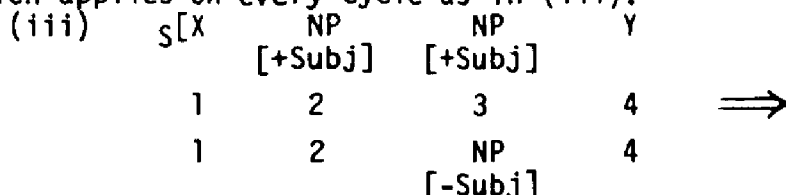
(continues fn. 110) has applied moving NP₂ up into S₁.

(i) That Zelmo loves Xenia surprises me.



At this point VNPI must apply, interchanging does and NP₂. Do now directly precedes surprise; after deletion, (i) is derived.

One way to 'explain' the application of VNPI to S₁ in (ii) but not to S₂ in (271) above is to postulate a rule of [Subj]-Switch, which applies on every cycle as in (iii).



The necessity of such a rule, however, is but a further example of the additional specification required in stating the applicational conditions of VNPI relative to those necessary to elaborate for SAI.

As a first approximation to the formulation of these rules, we may propose:

- (273) a. SAI
- | | | | | | |
|----------|---|--------|----|-----|---|
| V | X | S[(NP) | NP | Aux | Y |
| [+Perf] | | | ↑ | | |
| [+Inter] | | | | | |
-
- b. VNPI
- | | | | | | |
|----|----------|----|-----|---------|---|
| a. | V | NP | X | | |
| | [+Perf] | ↑ | | | |
| b. | V | X | S[V | NP | Y |
| | [+Perf] | | ↑ | | |
| | [-Inter] | | | | |
| c. | V | X | S[V | NP | Y |
| | [-Perf] | | ↑ | | |
| | | | | [+Subj] | |
- condition: postcyclic

The attempt will not be made here to collapse the three subparts of VNPI. Such a collapsing would involve the use of curly braces,¹¹¹ and perhaps more exotic conventions. Suffice it to say that the near complementarity of the environments for SAI and VNPI is not paralleled by correspondingly simple formulations of the rules.

Thus it seems that when the formulation of VNPI is more closely investigated and compared with its supposed complement SAI, there are good reasons for questioning step 1 of argument (254). While THERE in a verb-first analysis is admittedly more simply statable than the corresponding rule in an SVO system, quite the contrary is the case for the relative complexities of the inversion rules necessary under each analysis. As seen in (273), the generality of statement for SAI contrasts sharply with the disjoint environments necessary to be elaborated for VNPI. Therefore it is to be concluded that, at least with regard to

¹¹¹. McCawley in at least two places (1970:296, 1971b) explicitly argues against the use of curly braces in the formulation of rules.

the facts of inversion and of sentences with the dummy there, the verb-first analysis of English has little to recommend it in comparison with the more traditional SVO treatment of underlying elements.¹¹²

Insofar as VSO underlying order is not motivated, then there is no case for a rule VNPI, postcyclic or not. McCawley's case for noncyclicity depends crucially on the relatively greater simplicity of a verb-first analysis. Where this greater simplicity in fact does not exist, then a noncyclicity argument such as he constructs cannot stand.¹¹³

b. Whether Deletion. There is a restriction on the occurrence of whether in English to the effect that this form cannot occur in direct questions; this is illustrated in (274).

- (274) a. Ted wonders whether Sam can swim.
 b. John asked whether the car will be ready by Friday night.
 c. (*Whether) can Sam swim?
 d. (*Whether) will the car be ready by Friday night?

An obligatory rule Whether Deletion (WHETHER-DEL) may be postulated to account for the ungrammaticality of sentences such as (274c,d). As

112. If indeed devices such as curly braces are needed for the statement of VNPI, as in (273b), then this eliminates one of the advantages claimed (McCawley 1970:296) for an underlying verb-first order. Baker (1971:174-75) gives an argument against another purported advantage of the VSO hypothesis, showing that where only and even originate directly before the verb of the clause they modify (see McCawley 1970:296), then some further complication is necessary in VNPI (or a second inversion rule must be postulated) to handle the order of only, the auxiliary, and the subject in yes-no questions. For recent attempts at a thorough-going refutation of the VSO hypothesis, see Smith 1973 and Berman 1974.

113. The inversion process in questions, then, following the conclusion reached above in discussing Matthews 1970, may be taken as cyclic. Note, however, that the structural description of SAI-q is compatible with its applying last- or even postcyclically. In every case auxiliaries will invert if and only if the next higher verb is a member of the appropriate class. This means that if it turns out that SAI-q and SAI-fr should be combined into a single rule, their respective rule-types thus represent no barrier to a formal collapsing.

Chomsky (1971:46,72) has noted, such a rule would have to be "restricted to the matrix sentence."

This whether has been derived in different ways within transformational discussions of questions. Baker (1970) and Jacobs and Rosenbaum (1968), for example, suggest lexically expanding the abstract morpheme 'Q' into whether. Katz and Postal (1964) derive whether from a sentence-adverbial node dominating [wh + either + or], a treatment similar to that adopted by Bresnan (1970) and Chomsky (1971). No matter what the source of this question word, however, the rule deleting it must do so only in the same S's in which SAI-q applies: in direct questions and in the reported questions of direct discourse.

Since WHETHER-DEL must operate in the same environment as SAI-q, this means that the rule may be written to refer to a higher [+Perf, +Inter] (or simply [+Perf]) verb. With this trigger incorporated into its formulation, then, there is no argument for WHETHER-DEL in addition being marked as having to belong to any noncyclic rule-type. The application of this rule will, in fact, occur only on root S's; however, given a structural description referring to a higher verb, this root-cyclicity is intrinsic only, and does not represent an incompatibility with strictly cyclic application.

c. Imperative rules. Much as for WHETHER-DEL, rules for the generation of English imperatives must be guaranteed to apply only on the highest cycle or in clauses of quoted material. Thus, to explain grammaticality facts such as those in (275), Stockwell et al. (1968:685-97) postulate rules we may refer to as Subject Auxiliary Inversion in Imperatives (SAI-i) and You Deletion (YOU-DEL).

- (275) a. *Bill demands that don't (you) say that again!
 b. Don't (you) say that again!
 c. *I insisted that do you come in!
 d. Do (*you) come in!
 e. *They requested that come here!
 f. Come here!

SAI-i moves an imperative marker followed by NEG and/or EMP to the front of a sentence, and YOU-DEL removes second person subject pronouns. In both cases the rules are explicitly marked as applying last-cyclically.

As with SAI-q and WHETHER-DEL, so here the application of SAI-i and YOU-DEL to highest S's only (or, more strictly, to root S's only) may be guaranteed by their being formulated to include explicit reference to a [+Performative, +Imperative] verb in the next higher clause.¹¹⁴ When SAI-i and YOU-DEL are written in this way, then they become intrinsic root-cyclic rules, and require no explicit marking for membership in any (noncyclic or cyclic) rule-type. In particular, they are fully consistent with a strictly cyclic application.

II.B.4. Emonds' root-cyclic rules.

In his dissertation, Emonds (1970) mentions 16 rules of English which he claims must be considered to be root-cyclic - i.e., restricted to applying on a root S, or, "the highest S in a tree, an S immediately dominated by the highest S, or the reported S in direct discourse" (p. 6).

¹¹⁴. The specification of a higher verb [+Perf, +Imp] is here taken to imply the possibility of application both on the clause of the highest nonperformative and in directly quoted imperatives. As discussed above for the formulation of SAI-q in subsection a, this involves either explicitly adding [+Quotative, +Imp] to the structural descriptions of SAI-i and YOU-DEL, or, preferably, defining the feature [+Perf] as including direct utterances both of the speaker and also of someone referred to by the speaker.

Some of these have been discussed earlier in this study, with varying conclusions reached regarding the need for being explicitly marked as noncyclic. Here we may list all the root transformations in Emonds 1970, dividing these into three groups for purposes of later discussion. An example is given of each rule having operated; the place in Emonds 1970 where each is discussed is listed after the abbreviation of the rule.

(276) a. 1. Negative Constituent Preposing (NEG-PRE; p. 11)

Not a single coin can Burt identify.

2. Directional Adverb Preposing (DIR-PRE; p. 12)

Down she fell.

3. Topicalization (TOPIC; p. 18)

Roast beef I'd like to have for supper.

4. VP Preposing (VP-PRE; pp. 18-19)

Max plans to learn Swahili, and learn it he will.

5. Left Dislocation (L-DISL; pp. 19-20)

The factory, Alex predicted it would shut down by next month.

6. Right Dislocation (R-DISL; pp. 20-21)

Alex predicted it would shut down by next month, the factory.

7. Comparative Substitution (COMP-SUBS; pp. 21-22)

More surprising was his interest in medieval art.

8. Participle Preposing (PTCP-PRE; pp. 22-23)

Running the finest pizzeria in the whole county is Dominico S.

9. PP Substitution (PP-SUBS; pp. 23-24)

Under the mat were gathered all kinds of little creatures.

10. Subject Replacement (SUBJ-REPL; pp. 69-103)

That Peter is always late bothers Sue.

b. 11. Subject-Auxiliary Inversion (SAI; pp. 4-8)

Are they coming tomorrow?

Rarely had Sally seen such a blizzard.

12. Subject-Simple Verb Inversion (SVI; pp. 12-13)

Out from under that garbage can crawled at least a dozen sow bugs.

c. 13. Tag Formation (TAG; pp. 9-10)

We're ready now, aren't we?

14. Quote Preposing (QUOTE-PRE; pp. 14-16)

"Get off my toe!" hollered Steve.

15. Non-factive Complement Preposing (COMP-PRE; pp. 16-17)

The Cubs will lose again, I guess.

16. Adverbial Dislocation (ADV-DISL; pp. 113-14)

Bruce knew the right answer, luckily.

Although Emonds' treatment of these 16 rules would imply that each is restricted in a similar way in its application in derivations (viz., being able to operate only when in a sentence which is a root S), in fact these may be divided into three groups, each with differently-specified restrictions in formulation. When appropriate formulations of these 16 transformations are taken into account, then only one group will in fact apply only on root S's; none will require explicit marking for root-cyclicity.

a. Fifteen of Emonds' root transformations are discussed at length by Hooper and Thompson (1973), who show that for many of these the

restriction on rule application that Emonds places on them in having them be root-cyclic does not capture a significant generalization as to their range of occurrence. Specifically, they demonstrate that the restriction on application of the rules in (276a) above is a function, not of the S on which the movement actually occurs (i.e., not of being in a root S or not), but of whether or not the clause in which they operate may be taken as expressing an assertion.¹¹⁵ In the framework followed here, this fact will be discussed in terms of the features of the relevantly higher verb: where this higher verb is one that asserts the truth of its complement - whether the assertion is due to the speaker or to someone reported in the discourse - then the 10 rules in group a generally may operate, regardless of whether or not the verb immediately dominates a sentence that would be designated a 'root S'.

This has been illustrated in some detail in the discussion of TOPIC in section II.B.1 above. There it was seen that identification of a feature [+Assertion] is useful in predicting when TOPIC is possible in embedded (and main) clauses, and that in fact the formulation of TOPIC in (247), where this mentions explicitly the appropriate verb feature,

115. Fred Householder (personal communication) has suggested a somewhat different characterization of the environment in which root-cyclic rules may operate. He points out that the verbs that allow the rules of (276a) to apply in their complements (see (246A,B,E), for example) are those that report quotation - either direct quotation, where some linguistic act is repeated verbatim, or 'free indirect style', which reports verbatim except for tense and pronoun changes, plus a possible introductory that. Indirect quotation, on the other hand, claims to give only the sense of what was said or thought, and typically excludes Emonds' root transformations.

This proposal, as well as Green's reported in footnote 92 above, should certainly be considered in any fuller study of the phenomenon discussed by Hooper and Thompson. Again, though, investigation of the restrictions on the application of rules in embedded sentences is somewhat beyond the bounds of this study; here I take it that the relevant rules claimed to be root-cyclic can in fact apply in some but not all embedded contexts, and assume that the quality of the higher verb is significant in defining such applicational possibilities.

represents the most direct way of accounting for the relevant facts. In discussing SAI-fr in II.A.8.b above, similar facts were pointed out for NEG-PRE (see (205)-(206)).

It perhaps may be sufficient to illustrate Hooper and Thompson's observations with one more rule. For PP-SUBS, they cite the following sentences where it has applied in embedded clauses.

- (277) a. The scout reported that beyond the next hill stood a large fortress.
- b. *That over the entrance should hang the gargoyle was written in the plans.
- c. It was written in the plans that over the entrance should hang the gargoyle.
- d. It seems that on the opposite corner stood a large Victorian mansion.
- e. *The guide was surprised that beyond the next hill stood a large fortress.
- f. The scout discovered that beyond the next hill stood a large fortress.
- g. *It's mandatory that in the halls stand the guards.
- h. *The claim that on the wall hangs a portrait of Mao is still unsubstantiated.
- i. The rotunda, in which stands a statue of Washington, will be repainted.
- j. *The rotunda in which stands a statue of Washington will be repainted.
- k. Between the lobby and the vault is a hallway in which stands an armed guard.

1. They must be Disney freaks, because on the wall is a huge portrait of Donald Duck.

m. *We were all much happier when upstairs lived the Browns.

The sentence-types which allow PP-SUB (and in general, the other 9 rules of (276a) as well) are characterized as follows:

- (278) a. complement of class A verb (cf. (246) above) in certain constructions: (277a,c)
- b. complement of class B verb: (277d)
- c. complement of class E verb: (277f)
- d. nonrestrictive relative clause: (277i)
- e. restrictive relative, indefinite head: (277k)
- f. nonrestrictive because clause: (277l)

PP-SUBS, and the other 9 rules of its group, is generally not possible in the following embedded contexts:

- (279) a. complement of class A verb in certain constructions: (277b)
- b. complement of class D verb: (277e)
- c. reduced clause (one having no finite verb): (277g)
- d. noun complement clause: (277h)
- e. restrictive relative, definite head: (277j)
- f. temporal subordinate clause: (277m)

The authors show that the six contexts of (278) have in common that they allow a reading where the embedded clause represents a main assertion, and that the environments in (279) are all similar in that the embedded clauses do not express a main assertion. Similar paradigms are constructed for the other rules of (276a).

In the face of the common feature observed in (278) and (279), and its correlation with the facts of (277), Hooper and Thompson conclude that the notion of 'root S' is not significant in governing the domains

of application of PP-SUBS and such rules. Rather they find that some notion of assertion must be explicitly recognized as defining when Emonds' 'root transformations' may or may not apply. While they do not incorporate their observations in any explicit way into the formulation of the relevant rules, it seems simplest for now to assume a performative analysis and a definition of these 10 rules along the lines of the formulation of TOPIC in (247). That is, for NEG-PRE, DIR-PRE, and the others in (276a), it must be explicitly stated that the next higher V (whether performative or not) be one which allows its complement to be asserted.

Once the operation of these rules is made dependent on a specific verbal trigger in this way, then all explicit marking for rule-type becomes irrelevant. There is thus no basis for considering these rules to be root-, last-, or postcyclic; their application on only the appropriate S's is governed not by rule-type assignment, but wholly by the otherwise motivated structural descriptions of the rules themselves.

b. The second group of rules in (276) that Emonds found to be root-cyclic are subject-verbal inversion rules, one corresponding to SAI-q and SAI-fr as these were discussed above in section II.A.8.b, and the other to SVI as this was defined in the same place. Hooper and Thompson (1973) for some reason never mention SVI, and treat SAI only in the context of pointing out that it differs from the other purported root transformations in having more than simply an emphasizing function. In some cases, SAI(-q) marks an utterance as a question, and in others SAI(-fr) has very little independent function, being triggered by NEG-PRE.

These rules have been discussed above, where in every case it was

shown that something other than a classification as root-cyclic is necessary to guarantee their operation in all and only the appropriate contexts. In section II.A.8, SAI-fr and SVI were shown to be postcyclic rules, applying in sentences already passed in the upward cyclic movement through the tree, their operation being defined in terms of certain preposed elements. And in section II.B.3.a, it was shown that SAI-q could be considered a cyclic rule, its application being governed solely by a higher performative interrogative verb.

Thus for neither of the inversion processes considered by Emonds is it necessary (or sufficient) to mark them as being root-cyclic. As with the rules in (276a), so here the specifications of the appropriate trigger means that the rules will apply in more contexts than simply root S's.

c. The remaining four rules in (276), unlike the 12 others, seem to be genuinely restricted to applying only in root S's - i.e., in topmost (noncoordinate) S's and in the quoted matter of direct discourse. Like the other rules, however, the constraints on their application may be handled by the structural descriptions of the rules themselves; an explicit marking of these four rules as root-cyclic is thus unwarranted.

TAG was considered above in II.A.8.d in a discussion of the rule-type of DO-SUP. There it was pointed out that the operation of this rule in a given clause is dependent on the verb in the next higher S being a performative meaning roughly 'suppose'. This performative may optionally not be deleted, and thus some surface strings will manifest an embedded tag question. Once TAG is defined in this way, then it will in fact apply only in root S's in derivations. Its root-cyclicity is only intrinsic, however, and leaves no room for marking it

extrinsically as belonging to this or any other noncyclic rule-type.¹¹⁶

The three other rules in (276c) - QUOTE-PRE, COMP-PRE, and ADV-DISL - are little discussed by Hooper and Thompson. The examples in (280), however, are typical, and show that these rules must be restricted to applying on the highest nonperformative. In each case, the sentence is grammatical where the rule indicated has not applied, or where the embedded sentence stands alone as a main clause.

(280) a. QUOTE-PRE

1. *Ella noticed that, "I don't like spinach," said Bobby/Bobby said.
2. *It is only too memorable that, "Who lost the map of Maine?" shouted Mary/Mary shouted.

b. COMP-PRE

1. *I think Jason won't be coming after all, I finally realized.
2. *It appears that he wants winter to last all year, he believes.

c. ADV-DISL

1. *John found out that we weren't giving our fair share, actually.
2. *It was strange that Martha brought home the wrong book, unfortunately.

116. Hooper and Thompson's (1973:471, 477-78, 481) claim that embedded tags occur only with first person subject and with the main verb in the simple present tense is perhaps too strong, as indicated by the grammaticality of (i), pointed out to me by Fred Householder.

(i) He supposed they'd all gone, hadn't they.
This is an example of 'free indirect style' (see footnote 115), one of the environments described by Householder as allowing root transformations. Given strings such as (i), TAG perhaps should be defined on a higher verb characterized only as [+Suppose], and not [+Perf, +Suppose] as argued by R. Lakoff (1969b) and others. Under this analysis, TAG would be grouped with the rules of (276a), not (276c).

In addition to these rules being required to apply only on highest S's, their operation must be sensitive to the quality of the performative. None of these can apply in questions, as illustrated in (281); all seem restricted to assertive contexts.

- (281) a. *Did "I don't like spinach" Bobby say?
 b. *"Don't I like spinach," Bobby said?
 c. *Did Jason won't be coming after all I finally realize?
 d. *Won't Jason be coming after all I finally realized?
 e. *Did Martha bring home the wrong book, unfortunately?¹¹⁷

The specification of QUOTE-PRE, COMP-PRE, and ADV-DISL thus requires explicit mention both of the performative (to guarantee that the preposed material be moved to the front of all the nonperformative clauses and that ADV-DISL apply only in the highest nonperformative S) and of the specific nature of this performative (to guarantee that these rules apply only in assertions). The first requirement could be met by marking these rules as root-cyclic. The second one could not be accounted for in this way, however, for such a marking for rule-type could not without complication be made sensitive to the quality of the performative. As in the formulation of TAG, the simplest solution here is to write the structural descriptions of QUOTE-PRE, COMP-PRE, and ADV-DISL so that these explicitly define a higher performative (assertive, etc.) verb as trigger for their respective operations.

When the relevant facts are accounted for in this intuitively

117. Example (281e) could perhaps be considered grammatical as a kind of quasi-tag question. It is not acceptable, however, as a request for information. Notice that this sentence is not improved when ADV-DISL has not applied:

(i) *Did Martha unfortunately bring home the wrong book?
 The unacceptability of both (i) and (281e) may be explained as arising from the incompatibility between the "factive adverbial" unfortunately and the question sentence-type, which here does not presuppose the truth of its predicate.

simplest fashion, then there is no case for explicitly marking these rules for membership in some noncyclic rule-type. They are, along with the 10 rules of (276a) and with SAI-q, entirely compatible with a strictly cyclic application of rules. Only SAI-fr and SVI are not thus compatible; as discussed in previous sections, these must apparently be considered postcyclic.

II.B.5. Appositive Formation.

The only remaining argument that I am aware of for a rule of English syntax being last- or root-cyclic is that given by Lakoff (1968a:36-53) for the last-cyclicity of Appositive Formation (APPOS). This is the rule that derives (282b) from the conjunction in (282a); later rules then optionally derive a nonrestrictive relative such as in (282c).

- (282) a. Joan plays the flute and I saw her in the marching band.
- b. Joan, and I saw her in the marching band, plays the flute.
- c. Joan, who I saw in the marching band, plays the flute.

As the argument is presented in his "Deep and Surface Grammar" it is a rather complex one, involving, at one count, 66 steps. All these need not be reviewed here, as we shall be concerned primarily with those that attempt to show that APPOS cannot be cyclic. The argument may be summarized as in (283).

- (283) 1. APPOS cannot be precyclic. This is because it must apply in derivations after CONJ-RED, a rule which is not precyclic.
- 2. APPOS cannot be cyclic:
 - a. If it were cyclic, then any sentence with an embedded appositive clause would be structurally ambiguous; the

source for the appositive could be an S conjoined to any of the underlying S's. Yet sentences with indefinitely deeply embedded appositives are not ambiguous.

- b. If APPOS were cyclic, then it could change meaning if it could apply in embedded clauses.

APPPOS not applied:

(i) John denied that Harry shot Bill and robbed the bank.

APPPOS applied:

(ii) John denied that Harry, who robbed the bank, shot Bill.

Since (i) \neq (ii), and since it is assumed that transformations may not change meaning, this shows that APPPOS cannot be allowed to apply in embedded clauses.

- c. If APPPOS were cyclic, and appositives could arise from embedded, conjoined S's, then "the fact that appositive clauses always embody an assertion" (p. 41) would not be accounted for.
- d. If APPPOS were cyclic and could apply in embedded clauses, then certain facts of redundancy and nonredundancy in conjoined sentences could not be explained in a general manner.

3. APPPOS cannot be postcyclic. Pronominalization, Lakoff (1968a) argues, is cyclic and must be ordered after APPPOS,

4. Therefore, by elimination, APPPOS must be last-cyclic.

First, note that the arguments advanced in step 2 of (283) represent positive evidence for the last-cyclicity of APPPOS, given the definition of the rule-types adopted in this study. That is, the purported

ordering relation holding between Pronominalization and APPOS in step 3 is irrelevant to whether or not APPOS must be restricted from applying wholly within some lower clause; insofar as the facts cited under step 2 are correct, then APPOS must apply only on highest S's. The question here is whether this applicational restriction is a natural function of the structural description of the rule itself, or whether some diacritic must be added explicitly to guarantee last- or root-cyclic application in derivations.

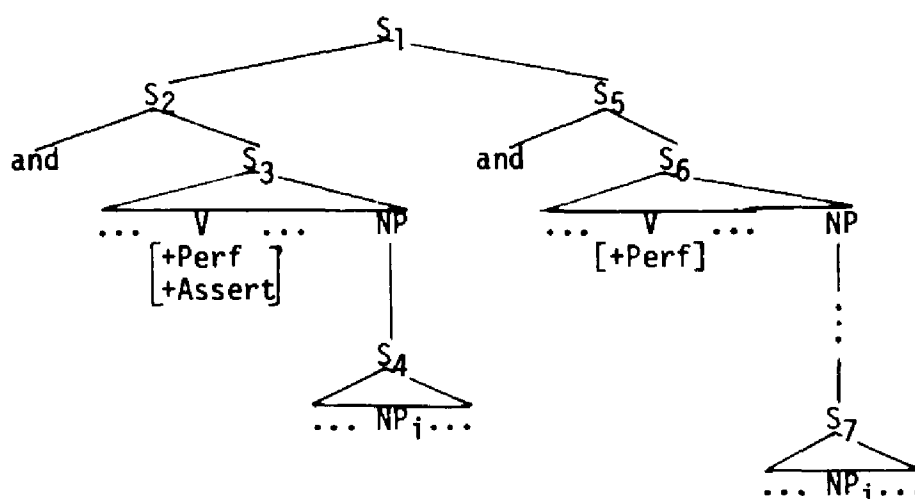
Although Lakoff 1968a contains no precise formulation of APPOS, a hint of an important feature necessary in the rule is given in step 2c above. There it is implied that sentences conjoined at the topmost S of a tree always represent an assertion, whereas conjuncts appearing lower down do not. Where this generalization holds, then appositives, since they always represent an assertion, should arise only from 'root' conjuncts.

There is certainly no disagreement about restricting appositives to asserted clauses only; Thompson (1971:86), for example, summarizes this constraint: "a restriction must be placed on the [nonrestrictive relative formation] rule to the effect that questions and imperatives themselves cannot become [nonrestrictive relatives - or, intermediately, appositives]." The disagreement with step 2c of (283) would be with the implication that the highest conjuncts of a tree may ipso facto be identified as assertions. In fact, interrogatives, imperatives, and all manner of illocutionary acts may appear as sentences immediately dominated by a coordinate root of a tree.

What this means is that the fact that appositive clauses embody an assertion is not something derivable from the fact that they may arise only from topmost S conjuncts. Rather, to capture this restriction

on APPOS there is no choice but for the structural description of the rule to explicitly mention the nature of the performative; merely the position of a clause in the tree does not allow prediction of the kind of speech act it represents. I take it, then, that APPOS will be formulated to apply to structures roughly of the form of (284a), where the kind of performative present must be specified for the clause that is embedded, but not for the matrix clause. The result of its application is (284b), where pruning has erased the two highest S's.¹¹⁸

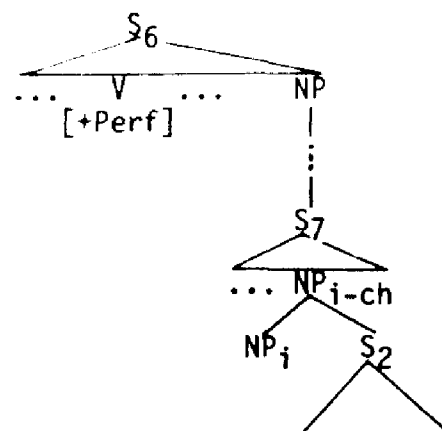
(284) a.



APPPOS



b.



¹¹⁸. I follow here a simplified version of the parallel rule "Swooping" formulated in Ross 1972a. Ross there gives no defense of the

Having discussed something of the formulation of the rule in question, let us consider the four reasons adduced by Lakoff for APPOS not applying cyclically. In the first place, Lakoff notes (pp. 37-40) that appositives may appear embedded indefinitely deeply in surface structures. In a sentence such as (285), for example, the appositive shows up in the fourth and most deeply embedded S.

(285) Bill knew a salesman who knew a farmer who knew that
Harry, who is a friend of mine, left early.

If APPOS could apply on any S, then (285) ought to be four ways ambiguous, for any of the four S's could have been coordinate with the appositive clause in the underlying structure. But (285) has only a single reading, namely where the appositive represents an assertion of the speaker uttering the sentence. This structural ambiguity may be eliminated, Lakoff argues, by requiring APPOS to apply only to conjuncts of the topmost S.

I certainly agree with Lakoff's intuitions concerning the non-ambiguity of (285). Given a formulation of APPOS which makes explicit reference to a higher performative, however, it is thereby prevented from applying on any lower cycles. The nonambiguity of a sentence such as (285) is thus guaranteed, not by marking APPOS as last-cyclic, but by virtue of its structural description inherently not allowing application on nonperformative cycles.

Some linguists would apparently disagree with Lakoff's generalization about the general nonambiguity of embedded appositives. Bach (1968:95), for example, cites (286a) as a case where the appositive

(continues fn. 118) rule embedding rightward instead of leftward (in Ross 1973a:110, Swooping embeds leftward); nor does he attempt to account for the restriction discussed above on what kinds of clauses may become appositives.

could represent an assertion of either the speaker of the sentence or the subject of the matrix clause. Thompson (1971:86-87) cites (286b,c) as even clearer cases of an appositive being the responsibility of the subject of the sentence.

- (286) a. I dreamt that Rebecca, who was a friend of mine from college, was on the phone.
- b. Harold says that his girlfriend, who is a little bit crazy, wants to go to Hanoi, but I think she's too rational to try it.
- c. The claims agent said that the paint job, which should have been done long ago, would cost \$150, but he doesn't know that now is when it should be done.

While I do not have too much trouble accepting (286a), even when Relativization has not applied to the appositive clause,¹¹⁹ sentences (286b,c) strike me as anomalous, and particularly so where the appositive has not undergone Relativization.

- (287) a. ??Harold says that his girlfriend, and she is a little bit crazy, wants to go to Hanoi, but I think she's too rational to try it.
- b. ??The claims agent said that the paint job, and it should have been done long ago, would cost \$150, but he doesn't know that now is when it should be done.

For dialects which do allow appositives to be attributed to subjects of any assertive clauses in an underlying structure and not just to the subject of an assertive performative, the rule APPOS would specify

119. Andrews (1971:603) points out that dream represents in some sense a special lexical item, that complements of this verb, as well as other clauses following this in the discourse, may generally be taken as referring to the world of the dream. For my dialect, this is much less possible with other, 'real world' assertion verbs (say, report, etc.).

only that the higher verb must be [+Assert]; this would mean that in (284a) the verb in S_3 would not be marked as being necessarily a performative. Even with such a simplified rule of APPOS, however, there would still be no argument against its applying cyclically, for it would produce only as many readings for a tree as there were verbs of assertion in it. For either dialect group, then, APPOS will be formulated to make explicit reference to a certain kind of higher verb, the mention of which itself guarantees that it will not apply inappropriately in embedded clauses.

The second argument against the cyclicity of APPOS concerns the fact that it could change the meaning of a sentence if it applied in embedded clauses (pp. 40-41). Lakoff illustrates this with APPOS applying in a coordinate complement of the verb deny. His example, shown above in (283), is repeated here in (288).

(288) a. John denied that S_1 [Harry shot Bill] and S_2 [Harry robbed the bank].

↓↓ APPOS

b. John denied that S_1 [Harry S_2 [who robbed the bank] shot Bill].

He observes that these differ in that the S_2 clause Harry/who robbed the bank is negated in (288a) but is affirmed in (288b). This meaning difference would not arise, Lakoff claims, if S_2 originated outside the complement of deny; therefore, he concludes, APPOS must be restricted to applying on topmost S's only.

Note that Lakoff's choice of verb in his example here is crucial. With report, assert, exclaim, claim, or any other verb of positive assertion, the application of APPOS to an embedded clause would leave the meaning of the sentence intact. Thus the only possible difference

between the sentences in (289) is that the appositive may not necessarily be assigned to the subject, as it is in (289a).

- (289) a. John reported that s_1 [Harry s_2 [Harry robbed the bank]].

↓ APPOS

- b. John reported that s_1 [Harry s_2 [who robbed the bank] shot Bill].

The difference between such derivations as (288) and (289) is due solely to the factor of negation, however, and not at all to the question of whether APPOS can apply on non-topmost S's. Schematically, (288) could be represented as in (290), where 'A' indicates an assertion, and 'Pa' and 'Pb' stand for the two statements about Harry's activities.

- (290) a. deny s_1 [A \sim Pa] s_2 [A \sim Pb]

↓ APPOS

- b. deny s_1 [A \sim Pa s_2 [A Pb]]

In (290a), the two complements of deny are appropriately marked as being asserted to be false. Purportedly by the application of APPOS to (288a), Lakoff derives (288b), a string that must be represented as in (290b), with S_2 now being asserted to be true.

But given a representation of underlying (288a) as in (290a), where the negative assertion of both complement S's is explicitly indicated, it seems that APPOS could apply to derive only (291), a string which does not reflect any change in meaning from (288a/290a).

- (291) John denied that s_1 [Harry s_2 [who didn't rob the bank] shot Bill].

In (291), as in (288a), both embedded propositions are asserted to be false. Any difference between (288a) and (291) revolves around who is responsible for the assertion in S_2 , and thus parallels exactly (289),

where a positive assertive verb is involved.

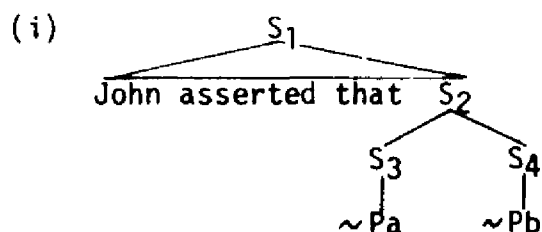
I thus conclude that APPOS can apply to (288a); when the structure underlying this string contains explicitly the information that each of the embedded asserted propositions contains a negative, then the rule applies only in a meaning-preserving fashion.¹²⁰ Lakoff's example (288) is misleading in that the same surface string (Harry/who robbed the bank) is actually negative in the one case but positive in the other. When the role of the relevant negative is taken into account, then there is no reason to restrict APPOS to applying on topmost S's only.

Lakoff's third argument in (283) against letting APPOS apply cyclically - that then the generalization could not be captured that appositives always embody an assertion (p. 41) - has been considered above. It cannot be relevant, as pointed out, for there is no basis for restricting topmost conjuncts to being assertions (or to being any other specific performative-type).

The last reason given for the noncyclicity of APPOS relates to a general statement Lakoff wishes to make about when a sentence is redundant (pp. 41-42). He notes that a sentence such as (292), which clearly has underlying identical conjuncts, is redundant.

(292) Bogart shot the major and Bogart shot the major.

120. A deeper representation of (288a) could be roughly as in (i).



APPOS applying on S₂ would derive (ii).

(ii) John asserted that Harry, who didn't rob the bank,
didn't shoot Bill.

Next, a rule raising the topmost negative to the main verb assert would derive (291).

When an appositive is formed from (292), it, too, is redundant.

(293) Bogart, who shot the major, shot the major.

Sentence (294), however, even though it includes the redundant (293) in its surface structure, is not redundant.

(294) It is not obvious that Bogart, who shot the major, shot the major.

Where APPOS is restricted to applying only on the highest S, then (294) must have nonidentical conjuncts in its underlying structure, as in (295a). If APPOS could apply on a lower cycle, then (294) could originate from (295b), where the coordinate S dominates identical S's. (The examples here are shown with Extraposition and other irrelevant rules having already applied.)

(295) a. [It is not obvious that Bogart shot the major] [Bogart shot the major].

b. It is not obvious that [Bogart shot the major] [Bogart shot the major].

The most general explanation of these facts, Lakoff in effect claims, is to limit the application of APPOS to topmost S's and to say simply that if an underlying structure has an S with identical conjuncts, then the corresponding surface string is redundant. If APPOS were not so restricted, then there would be no general way to explain the nonredundancy of (294 < 295b) and the redundancy of (293).

As in the second reason given in step 2 of this argument, so here the example sentence chosen is particularly crucial to Lakoff's point. If instead of (294) he had considered (296), for example, a sentence that on at least one reading is redundant, then presumably it could be argued that APPOS must not be allowed to apply to the highest S.

(296) It is obvious (reported/said/claimed/...) that Bogart,
who shot the major, shot the major.

Following the general explanation adopted for redundant sentences, we would be forced to say that (296) could not have arisen from the positive counterpart of (295a), but only from APPOS applying on the lower cycle in the counterpart of (295b); only in the latter deep structure would there be identical conjuncts.

Order may be brought to the facts here by again taking explicit account of the notion of assertion. Where APPOS is defined as applying only when the higher verb is making an assertion, then it may be unrestricted as to what cycle it operates on, and the general principle that deep structures with identical conjuncts result in redundant surface structures may be retained.

Consider the deep structures in (295). The complement of a verbal such as not be obvious makes no assertion, whereas the righthand S in (295a) does represent an assertion on the part of the speaker. The application of APPOS to these strings is diagramed in (297).

- (297) a. [not be obvious [-A]] [+A]
 \Downarrow APPOS
not be obvious [-A [+A]] (= 294)
- b. not be obvious $s_1[-A]$ $s_2[-A]$ ($s_1 = s_2$)
 \nrightarrow APPOS
 (not be obvious $s_1[-A]$ $s_2[+A]$)

An appositive may be formed in (297a), for the higher verb (as assumed here) is assertive. The output of APPOS applying here is nonredundant, as is its input. No appositive is possible in (297b), however, for the relevant verb is making no assertion. The only relevant surface

structure corresponding to (295b) and (297b) is (298).

- (298) It is not obvious that Bogart shot the major and (that)
Bogart shot the major.

As expected, this sentence is redundant.

The underlying structure of (296), however, could be presumably for at least some speakers, either (299a) or (299b).

- (299) a. [be obvious [+A]] [+A]

↓ APPOS

be obvious [+A] [+A]

- b. be obvious $S_1[+A]$ $S_2[+A]$ ($S_1 = S_2$)

↓ APPOS

be obvious $S_1[+A]$ $S_2[+A]$

In (299a), the appositive clause is the responsibility of the speaker; the output is, strictly speaking, nonredundant, for the complement of be obvious is an assertion made by the speaker with reference not to himself as observer, but to some indefinite set of unspecified observers.¹²¹ APPOS may apply in (299b), a structure in which identical propositions are asserted to be obvious to a generalized observer. Particularly for speakers who allow APPOS in embedded assertions, I would expect (296) to be redundant.

This fourth reason, then, represents no obstacle to APPOS being allowed to apply strictly cyclically. Where this rule is defined as in (284), then sentence redundancy may be explained in a completely general way without explicitly restricting the application of APPOS to a given S of the tree.

¹²¹. It is difficult to keep separate the speaker of a sentence such as (296) and the set of unspecified observers for whom the obviousness of the given proposition is asserted; therein seems to lie the redundancy felt about the output of (299a).

The conclusion, then, about the need to explicitly mark APPOS for membership in a given rule-type, is similar to that reached for Emonds' rules listed in (276a,c) above. When the nature of the performative that must govern APPOS is explicitly stated in the structural description of the rule, then there is no argument for extrinsically marking this transformation as to which cyclic domains it may operate in. We have examined four reasons advanced by Lakoff for so marking APPOS, and have found that in each case a formulation of this process as in (284) obviates the need for its being further elaborated in the manner Lakoff suggests.

II.C. Arguments for transformations being precyclic or anywhere.

There are only two arguments to be considered in this section - one dealing with a rule Sentence Deletion (S-DEL) or Sentence Pronominalization, the other with Gapping (GAP). Besides these two rules, I am not aware of any other processes of English syntax discussed within a generative framework which have been claimed to be assigned to one of these two noncyclic rule-types.

II.C.1. Sentence Deletion.

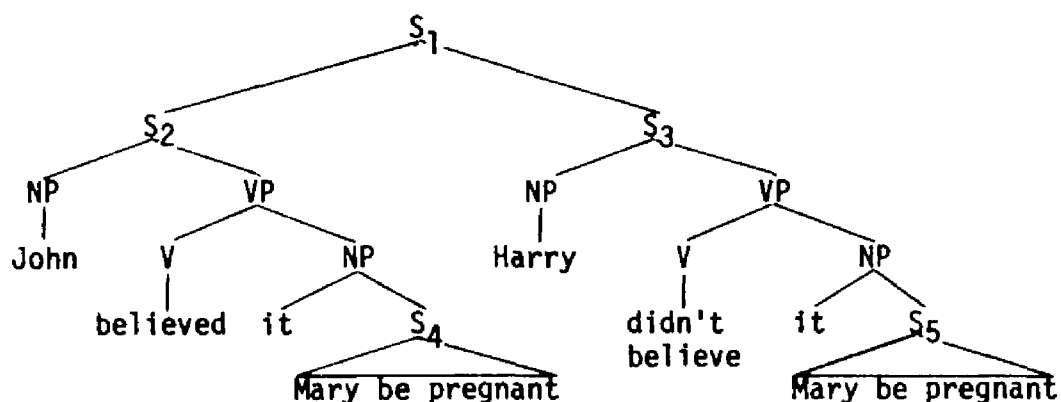
The argument for the noncyclicity of S-DEL is discussed in two places in Lakoff 1968a. In the first part (pp. 35-36) the author argues that it must be allowed to apply precyclically, this based on its relation with the cyclic rule Passive (PASS). Later on in his paper (pp. 66-74), Lakoff suggests that the same rule, S-DEL, might be involved in the derivation of certain other sentences, but in these that it would have to apply cyclically (i.e., non-precyclically). The whole argument could be summarized as in (300).

- (300) 1. S-DEL must be allowed to apply before PASS. Otherwise certain sentences could not be generated.
2. If S-DEL were cyclic, the desired order could not be guaranteed by ordering S-DEL before PASS. This is because PASS applies on a cycle lower than the one in which S-DEL would apply.
3. If S-DEL were precyclic, the desired order could be guaranteed by assigning these rules rule-type features as follows:
- Pr. S-DEL
- C. PASS
4. Therefore S-DEL must be precyclic.
5. S-DEL must be allowed to apply after Equi-NP Deletion (EQUI), a cyclic rule, otherwise certain sentences could not be generated.
6. Therefore S-DEL cannot be precyclic.
7. Therefore S-DEL must be an anywhere rule.

Steps 1-4, repeated without criticism in Kimball 1973a:55-56, are parallel to many of the arguments that have been made for rules being postcyclic. Here Lakoff shows that to a structure such as (302), from which (301) must be generated, S-DEL can delete the relevant S only if PASS has not yet applied.

- (301) Mary was believed by John to be pregnant, but Harry didn't believe it.

(302)



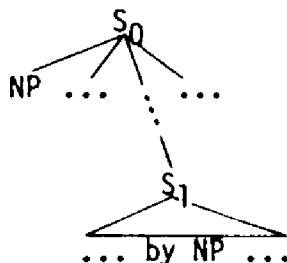
Once RAIS and then PASS apply on the S_2 cycle, the subject of S_4 will be moved away from its predicate, becoming the derived subject of S_2 . But then on S_1 , a cyclically applying S-DEL will be blocked from application inasmuch as S_4 and S_5 now would not meet the identity condition specified in the rule (see (5) in chapter I above). If S-DEL were given an opportunity to apply before these cyclic rules, however, then its structural description could be met, and it would be able to reduce S_5 as required. This relative ordering of S-DEL and PASS can be guaranteed, Lakoff argues, only by assigning these rules to different rule-types. Since Lakoff contends in an earlier section that PASS must be cyclic, this means that S-DEL can only be characterized as precyclic, applying to any S in the tree before the beginning of the upward-moving cycle.

This argument for the precyclicity of S-DEL/S-PRO seems to me to be quite strong. I am aware of only two attempts to challenge the conclusion in step 4, neither of which, given the assumptions of the present investigation, is very convincing. Peterson (n.d.) shows that a conclusion of precyclicity may be avoided by redefining the notion 'cyclic application' in certain fundamental ways; Grinder and Postal (1971) discuss a certain constraint which they hold to constitute evidence for S-PRO applying cyclically (or postcyclically) and in

addition being formulated with a global constraint. We consider the latter first.

Grinder and Postal's case for the cyclicity of S-PRO is based on a certain restriction between coreferential NPs where one is a passive agent (i.e., occurs in a (passive) by phrase); this is summarized in (303).

- (303) 1. As noted by Ross (1970b), there is a restriction on the occurrence of NPs as passive agents when they are coreferential with certain other NPs in the sentence.
2. This constraint should be formulated to throw out all derivations which include at any point the following structure (where by arises via PASS and where the two NPs are coreferential):



3. Sentences to be excluded by this constraint include those in which PASS and S-PRO both have applied.
4. In such sentences, this constraint is applicable only if PASS applies before S-PRO.
5. Since PASS is cyclic, this means that S-PRO also must be cyclic.
6. Since in some cases S-PRO requires information from a tree before any cyclic rules have applied to it, this means that S-PRO must be formulated as a global derivational constraint.

Ross (1970b:233-34) cites the following stylistically deviant sentences as examples of this constraint on coreferential NPs in passive constructions.

- (304) a. ??Tom thinks that it was given by him to your sister.
 b. ??Sue was expected by Max to wash him.
 c. *Sue was expected by Max to be washed by him.
 d. That it had been given by him to your sister was mentioned by Tom.

His formulation of the constraint in (305), however, is crucially different from Grinder and Postal's.

- (305) If a deep structure subject NP and some other NP in the same deep structure are coreferential, then the former NP may not become a passive agent.

Specifically, Ross does not require the subject NP to command the relevant NP in the by phrase.

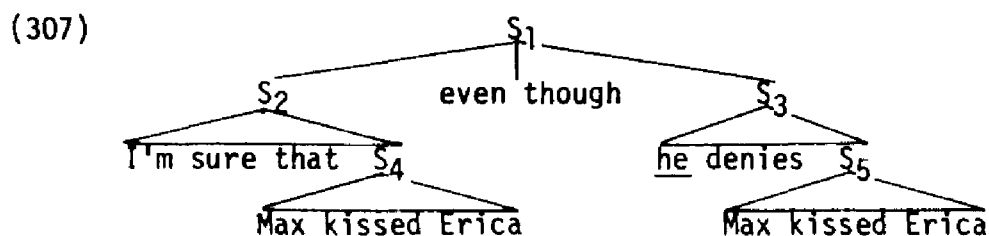
Grinder and Postal apparently accept the grammaticality judgments of the sentences in (304), and report parallel judgments for the crucial strings in (306).

- (306) a. *I'm sure that Erica was kissed by Max even though he denies it.
 b. I'm sure that Max kissed Erica even though he denies it.

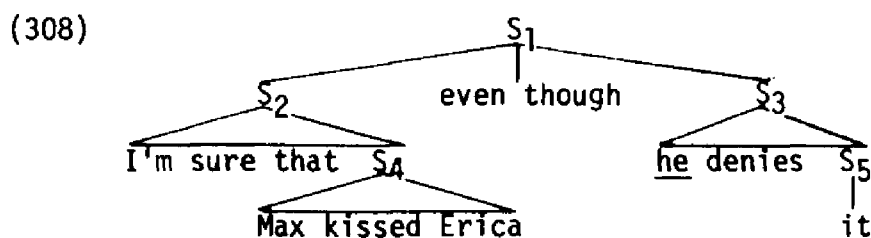
While sentences such as (306a) seem to me to be perfectly acceptable, thus leaving argument (303) with no empirical support, let us assume that the "many speakers" mentioned by the authors may indeed be found who would reject (306a). As Grinder and Postal emphasize, one would expect (306a) to be excluded by the same mechanism as that which is invoked in ruling out (304a,b,c).

Assuming for now, then, that the relevant constraint is to be

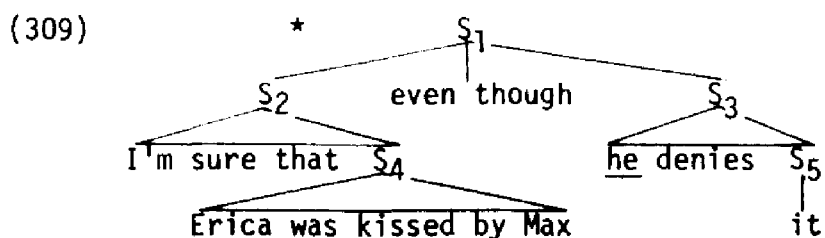
defined as in (303.2), and that this must be violated at some point in the derivation of (306a), this will mean that S-PRO must be applied only after PASS. To see that this is the case, consider a precyclically applying S-PRO. The relevant underlying structure is (307).



Here there is no violation of the constraint. The result of S-PRO pronominalizing S_5 is (308).



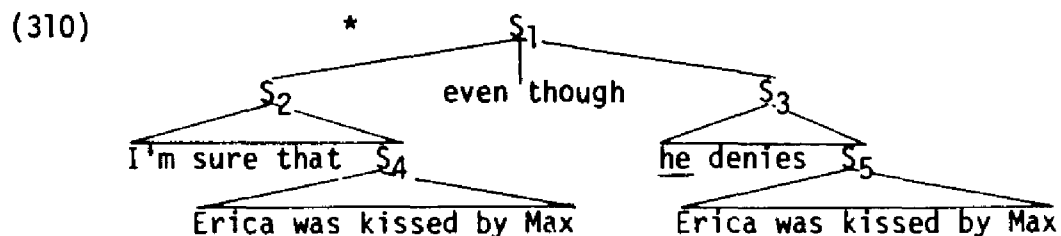
Still there is no violation, for there is no by phrase. PASS applying on the lowest cycle in the left conjunct yields (309), a structure that underlies (306a) and which must somehow be marked as ungrammatical.



Grinder and Postal's constraint, however, does not apply to structures such as (309), where the relevant by phrase is not commanded by the appropriate subject NP.

When S-PRO applies cyclically, however, then (306a) is naturally

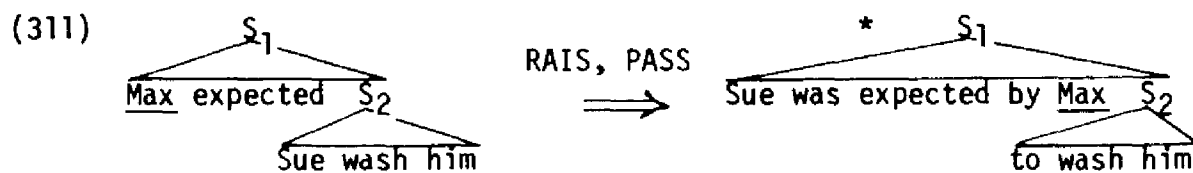
(i.e., in terms of a constraint needed on independent grounds) excluded. PASS will apply first to (307), presumably on both S_4 and S_5 . This yields (310), which contains a structure (i.e., S_3) falling under the domain of the constraint.



Now S-PRO, applying on the S_1 cycle, will pronominalize S_5 , deriving (309), and ultimately, (306a). Thus, the argument runs, in order to avoid postulating an additional constraint to handle (309), S-PRO must be allowed to apply only after PASS has operated, creating a structure that will violate (303.2). In order to handle sentences like (301), then, S-PRO cannot be a 'local' transformation, but must be allowed to refer back to the tree before any cyclic rules applied to it.

Ignoring the doubtful quality of the evidence adduced to support (303), this argument fails in that Grinder and Postal nowhere justify their reformulation of Ross's constraint (305). Yet this must be justified, for Ross's version of the constraint handles all the facts presented by Grinder and Postal in support of the non-precyclicity of S-PRO. Specifically, the structure in (309), formed by S-PRO applying precyclically and then PASS operating cyclically, is marked as deviant by virtue of the deep subject of S_4 , Max, having become a passive agent and being coreferential with he in S_3 . That is, unless there is some reason for preferring Grinder and Postal's version of this constraint, then there is no compelling motivation for formulating S-PRO as a global rule.

In fact there is good reason to prefer (305) over the formulation of this constraint given in (303.2). This is because Ross's version, but not Grinder and Postal's, correctly predicts that sentence (304b) is unacceptable. The derivation of this sentence is sketched in (311), where RAIS and PASS are the only relevant rules to apply.



Ross's (305) is violated, for the underlying subject of S_1 becomes a passive agent and is coreferential with another NP in the string. Grinder and Postal's is not violated, for there is at no point a subject NP commanding an NP coreferential with it which is in a by phrase. Ross's version of this restriction on passive constructions is thus preferable on grounds of observational adequacy.

My conclusion here is that Grinder and Postal have little case for S-PRO as a globally-formulated rule. Until there is some independent reason for preferring their statement of the relevant constraint over a previously given alternative (an alternative that also accounts for more of the relevant data), then I see no reason for accepting step 2 in (303). When this step cannot be established, however, then step 4, which requires PASS to apply before S-PRO is irrelevant. This means that there is no ordering paradox here, wherein PASS and S-PRO in some cases have to apply in one order and in other cases have to apply in the reverse order in derivations, and thus no basis for relying on a global formulation of S-PRO.¹²² The only necessary conclusion about how S-PRO

122. I do not consider in this study the larger question of the extent to which transformations must be allowed to be formulated globally.

must apply is that reached in step 4 of (300), viz., that S-PRO must be precyclic.

The only other explicit attempt I have seen to subvert this argument for precyclicity is in Peterson n.d. There the author shows that by defining the transformational cycle in certain ways different from the Aspects-based definitions assumed in section I.B above, and by not requiring Pronominalization to describe Langacker's (1969) 'primacy relations', S-PRO may apply cyclically and still generate sentences such as (301). More specifically, Peterson's proposal comprises at least the four notions in (312).

- (312) 1. a definition of 'parallel sentences': "two or more sentences are parallel if they are dominated (with no intervening S nodes) by the same S" (p. 3) - in (302), S₂ and S₃ are parallel;
2. a requirement that the upward cycle process subtrees that are parallel S's sequentially, and not simultaneously - in (302), this means that rules will apply to S₅ and then S₃ before they apply to S₄ and S₂ (or vice versa; no left-right order is specified);
3. a relaxing of the restriction on rules not being able to 'look up' the tree; structural changes performed in a given S must be performed when actually on the cycle of that S, but information relevant to the application of such

(continues fn. 122) If a global formulation of a rule such as S-PRO is not otherwise ad hoc, however, and if the relevant constraint on the application of PASS can be shown somehow to be more naturally stated in a way consistent with (303.2), then Grinder and Postal's argument here represents evidence against S-PRO as a noncyclic transformation. Further, since there apparently exists no other rule (in English, at least) for which a strong case exists for its being precyclic or anywhere, the argument would have the effect of eliminating the rule-type as a whole from the grammar.

a rule may be obtained from S's higher up in the tree or from parallel S's;

4. a rule Pronominalization which, following Lakoff 1968b, applies freely and which is supplemented by a set of output conditions defining the appropriate relations of pronoun and antecedent.

Given these definitions, then, S-PRO may apply strictly cyclically. In deriving (301), the right branch under S_1 must be chosen to begin the cycle. On S_3 , S-PRO, utilizing information from the parallel sentence S_2 (namely, that S_4 is identical to S_5), applies to pronominalize (or delete, given Lakoff's deep structure) S_5 . This change in S_3 is thus cyclically performed, where 'cyclically' includes referring to S's not already processed in the derivation. The rule in question does not keep track of command relations between pronoun and antecedent, and thus it is not required to apply only on the highest S dominating both identical elements; that is, here S-PRO may apply on S_3 and not on S_1 .

While I think it would be interesting to work out further the alternative definition of the upward cycle suggested in 3 of (312), such an elaboration would be somewhat beyond the scope of the present study, one which seeks to evaluate the postulation of the various rule-types as these have been argued to be necessary additions to the Aspects (or Aspects-implied) definition of the transformational cycle. When the upward (and downward) restrictions on the application of rules governed by such a cycle are revised as Peterson proposes, then arguments such as those reviewed in this second chapter would have to be radically reevaluated.

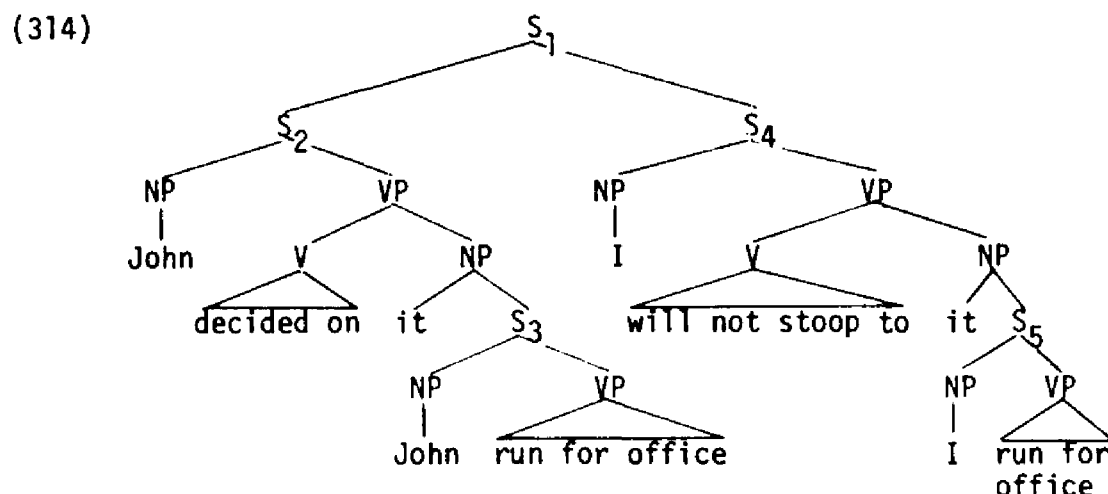
A further reason for not pursuing this alternative here is that Lakoff's (1968b) arguments regarding the rule-type of Pronominalization

are in many cases invalid (see section II.D below), and thus do not necessarily support the reanalysis of Pronominalization that Peterson (n.d.) accepts.

I am aware of no further evidence or suggestions that might indicate that S-PRO should not be allowed to apply precyclically. The conclusion in step 4 of (300), then, I take to be quite in order.

Turning now to the remaining steps in (300), these are based on a sentence such as (313), the underlying structure of which is roughly (314).

(313) John decided to run for office, but I will not stoop to it.



S-DEL cannot apply precyclically to (314), for there are not the requisite identical S's. Once the cyclic rule EQUI has applied on S_2 and S_4 , however, then the identity condition on S-DEL can be satisfied; after the nonidentical subjects of S_3 and S_5 are deleted, the remaining parts of these sentences are identical. Thus, given a sentence such as (313), and given these rules, there is evidence here that S-DEL cannot apply precyclically. This conclusion, combined with the conclusion derived from the interaction of S-DEL and PASS, leads Lakoff to suggest that S-DEL is an anywhere rule, applying at any point in the derivation

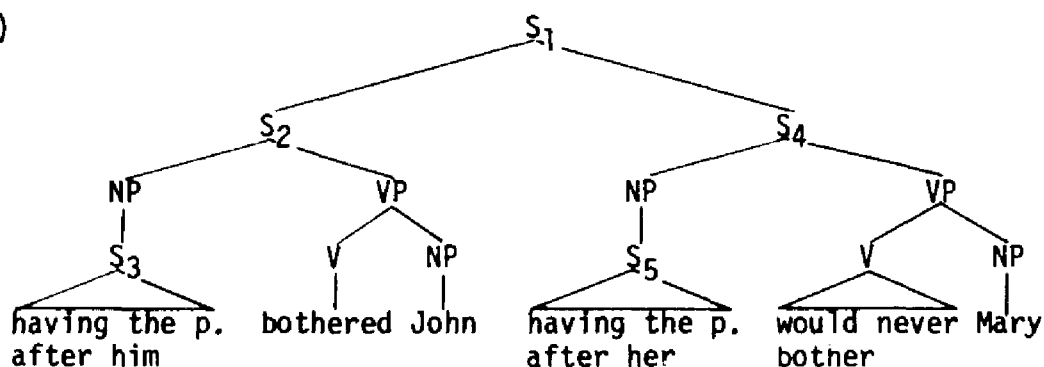
where its structural description is satisfied.

Lakoff (1968a:72-74) does suggest that perhaps some rule other than S-DEL is involved in deriving (313) from (314), a rule of VP-Deletion (VP-DEL), defined very similarly to S-DEL but restricted to deleting VPs only (see (6) in chapter I above). This rule could then be cyclic, and S-DEL precyclic, and all relevant facts would be accounted for. However, as mentioned in chapter I here, Lakoff in "Deep and Surface Grammar" apparently favors the derivation of (301) and (313) via a single deletion rule, and thus would be required to mark S-DEL as belonging to the anywhere rule-type.

Lakoff's preference for deriving sentences such as (313) by means of S-DEL, instead of a second, ad hoc rule postulated only to save S-DEL from being an anywhere rule, is seen much clearer in a later paper. In Lakoff 1970a:164, the author discusses criticisms raised by Chomsky regarding the use of S-DEL in deriving sentences such as (313). There Lakoff in no way hints that any process other than S-DEL is involved. Appealing to Ross's (1968) notion of 'sloppy identity', whereby "in rules deleting constituents under identity, pronouns commanded by their antecedents are ignored in the definition of 'identical constituents'" (Lakoff 1970a:164), Lakoff shows that S-DEL may in fact apply to (314) and similar structures. For example, he mentions the sentence (315), which after Pronominalization (PRO) has the intermediate structure in (316).

(315) Having the police after him bothered John, but it would
never bother Mary.

(316)



S-DEL now applies on the S_1 cycle, S_3 and S_5 being identical except for the differing, commanded pronouns in each.

Since her in S_5 here derives (at least in Lakoff 1968a and 1970a) via a rule PRO that operates other than precyclically, and since the definition of identity that makes the application of S-DEL possible is satisfied only after PRO has applied, it may be concluded that S-DEL cannot apply precyclically in the derivation of (315), (313), and other such sentences.

I take it, then, that the argument under review here consists of all the 7 steps of (300), that Lakoff is demonstrating that S-DEL must be guaranteed to apply as an anywhere, and not simply a precyclic rule. Details of the formulation of this process and of the relevant semantic facts are discussed, for example, in Lindholm 1969, Pizzini 1970, and in an interesting paper by Cushing (1972), but nowhere has it been suggested that S-DEL/S-PRO could be a rule that applied consistent with an Aspects-type upward cycle. The case for S-DEL as an anywhere rule, for the moment at least, seems reasonably convincing.

II.C.2. Gapping.

The remaining example of a rule argued to be anywhere is Ross's (1970a) rule Gapping (GAP). As discussed above in section II.A.7.b,

GAP as an anywhere rule figures prominently in Ross's explanation of certain facts of coordinate structures in languages of the world. The argument for its being noncyclic is sketched in (317).

- (317) 1. In order to explain the possible and impossible surface orders of elements in verb-reduced conjunctions of various languages, GAP must be able to apply "at any point in a derivation" (p. 845). Specifically, GAP must be able to apply both before and after Scrambling (SCRAM).
2. If GAP were precyclic, cyclic, last-cyclic, or postcyclic it would not be able so to apply.
3. Therefore GAP must be an anywhere rule.

This argument is fatally deficient on two counts. In the first place, as several have shown, when rules other than SCRAM are taken into consideration, GAP cannot be allowed to apply freely whenever its structural description is met (Jackendoff 1971:23-24, Koutsoudas 1971:376, Sanders 1970:7-8). For example, it is not obvious how Ross would block the derivation of (318c = Koutsoudas' 122) where GAP has applied precyclically.

- (318) a. John ate the meat and Mary ate the fish.

↓ (Pr) GAP

- b. John ate the meat and Mary the fish.

↓ (C) PASS

- c. *The meat was eaten by John and Mary the fish.

It should be noted that sentences such as (318c) can never arise where GAP (and PASS) are cyclic, for then PASS will always apply on a cycle lower than the one on which GAP applies.

In the second place, there is ample evidence that GAP should not

be formulated so as to apply bidirectionally. This has been surveyed above in discussing arguments for the postcyclicity of GAP, and it has been shown that GAP should be written to apply only forwards, and that only Conjunction Reduction should properly be a rule that applies in both directions. But when these rules are formulated in this way, then there is no evidence whatsoever that GAP needs to be anything other than cyclic. All the gapping facts may be explained by rules that apply strictly cyclically, as illustrated above in (189).¹²³

Given this evidence relevant to the argument in (317), I conclude that there is no basis for requiring GAP to apply precyclically, or in any other way noncyclically.

II.D. Arguments for Pronominalization being noncyclic.

Here we discuss arguments purporting to show that Pronominalization (PRO) cannot apply cyclically in derivations. The larger question of how overall to handle pronominals in the grammar cannot be discussed here. It will be seen that, whatever part of their explanation is to be borne, for example, by output conditions (see Lakoff 1968b, Postal 1972b), there is actually little evidence that Ross's (1967) claim regarding the cyclicity of PRO needs to be rejected.

The six noncyclicity arguments concerning PRO that I am aware of are due to Lakoff (1968b), Postal (1971, 1970b), and Bach (1969), and are reviewed individually below. As noted in the Introduction, although extrinsic ordering of rules was irrelevant in all the arguments considered in sections II.A-C, there are cases here where this question becomes important; for certain arguments, PRO must be noncyclic only if it cannot be extrinsically ordered after some other rule.

123. In (189), note that OBJ-PRE corresponds exactly to Ross's SCRAM.

II.D.1. Lakoff 1968b:28-29.

One argument where, contrary to the author's claim, an ordering constraint restricting PRO to applying only after EX-NP (on a given cycle) allows PRO to be cyclic is in Lakoff 1968b. This may be summarized as in (319).

- (319) 1. It must be guaranteed that PRO apply after EX-NP. Otherwise ungrammatical sentences would be generated.
2. If PRO were cyclic, the order of application EX-NP before PRO could not be ensured by extrinsically ordering these rules this way. This is because EX-NP is postcyclic and thus cannot be ordered to apply before a cyclic rule.
3. If PRO were postcyclic, then the desired order could be guaranteed by assigning these rules ordering and rule-type features as follows:

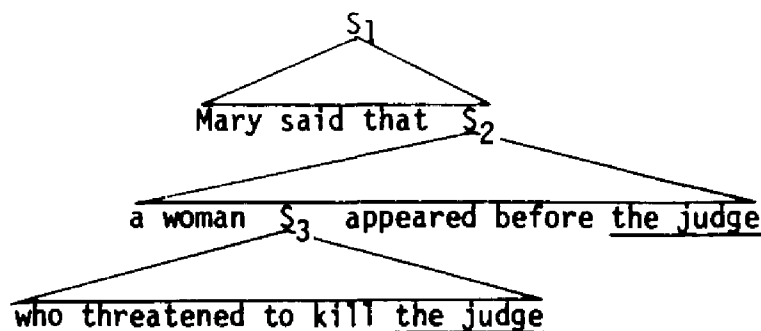
Po, 1. EX-NP

Po, 2. PRO

4. Therefore PRO cannot be cyclic.

That step 1 is correct, given Lakoff's (1968b) formulation of these two rules, may be seen by considering his example. If PRO applies on the S_2 cycle of (320), then both the grammatical sentences of (321) will be generated.

(320)



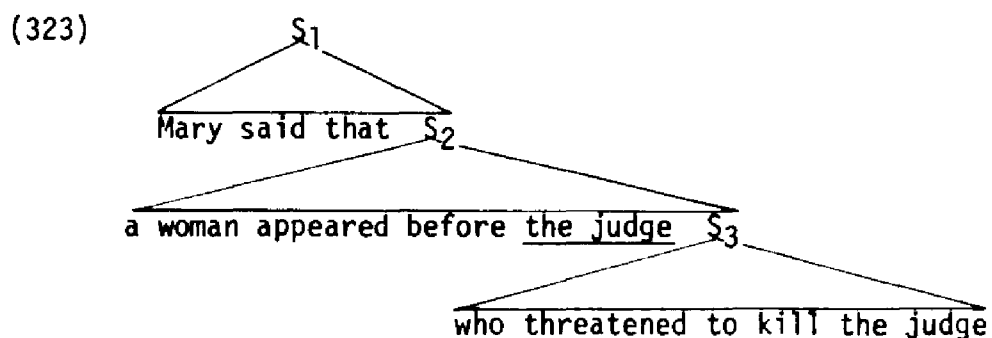
(321) a. Mary said that a woman who threatened to kill the judge appeared before him.

b. Mary said that a woman who threatened to kill him appeared before the judge.

Now if EX-NP can apply to the output of PRO, then where it applies to the structure underlying (321a) ungrammatical string (322) is the result.

(322) *Mary said that a woman appeared before him who threatened to kill the judge.

Only grammatical strings will be derived, however, if EX-NP is restricted to applying before PRO. Using the same example, after EX-NP applies to (320) resulting in (323), PRO may apply only forwards.



That is, given a Langacker-Ross formulation of PRO, the rule could apply to (323) to generate (324) but not (322).

(324) Mary said that a woman appeared before the judge who threatened to kill him.

While these facts about EX-NP and PRO and their relative order of application are reasonably straightforward, the explanation of these facts in terms of postulating PRO as a noncyclic rule is questionable. This is due to the weakness of step 2 in (319), where EX-NP is asserted to be postcyclic. As the discussion of (42) above indicated, Lakoff has not shown that EX-NP in fact is required to be anything other than

cyclic. But where EX-NP is cyclic, then PRO also may belong to this rule-type; to guarantee the correct order of application these rules need only to be assigned the ordering features in (325):

(325) 1. EX-NP

2. PRO

All the relevant facts may be explained by means of rules that are only cyclic. Granting for now the possibility of ordering PRO after another rule, argument (319) thus offers no evidence for its being necessarily noncyclic.

II.D.2. Postal 1971:83-85, 1970b:453-57; Lakoff 1968b:29-30.

A second argument involves the relation of PRO and QUEST. As given in these three sources, this may be outlined as in (326); example sentences are from Postal 1971.

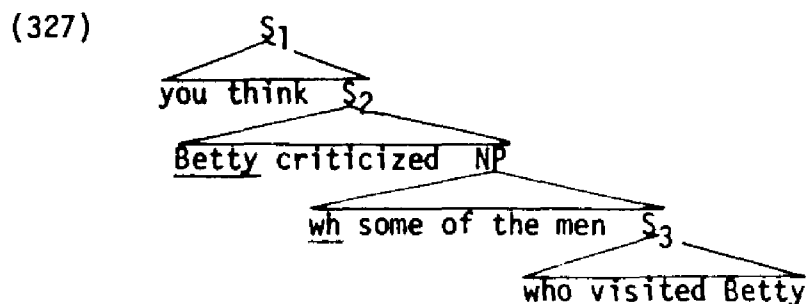
- (326) 1. PRO must be made to apply after QUEST. Otherwise there is no way to derive sentences with PRO having applied in either direction.
2. If PRO were cyclic, this order could not be guaranteed by ordering it after QUEST, for there are sentences where PRO applies on a cycle lower than QUEST.
3. If PRO were postcyclic, then the order could be ensured by marking these rules with the following features:

C(or L). QUEST		Po, 1. QUEST
	or	
Po. PRO		Po, 2. PRO

4. Therefore PRO must be noncyclic.

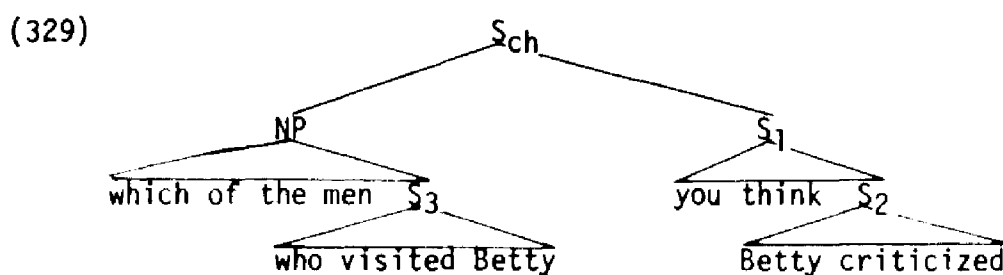
Step 1 of (326) is based on facts such as the following. Considering structure (327), which we may take here to be an underlying structure, if PRO applies only before the application of QUEST, then only

(328b) may be derived; if PRO is guaranteed to apply only after QUEST, however, then both of the grammatical strings in (328) may be generated, as required.



- (328) a. Which of the men who visited Betty do you think she criticized?
 b. Which of the men whc visited her do you think Betty criticized?

Specifically, only forward PRO is possible on the S_2 cycle of (327). After QUEST has applied to (327), however, (329) is derived, in which neither occurrence of Betty commands the other and where PRO is therefore possible in either direction.



Therefore, continues argument (326), PRO must be restricted to applying after QUEST. Since ordering features are not sufficient to guarantee this (in deriving (328), PRO and QUEST never apply on the same cycle), rule-type features must be resorted to.

This conclusion is rendered invalid, however, by the fact that for

all sentences such as those cited in support of argument (326) there are synonymous strings where PRO has not applied at all. That is, alongside of the sentences of (328), the grammar must also generate the grammatical (330).

(330) Which of the men who visited Betty do you think Betty criticized?

This is to say that in at least some cases PRO must be optional.¹²⁴

If PRO must be allowed not to apply in the derivations of (328) and (330), then this means that no ordering restriction whatever is required between QUEST and PRO, neither extrinsic ordering nor any ordering effected by rule-type assignment. More specifically, when PRO is optional, then there is no basis here for any argument that PRO must apply noncyclically.¹²⁵

Considering (327) again, if PRO is chosen to apply on the S_2 cycle, then, after QUEST operates, (328b) will be the output. If PRO does not apply then, QUEST applies on the highest cycle, deriving (329). In the S_{ch} cycle in (329) PRO may apply either forwards or backwards, thus allowing for the generation of both (328b) and (328a). If the rule is not chosen for application at this point in the derivation either, then the grammatical (330) results.

Thus all and only the relevant grammatical sentences are generated by a cyclically applying PRO (and QUEST). There is no case here for

124. The only work I know of dealing directly with the obligatoriness or optionality of PRO is Morrisroe 1969. There the author discusses pronominalization in several environments, concluding that "surface structure is the primary determiner of when pronominalization is optional" (p. 186). This suggests that PRO should be only an optional process, with an output condition defining those surface structures which require coreferential NPs to be reduced.

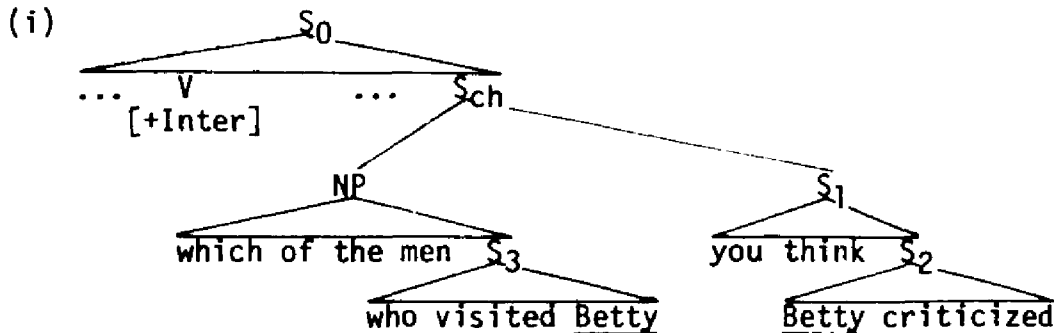
125. Bach (1969:1-2) has also called attention to the crucial role of the optionality of PRO in this argument.

marking PRO to be in any way noncyclic.¹²⁶

II.D.3. Lakoff 1968b:30-31.

The last of the three arguments in Lakoff 1968b against the cyclicity of PRO considers sentences of the type cited by Ross (1967) in his original argument for PRO having to apply cyclically. This is summarized in (331).

126. Strictly speaking, this criticism of argument (326) depends on a formulation of QUEST that does not rely on a higher trigger, such as is assumed in Postal 1971, 1970b, and Lakoff 1968b. I have suggested earlier in this study (so also Postal 1972c:220 and, at least implicitly, Lakoff 1969) that formulation of this rule with explicit reference to a higher verbal trigger is more adequate. With such a rule, and under the assumption that S nodes formed by Chomsky-adjunction are to be treated equally with underlying S nodes for the purposes of defining the domain of application of cyclic rules, then a cyclically applying PRO would not be able to apply after QUEST in derivations such as (327)-(328). The output of a higher trigger QUEST applying to (327) is shown in (i).



In order to derive (328a), PRO would at this point have to apply on the Sch cycle, the lowest S node to dominate both occurrences of Betty. Following the principles of cyclic application adopted in chapter 1, however, PRO could only be considered for application in the S₀ domain, and could not effect any changes in any lower subdomain.

It is possible, though, that S_{ch} nodes should not be considered to be 'cycle-defining' nodes, and that the suggestion in footnote 23 of the first chapter here is unsupportable. While an S_{ch} may be referred to by transformations (e.g., EXTRA), there apparently is no necessity for having these function in the operation of the transformational cycle. Thus it does not seem unreasonable to allow PRO to operate in (i), to derive the crucial sentence (328a).

Note that other arguments discussed here that are based on a rule being unable to apply too far down in the tree (e.g., argument (343) in this section; the arguments regarding the ordering of REFL considered in section III.A) do not crucially involve S_{ch}.

- (331) 1. If PRO is cyclic, then the difference in grammaticality between (a = Lakoff's 197) and (b = his 200) can be explained naturally. This has been pointed out by Ross (1967).
- (a) *Realizing that John had cancer bothered him.
 (b) Mary's realizing that John had cancer bothered him.
2. If PRO is cyclic, then the difference in grammaticality between (c = Lakoff's 216) and (d = his 217) cannot be explained naturally.
- (c) *Realizing that John had cancer seemed to him to have been bothering Mary.
 (d) My realizing that John had cancer seemed to him to have been bothering Mary.
3. "The difference between [c] and [d] is just the difference between [a] and [b]. When the subject of realizing has been deleted, pronominalization cannot go forward. The same phenomenon is operating in both cases. But in [c], the understood subject of realizing is 'Mary' not 'John'. Therefore, Ross' cyclic pronominalization theory could not account for [c]..." (p. 31). That is, given cyclic operations of PRO, EQUI, and RAIS, there is nothing on any cycle that will block the derivation of (c).
4. "If the same thing is going on in both [c] and [a], then Ross' theory is wrong since it cannot account for both phenomena" (ibid.).

The problem with argument (331) is the misleading example sentence (c). As Jackendoff (1972:187) has pointed out, it is difficult to assign any subject at all to realizing, regardless of the direction of

pronominalization. Lakoff asserts that Mary is understood as the subject, but this is a reading of (c) which I find simply incorrect. When the tense of the final clause is changed, however, as in Jackendoff's suggestion in (332), then Mary can be the subject of realizing. At the same time the sentence becomes quite acceptable.

(332) Realizing that John had cancer seemed to him to bother Mary. The ungrammaticality of (c), then, "has to do with something like sequence of tenses, and not at all with pronominalization" (Jackendoff 1972:187). When this factor of tense is ignored, then it is clear that (a) and (c) are not parallel examples and that the theory should therefore not treat them the same.

The following pairs of sentences constitute further evidence that the facts of pronominalization in sentences such as (a) and (c) in (331) are not the same. For each different initial verb the sentence is ungrammatical where the understood subject is John and PRO has operated forwards, but grammatical if PRO has applied backwards or if the understood subject can be Mary.

(333) a. *Discovering that John had cancer bothered him.

b. Discovering that John had cancer seemed to him to bother Mary.

(334) a. *Imagining that John would be executed bothered him.

b. Imagining that John would be executed seemed to him to bother Mary.

(335) a. *Denying that John had any part in the crime appealed to him.

b. Denying that John had any part in the crime seemed to him to appeal to Mary.

When idiosyncrasies regarding tense sequences are taken into account, then the difference between (a)-type and (c)-type sentences

becomes considerable. In particular, there is no need for forward (or backward) pronominalization to block in the latter kinds of sentences. Ross's cyclic theory of pronominalization correctly blocks the ungrammatical (a) sentences and correctly allows the generation of the (c) sentences; that is, a cyclic rule PRO can "account for both phenomena," naturally handling all the pronominalization facts considered here.

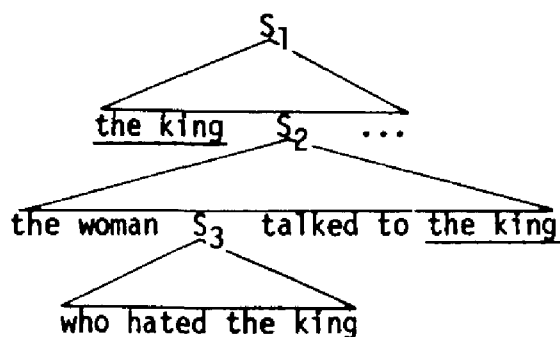
II.D.4. Postal 1971:247-48.

A fourth argument for PRO being required to apply noncyclically is based on the 'pronominal virgin' clause in Postal's Crossover Condition; (336) outlines this argument.

- (336) 1. PRO must be made to apply after REL. Otherwise in certain structures REL would have to be blocked from crossing a pronominal nonvirgin across a coreferential NP.
2. The Crossover Condition (pp. 153, 181) must be stated so as to restrict movement over pronominal virgins but allow crossing over nonvirgin pronouns.
3. If PRO were postcyclic [and ordered after REL], then the Crossover principle could be preserved in its most general formulation.
4. Therefore PRO must be noncyclic.

Postal's example, where the application of a cyclic rule PRO would necessarily precede the application of REL (no matter what rule-type REL is assumed to be), is shown in (337).

(337)



PRO, applying on S_2 , could add a feature [+Anaphoric] to the king in S_3 . Then, when REL must apply on S_1 , moving the instance of the king dominated most immediately by S_2 to the front of S_2 , nothing would block its application, and the ungrammaticality of (338) would be unaccounted for.

(338) *The king who the woman who hated him talked to....

When REL is considered for application to (337) at a point when the king of S_3 is unmarked with any pronominal features, however, then versions V and VI of the Crossover Condition come into play, preventing the crossing of the coreferential NPs that REL would otherwise effect. Assuming the appropriateness of explaining sentences such as (338) in terms of the crossover principle, and assuming in particular the 'pronominal virgin' clause of this principle, the conclusion of (336) does seem to follow validly.

In fact, both of these assumptions must be challenged, thus seriously calling into question the conclusion here regarding necessary noncyclicity. In the first place, the Crossover Condition itself, at least insofar as it may be invoked to explain the likes of (338), has been rejected by Postal (1972b:54-55). He argues that the constraint against coreferential NPs, where one is a wh-form and the other a pronoun, and where these have been crossed in the course of a derivation, is best handled in terms of a globally defined output constraint, stated roughly as in (339).

(340) 'Pronominal virgin' clause (Postal 1971)

crossing permitted: ... NP_i ... NP_i ... *

[+Anaphoric]

crossing forbidden: ... NP_i ... NP_i ... *

[-Anaphoric]

This (mirror image) formulation is consistent with a claim Postal makes about rule ordering, namely that the relevant rules must be extrinsically ordered as in (341).

- (341) 1. REFL
2. TOPIC, REL, QUEST, ...
3. PRO

Given this ordering, one claimed to be "independently justifiable" (p. 149), it follows that the movement rules will be blocked from applying in just the right cases. Where REFL applies before the rules in (341.2),¹²⁷ then TOPIC, REL, etc. will have the opportunity to apply to an NP that is marked [+Anaphoric, +Reflexive] (see Postal 1971:11); movement is not otherwise restricted here. With respect to PRO, however, given the ordering in (341) the movement rules will have only 'pronominal virgins' to apply to, and by clause (340) will be blocked from application.

There is an obvious reformulation of (340), however, which does not rest at all on rule ordering, but which, unlike (340), expresses directly the generalization that Postal is concerned with here; viz., that reflexives can be involved in rules that cross coreferential NPs, but nonreflexive pronominals cannot. This makes use of the feature [Reflexive] instead of [Anaphoric].

¹²⁷ As shown in section III.A below, the ordering of REFL with respect to REL, QUEST, and TOPIC is strictly an intrinsic ordering; there is no basis for concluding that REFL here is involved in any strict ordering.

(342) 'Pronominal virgin' clause (alternative)

crossing permitted: ... NP_i ... NP_i ... *

[+Reflexive]

crossing forbidden: ... NP_i ... NP_i ... *

[-Reflexive]

This is equally as simple as (340), it accounts for the relevant facts, and it is in no way tied to any claims regarding ordering of rules. Since REFL is intrinsically ordered before the movement rules in question, crossing will not be restricted. And, since (342) prevents movement both over 'pronominal virgins' and over nonreflexive pronouns, it is clear that there can be no question here of any need to restrict the relative order of application of PRO and the movement rules.

But with (342) as the statement of the relevant clause of the Crossover Condition, argument (336) is invalid. Whether or not the king in S_3 of (337) has been operated on by PRO, REL would be prevented from moving the coreferential NP over it. Facts such as (338), then, represent no reason whatever to restrict PRO from applying in any way noncyclically. Both with the Crossover Condition, and without it, there does not seem to be any support for the ordering restriction referred to in step 1 of (336). When this cannot be justified, however, then no conclusion against strictly cyclic application can be drawn.

11.D.5. Bach 1969:2.

Two further arguments against the cyclicity of PRO are found in Bach's (1969) unpublished but widely circulated paper, "Anti-Pronominalization." In this the author tries to demonstrate that the rule PRO, such as described in Ross 1968 and Langacker 1969, can be neither precyclic, cyclic, last-cyclic, or postcyclic. For Bach, then, this means that PRO can be a member of no rule-type at all, and thus cannot

be considered to be a rule of the grammar. This conclusion against PRO as a rule is brought into question, however, when we look in detail at the arguments given against its being cyclic.

The first argument concerns the rules EX-NP and QUEST, and is in some respects similar to (326) above.

- (343) 1. PRO must (at least) sometimes be optional
2. If PRO is optional and cyclic, then it must be possible for it not to apply in some embedded S but to apply on a later cycle to a higher S.
 3. In certain cases, an optional cyclic rule PRO generates ungrammatical sentences.
 4. Therefore PRO cannot be cyclic.

The example of a sentence which Bach finds ungrammatical but which he claims could not be blocked if PRO is optional and cyclic is (344).

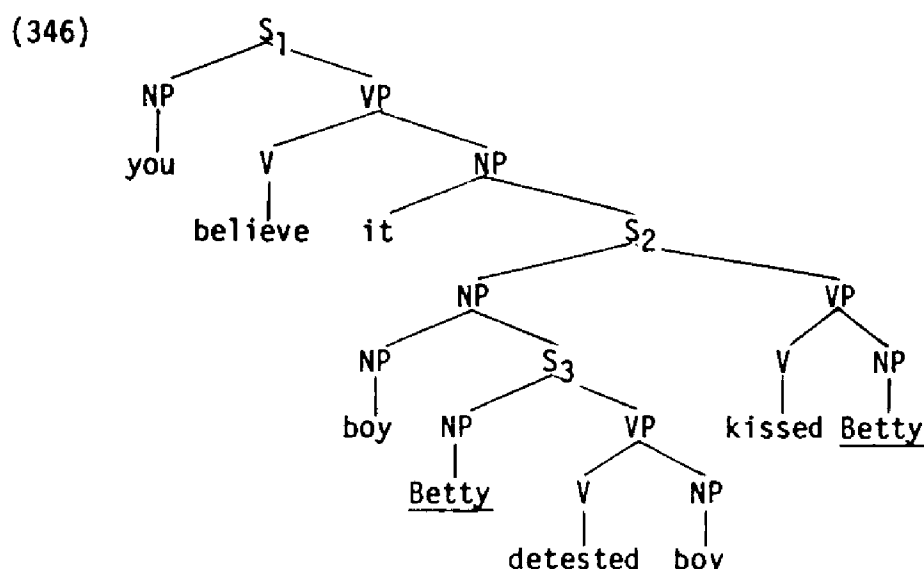
- (344) *Which boy do you believe to have kissed her that Betty detested?

This sentence is reasonably acceptable when the coreferential NPs are in the opposite order, however, as in (345a); and, if PRO has not applied at all, the result (345b) is also reasonably unobjectionable.

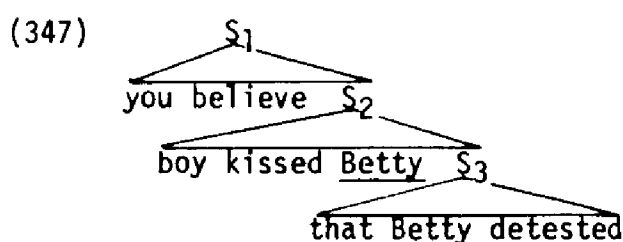
- (345) a. Which boy do you believe to have kissed Betty that she detested?
- b. Which boy do you believe to have kissed Betty that Betty detested?

If there is no natural way to block (344), then this example constitutes evidence against the cyclicity of PRO.

The underlying structure of (344)-(345) is presumably similar to (346). (The trigger for QUEST is here omitted.)



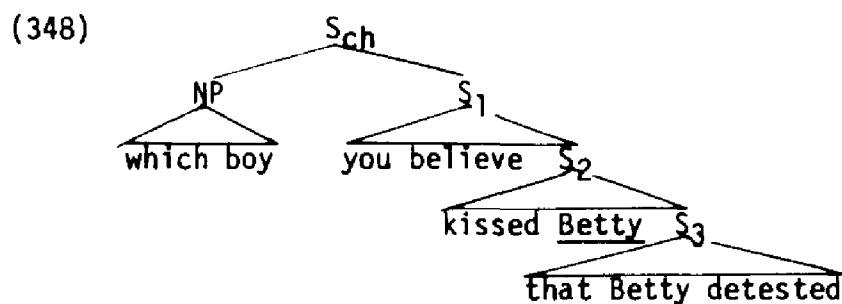
On the S_3 cycle no rule of any relevance applies. On the S_2 cycle REL and EX-NP will operate, with the application of PRO being possible, but not obligatory. Here, also, I will assume the ordering in (325), namely, that EX-NP must precede PRO. After REL and EX-NP have applied, the result is as in (347).



At this point in the cycle at S_2 PRO may apply; since the leftmost occurrence of Betty commands the rightmost one, the rule may apply only forwards. If PRO is chosen to apply, then, after the application of QUEST on S_1 , the grammatical (345a) will be generated. If PRO is not selected for application, then (345b) may be generated. What is important to note here is that, given the constraint on the relative ordering of EX-NP and PRO, there is no way rules could apply at S_2 to generate a string that could underlie the ungrammatical (344). The only

way this could be generated is if PRO does not apply on S_2 , but applies on some later cycle where the structural conditions are such that it could apply in the undesired direction. It is Bach's contention that in fact such structural conditions are later present and that there is thus no natural way to block (344).

His argument continues: apply QUEST on the top cycle. The tree in (348) is the result of its application to (347), where PRO has not applied in S_2 . (Whether the questioned element attaches by daughter- or Chomsky-adjunction makes no difference in what follows; nor does it matter how the trigger for QUEST is defined.)



Now, Bach apparently would maintain, when a cyclic PRO is given its chance to apply on the top cycle it could apply in either direction; since, with respect to the S_1 cycle, neither coreferential NP commands the other this means that both (345b) and (344) would be generated. The fact that (344) is an unacceptable string could not be explained without attaching some ad hoc condition to a cyclic PRO. In order to achieve a reasonably general explanation of these facts, then, it can only be concluded that PRO cannot be a cyclic rule.

But this argument cannot stand. The fatal flaw here is in Bach's application of PRO to the tree in (348). Where PRO is assumed to be cyclic (as it is in this argument), then this implies that it can apply only on a given S of the generalized phrase marker, which one being

defined by the bottom-to-top movement of rules through the cyclic nodes. In particular, it may not apply too low on the tree, i.e., applying strictly to elements within some S that has already been passed in the cycle. In order for PRO to apply on the S_{ch} (or S_1) cycle in (348) it would have to consider elements that are wholly within a lower cyclic domain, thus violating the very definition of cyclicity. Assuming that PRO is cyclic means that it will not be able to apply on any cycle other than S_2 in (346)-(348), and thus that the ungrammatical (344) cannot be generated.

The possibilities of pronominalization in a structure such as (346), then, are governed entirely by the possibilities of this rule applying on one subordinate S only (and on PRO being ordered after EX-NP on any given cycle). As noted above, on the S_2 cycle (the only cycle on which a cyclic PRO may apply), PRO may apply forwards or not at all. These two possibilities represent all and only the grammatical sentences that must be derived from (346). The crucial sentence (344) can never be generated, so long as rules are consistently applied in a cyclic manner. Where step 3 in argument (343) above cannot be substantiated, there is then no basis for concluding that PRO cannot be cyclic; in fact, a strictly cyclically applying PRO accounts nicely for all the facts here.

II.D.6. Bach 1969:3.

The final argument also utilizes PRO being extrinsically ordered after another rule, this time EXTRA. It is summarized in (349).

- (349) 1. EXTRA is an optional rule.
2. If PRO is cyclic, then it will be able to apply before EXTRA whether EXTRA is cyclic or whether it is last-cyclic.
3. If PRO applies before EXTRA in a derivation, then an

ungrammatical sentence can be generated.

4. Therefore PRO cannot be cyclic.

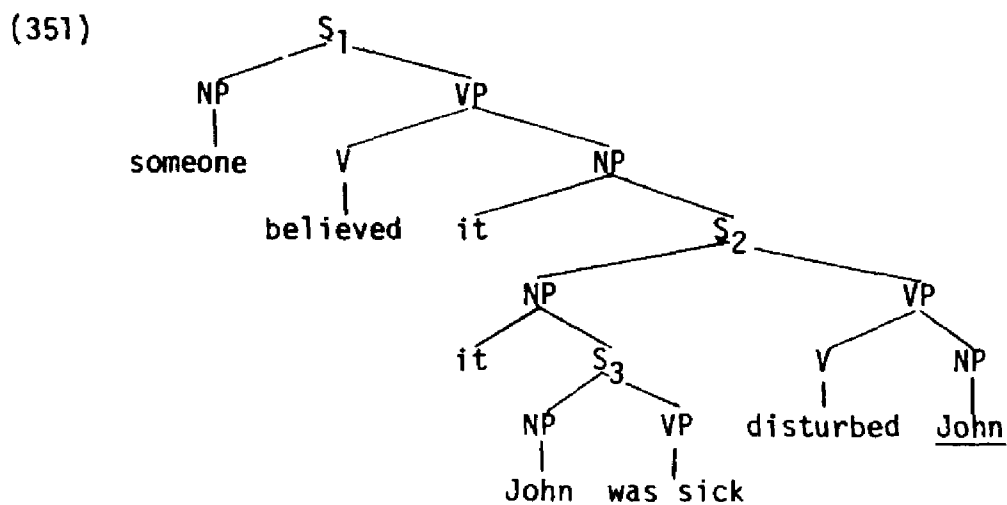
As Bach (p. 3) admits, and as the discussion of extraposition rules in section II.A.3 above has attempted to demonstrate, the case for EXTRA being noncyclic is presented "not very convincingly." I will thus not consider the alternative mentioned in step 2 of (349) that EXTRA is last-cyclic beyond mentioning that this would, if able to be substantiated, lead correctly to the conclusion that PRO cannot be cyclic.

We will be more concerned with Bach's argument that a cyclic rule EXTRA means that PRO cannot also be cyclic. The example given of an ungrammatical sentence that could be derived when both EXTRA and PRO are cyclic and where EXTRA has been chosen to apply is (350a). Grammatical strings that must be derived from the same deep structure include (350b) and (350c), where EXTRA has not applied in the latter.

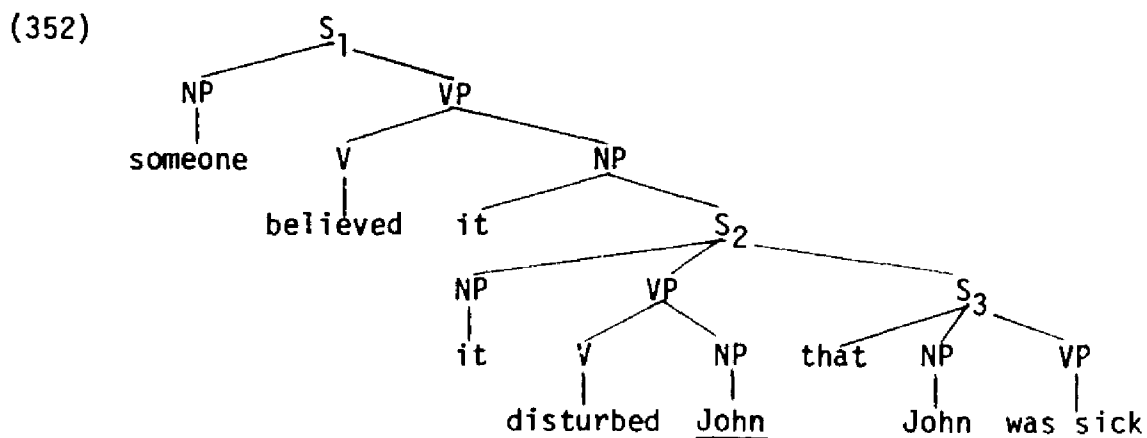
- (350) a. *It was believed to have disturbed him that John was sick.
 b. It was believed to have disturbed John that he was sick.
 c. That John was sick was believed to have disturbed him.

Let us, then, follow the steps in the derivation of (350a) to see whether there is any natural way that this may be blocked in a grammar where EXTRA and PRO are cyclic rules.

The underlying structure for the sentences of (350) may be considered to be as in (351), based on Bach's example 14.

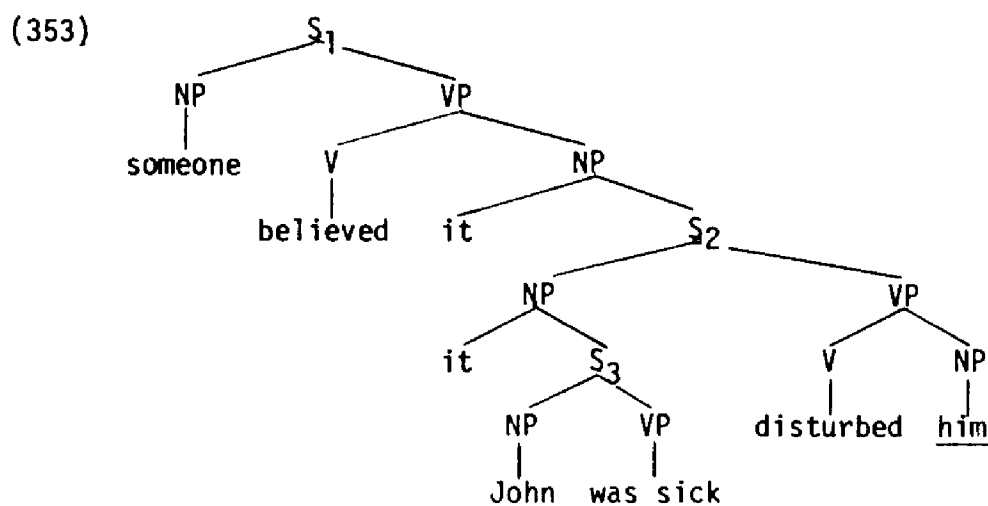


If EXTRA is chosen to apply on the S_2 cycle, then (352) is the result.

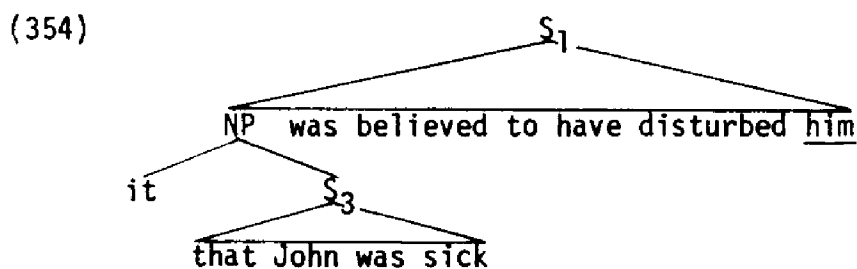


Assuming that PRO is extrinsically ordered after EXTRA, it could now apply forwards at S_2 . After RAIS, PASS, and Agent Deletion (AG-DEL) have applied on the top cycle, then (350b) would be derived. Note that if EXTRA has applied on the S_2 cycle, then backwards PRO is not possible, from which it follows that the undesirable (350a) could not be generated.

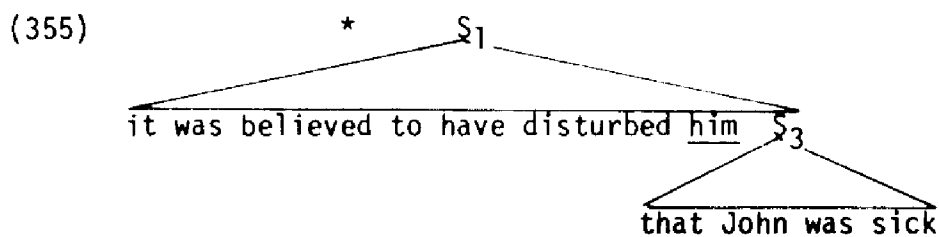
As Bach points out, EXTRA must be considered an optional rule. When this rule does not apply on S_2 in (351), then PRO can apply in either direction. In the interesting case it applies forward, pronominalizing the last John in the sentence. At the end of the S_2 cycle the tree would be as in (353).



Now RAIS, PASS, and AG-DEL apply as before on S_1 , deriving (354).



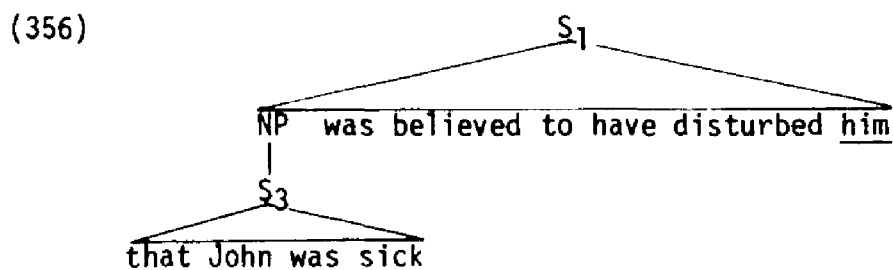
At this point Bach allows EXTRA to be considered for application again. If it does not apply, then the sentence ultimately derived is (350c). If EXTRA is chosen for application, however, then the P-marker derived is (355), which underlies the ungrammatical (350a).



As long as PRO is cyclic, Bach in effect points out, then even though a strict ordering of EXTRA before PRO be imposed, PRO may apply before EXTRA in derivations, with the result that unacceptable strings will be generated. Therefore PRO cannot be a cyclic rule.

But there is a problem here, namely, that Bach ignores the rule It Deletion (IT-DEL), necessary, for example, in deriving (350c) from his underlying representation (351). Assuming the simplest possible case, namely, that IT-DEL, as well as EXTRA, PRO, and all the other rules involved here belong to the same rule-type and are cyclic, it can be seen that (350a) could never be derived and that Bach's (349) thus represents no convincing argument that PRO could not be cyclic.

In terms of the tree in (351), if on the S_2 cycle EXTRA is chosen not to apply, then the structural description of IT-DEL will be satisfied and it must apply,¹²⁸ deleting the it that is the sister of S_3 . After PRO applies to S_2 (in either direction), and after RAIS, PASS, and AG-DEL have applied on S_1 , one of the two possible outputs will be:



In terms of the rules being considered here, (356) cannot be operated on further and (350c) would be the only possible output

¹²⁸. Where EXTRA and IT-DEL are distinct rules, then EXTRA must be allowed to apply first and be optional and IT-DEL must be obligatory, as several have pointed out (see, for example, Lakoff 1968a:16). Further, following a suggestion of Householder (1971a:115, 1971b:459), if these two rules are collapsed as in (i), then the rule is obligatory, and one or the other of the structural changes will be carried out any time its structural description is satisfied.

(i) X NP[it S] Y

 1 2 3 4 \Rightarrow

 { 1 2 \emptyset 4 + 3 }

 { 1 \emptyset 3 4 }

sentence.¹²⁹ In particular, Bach's rule EXTRA could not apply to (356), for the it mentioned in its structural description is not present. When EXTRA cannot apply here, though, then there is no way to get the coreferential NPs into the wrong order, as they are in (355). And where (355) and (350a) cannot be derived, there is no motivation for considering PRO as anything other than a cyclic rule. Given the extrinsic ordering constraint of EXTRA before PRO, step 2 of (349) is false and cannot support a conclusion of PRO being necessarily noncyclic.¹³⁰

These are all the specific arguments I know of for taking PRO to be a process that must operate noncyclically. Of the six, only the last one reviewed here provides any potential support (as suggested in footnote 130) for the popular belief that Ross's (1967) arguments for the strict cyclicity of PRO must be rejected, and even this does not seem to be strong support, resting as it does on the need to show that it cannot appear in underlying structure. Granting only that PRO may be ordered after certain rules, there does not exist clear evidence against its being a member of the cyclic rule-type.

129. Had PRO applied backwards in (353), then the grammatical sentence corresponding to (350c) but with coreferential NPs reversed would have been derived.

130. It should be noted that my criticism of arguments (349) depends crucially on it being present in the P-marker at the time EXTRA is considered for application; where it is inserted only as a by-product of an optionally applying EXTRA, then clearly there can arise strings such as (355) in which EXTRA has applied after PRO in a derivation. The case is thus parallel to argument (65) analyzed above for the postcyclicity of EXTRA. Insofar as the question of the derivation of this it may be regarded as uncertain, as pointed out in section II.A.3.d, to that extent arguments (65) and (349) for the necessity of noncyclicity are by themselves inconclusive.

II.E. Summary of arguments for noncyclicity.

In the preceding pages of this chapter have been examined all the arguments I am aware of for specific transformations of English being necessarily noncyclic, i.e., being required to apply in some manner inconsistent with an Aspects-style transformational cycle. The majority of these arguments, upon close examination, have been found not to constitute evidence requiring expansion of this cycle to include rules of other rule-types. In the case of REL, there was evidence that suggested a cyclic application was necessary; for the other invalid arguments, the evidence showed merely that the rules were fully consistent with a strictly cyclic application in derivations.

The chart in (357), then, lists all the rules other than PRO for which a noncyclicity argument has been considered here, and indicates whether the argument for the necessity of noncyclic application was found to be valid or invalid.

(357)	Inconsistent with strictly cyclic application; <u>validly</u> argued to be necessarily:	Consistent with strictly cyclic application; <u>invalidly</u> argued to be necessarily:
Adverb Preposing		postcyclic
Affix Hopping	postcyclic	
<u>All</u> Movement		postcyclic
Appositive Formation		last-cyclic
Conjunction Reduction		postcyclic
Coordination Reduction		last-cyclic
<u>Do</u> Gobbling	postcyclic	
<u>Do</u> Support	postcyclic	
Emonds' rules (276a)		root-cyclic
Emonds' rules (276c)		root-cyclic

Extraposition		postcyclic
Extraposition from NP		postcyclic
Extraposition of PP		postcyclic
Gapping		postcyclic, anywhere
Negative Contraction		postcyclic
Number Agreement		postcyclic
Object Preposing		postcyclic
Particle Movement		postcyclic
Preposition Deletion	postcyclic	
Question		postcyclic
Relativization		postcyclic
Subject Auxiliary Inversion in imperatives		last-cyclic
Subject Auxiliary Inversion in questions		last-cyclic, root-cyclic
Subject Auxiliary Inversion with fronted constituents	postcyclic	root-cyclic
Subject Verbs Inversion	postcyclic	root-cyclic
Sentence Deletion/ Sentence Pronominalization	anywhere	
Topicalization		postcyclic, last-cyclic, root-cyclic
<u>Whether</u> Deletion		last-cyclic
<u>You</u> Deletion		last-cyclic

Of all the rules argued to be noncyclic, I thus find that only seven apparently require such application: the postcyclic verbal rules AF-HOP, DO-GOB, DO-SUP, SAI-fr, SVI, as well as P-DEL; and the anywhere S-DEL.

III. Proposals for assigning rule-type distinctions nonidiosyncratically.

Given that not all transformations of English can apply in a manner consistent with an Aspects cycle, is it the case that every rule must be marked idiosyncratically for its membership in a given rule-type, or is it possible to predict rule-type assignment in terms of some otherwise necessary feature of the formulation of each rule? That is, must the structural description of each transformation be complicated with a language- and rule-specific feature indicating whether the rule applies cyclically, postcyclically, or anywhere, just as in some theories rules must be individually marked with extrinsic ordering features?

There have in fact been several attempts to answer this latter question in the negative, that is, to point out positive correlations between certain features of rules and the rule-types of which they must be members, and thus to conclude that extrinsic marking for rule-type is unnecessary. I am aware of four such attempts - by Postal, Emonds, Kimball, and most recently by Perlmutter and Postal; each of these is examined below. In most cases the specific proposals are not immediately interesting, and for two reasons. First, a rigorous application of the features for distinguishing among rules in many cases leads to a classification of rules exactly opposite to that claimed by the author. Second, in almost every case the rules for which criteria of rule-type differentiation are proposed do not include those we have found to be necessarily noncyclic. That is, the rules considered below are, if the arguments in chapter II are correct, fully consistent with strictly cyclic application; proposals to divide them into different rule-types are thus irrelevant. The criteria advanced, however, will be examined further in the concluding chapter, when a broader search will be made for ways to uniquely characterize noncyclic rules.

be determined by an otherwise ad hoc diacritic added to each rule, but could instead be a function of the form of the rule itself (2a) and of how it applies in derivations (2b,c).

The prediction of cyclicity or noncyclicity in terms of features (2a-c) does not seem possible, however. The most obvious and serious difficulty is that part of the explanandum - the noncyclicity of QUEST, REL, and TOPIC - cannot itself be demonstrated to be true. In section II.A.1 above, Postal's arguments for the postcyclicity of QUEST, REL, and TOPIC were considered at length and were shown to include no evidence that these rules had to apply in any noncyclic manner whatsoever.¹ That is, given the most natural formulation of each rule, all three are completely consistent with a strictly cyclic application of rules. In section II.B.1, further arguments against the cyclicity of TOPIC were reviewed. Again it was shown that under the formulation of this rule that most naturally handles the set of complex facts involved, there is no reason to require it to apply noncyclically. But where the rules under consideration - those in (1) - cannot be shown to require assignment to different rule-types, then there is simply nothing to predict, no diacritic to be eliminated.

Note further that feature (2b) cannot be maintained as a point of difference between (1a) and (1b). Specifically, it is not the case that QUEST, REL, and TOPIC must be extrinsically ordered after REL. Consider, briefly, the three arguments involved.

1. REFL before REL (p. 79). This argument parallels the argument given for ordering REFL before QUEST; it is not spelled out by Postal,

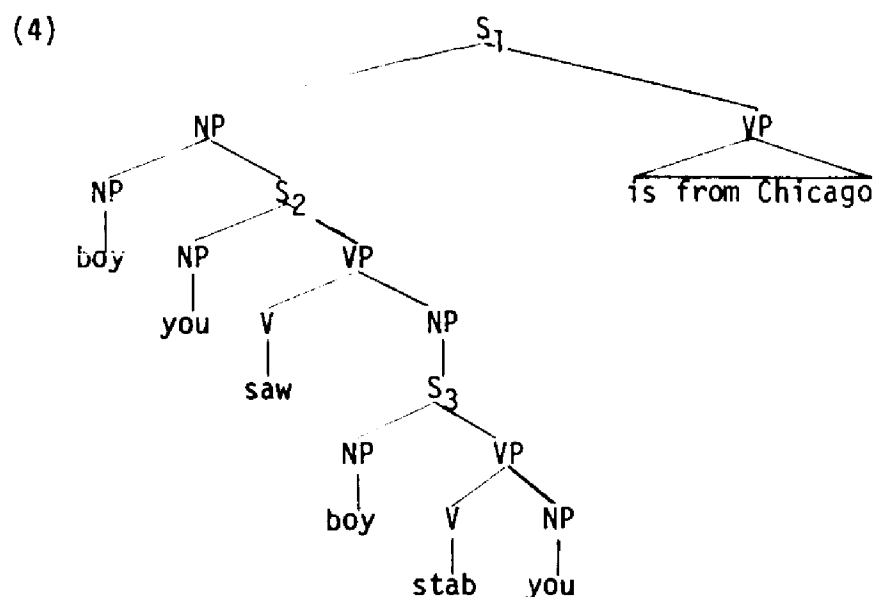
1. There an argument was presented that REL must in fact be cyclic. Since Postal considers POSS-SHIFT to be cyclic (p. 148), it is hard to see how REL could be otherwise, given sentences such as (5) in II.A.1, in the derivation of which REL must apply before POSS-SHIFT.

but apparently involves sentences such as those in (3).

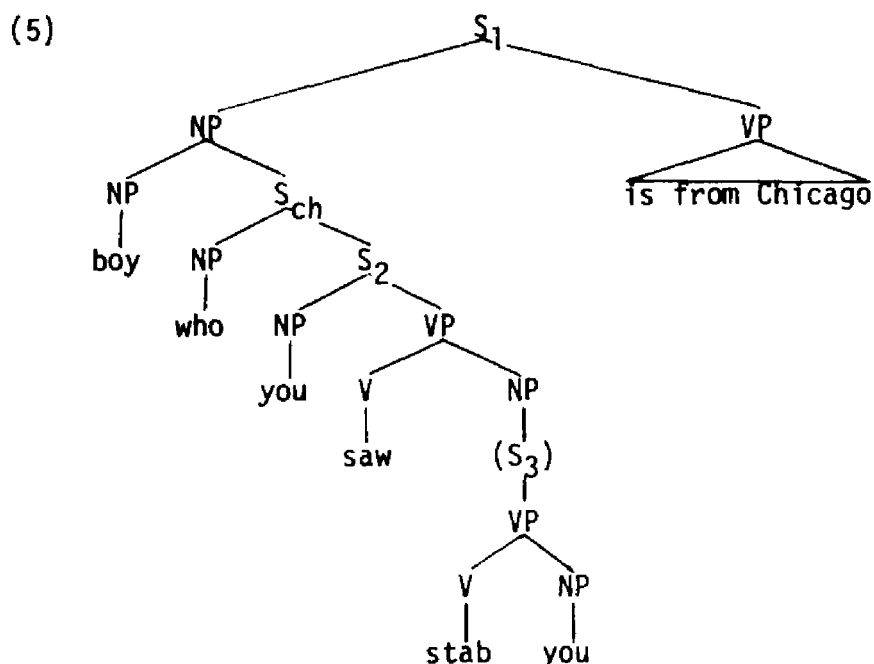
(3) a. The boy who you saw stab you is from Chicago.

b. *The boy who you saw stab yourself is from Chicago.

The underlying structure of (3a), following Postal in his representation of the complement of see, is (4).



There is no cycle in (4) to which REFL may apply, for no cycle contains coreferential clause mates. REL is applicable only on S_1 ; as it applies there, (5) is derived.



Now, Postal argues, if REL were ordered before REFL, then REFL could apply to tree (5). In S_2 , after the relative pronoun has been extracted from the lower sentence, the S_3 node is pruned, leaving coreferential clause mates. But REFL must not be allowed to apply here, for otherwise the ungrammatical (3b) would be derived. Therefore REFL must be ordered before REL.

We may agree with the need to block the derivation of (3b). What is necessary to achieve this, however, is simply the cycle, assumed here as independently necessary. That is, when the cycle reaches S_1 in (4), then REL applies. The output of REL applying on S_1 results in no coreferential NP not dominated wholly by some subordinate cycle, and thus REFL cannot apply. The only way to derive (3b) is for REFL to 'look down' two cycles below the one where rules are applying and to make a change in S_2 . Where REFL applies strictly cyclically, however, as Postal (pp. 159-63) argues it must, then such an application on a lower S is impossible. In short, there is no evidence here requiring REFL to apply before REL; with either order, only grammatical strings result.

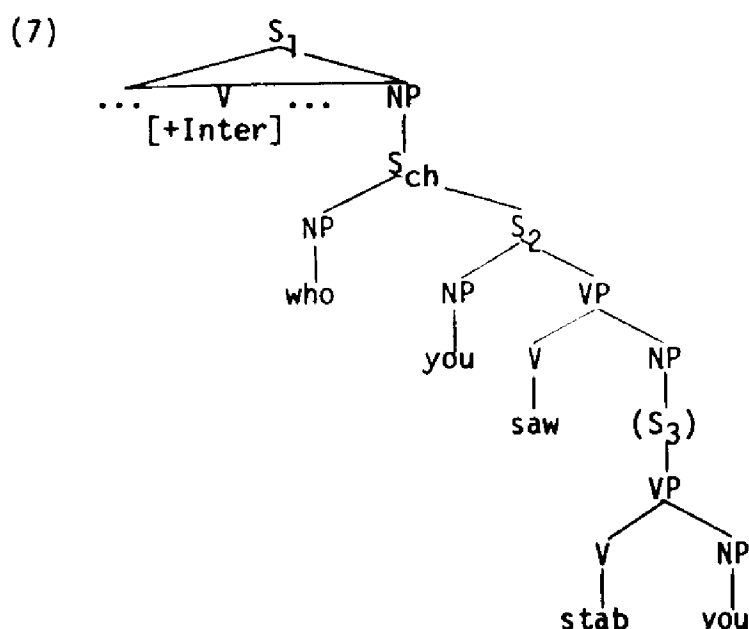
But now this means that REL behaves in at least one respect like the rules of (1a), and thus that the order of application of a rule with respect to REFL is not a valid diagnostic for the division of rules Postal intends. The inadequacy of feature (2b) may also be shown for QUEST and TOPIC.

2. REFL before QUEST (pp. 77-79). The argument for this ordering involves the strings in (6), where again the b example is to be blocked by extrinsically ordering REFL so that it has no chance to apply to the output of QUEST, where that output includes a pair of coreferential clause mates.

(6) a. Who did you see stab you?

b. *Who did you see stab yourself?

Given a formulation of QUEST where the trigger is naturally defined as a higher interrogative verb, as in (11) in section II.A.1 above,² the result of QUEST applying to the relevant underlying string is shown in (7).



2. Postal 1971 lacks any description of the trigger necessary for the correct application of QUEST. In later work (1972c:220),

Now since QUEST applied on S_1 , REFL in order to apply would have to operate wholly within the S_2 cyclic subdomain, an application ruled out by the principle of the cycle.

Again we can see that ordering is not relevant here; letting the rules apply strictly cyclically yields all and only the desired results. In particular, the ordering of QUEST before REFL is entirely compatible with all the facts.

3. REFL before TOPIC (pp. 146-48). The sentences considered here are those in (8).

(8) a. Harry you saw stab you.

b. *Harry you saw stab yourself.

Exactly parallel to the discussion of REFL and QUEST, when TOPIC is formulated with a higher verbal trigger, as Postal (1972c:220) suggests and as argued in section II.B.1 above is necessary, then the definition of cyclic application of rules will guarantee that REFL never applies too far down in the tree. This means that, quite apart from any extrinsic ordering restrictions, (8b) could never be generated.

Postal considers a second kind of topicalized sentence, arguing that examples such as (9) also show the necessity for this ordering.

(9) Himself Harry loves.

Here also, however, the proper formulation of TOPIC as a higher-trigger rule means that a cyclically applying REFL will apply only before TOPIC, and that ordering restrictions (regardless of which rule is ordered first) are irrelevant.³

(continues fn. 2) however, the author explicitly expresses his preference for a statement of this rule that refers to a higher [+Interrogative] verb.

3. This example is discussed by Ringen (1972:271-72), who shows that even with a version of TOPIC that utilizes no higher trigger,

For none of the three rules of (1b), then, is it the case that they must be extrinsically ordered after REFL. More specifically, these all "are consistent with being ordered before REFL." Feature (2b) is thus not at all a point of difference between the rules of (1a) and those in (1b), rules which also have been shown not to differ on the question of their rule-type (i.e., not to differ on point (2d)).

What remains, then, of the bases of distinguishing (1a) from (1b) are (2a,c), the correlation between a rule's having or not having as essential variable, and its operating without or with exceptions.⁴ Neither of these features, however, relates to the question of the rule-types of rules, which means that the correlation we are interested

(continues fn. 3) extrinsic ordering restrictions are unnecessary in order to guarantee only the correct results.

4. Judging from his passing mention of rule government, rule exceptions, essential variables, and an implicit reference to the significance of a rule making mention of a verbal (Postal 1971:148, 207), it is possible that Postal had in mind an extended syllogism such as that in (i), which has the effect of explaining the correlation of properties (2a) and (2c).

- (i) 1. If a rule is written with an essential variable, then it will not mention a verb.
- 2. If a rule does not mention a specific verb or verb class, then it is 'ungoverned'. (Definition; R. Lakoff 1968:23)
- 3. If a rule is ungoverned, then it cannot have exceptions. (Def.; ibid.)
- 4. Therefore, if a rule is written with an essential variable, it cannot have exceptions.

Steps 2 and 3 are based on the only semblance of a definition of 'government' that I could find in print; step 1 is presumably not a necessary truth, but a de facto generalization regarding then known transformations.

It may be the case, however, that step 1 of (i) cannot be maintained. Arguments have been presented in section II.B.1 showing the need to define the variable movement rule TOPIC on a higher verb, and not simply in terms of the NP moved, as in Ross 1968:115. Also, QUEST has a natural formulation where this mentions specifically a certain class of higher verbs. Whether TOPIC and QUEST thus formulated allow exceptions or not is unclear to me. The respective verbal features presumably would be defined strictly in terms of the features held in common by the set of verbs which govern the relevant movement, so perhaps by definition there would be no exceptions. I do not know if these verbs in fact have an exhaustive characterization, and thus am not sure about the relation between essential variables and exceptions implied in Postal 1971.

in here cannot be established.

If syntactic transformations must be divided into various sets of rules, as indeed the arguments of chapter II attempt to show is necessary, then the particular criteria elaborated in Postal 1971 for nonidiosyncratically assigning rule-type features are simply not adequate. On the one hand there is no reason to think that the rules he wishes to distinguish in terms of rule-type in fact require such differentiation. On the other hand the rules found in this study to require a noncyclic application do not represent a natural class with respect to the possibility of their having exceptions or with respect to their being formulated with an essential variable.

III.B. Emonds 1970.

In this work the author outlines and defends a 'structure-preserving hypothesis', a proposal for restricting the set of possible transformations. Emonds' hypothesis is based upon a three-way division of rules, and may be summarized as in (10).

(10) Syntactic rules may be divided into:

- a. those that move a specified constituent - not a phrase - over a single adjacent constituent (= minor movement rules), and
- b. those that do not. These in turn may be divided into:
 - b1. those whereby "any constituents moved, inserted, or copied are immediately dominated [only] by a root in the derived structure" (p. 7) (= root transformations), and

b2. those where constituents operated on need not be immediately dominated by a root S (= structure-preserving transformations).

Hypothesis: The outputs of type b2 rules must be P-markers that could be generated by the base Phrase Structure rules. The outputs of the b1 rules need not (must not?) be.

While the distinction between rules of group (10a) and (10b) is obvious upon inspection of the structural description of a given transformation, the difference between root transformations (RTs) and structure-preserving transformations (SPTs) is not so determinable. The question considered here is whether Emonds provides a way to avoid marking all rules of class (10b) idiosyncratically as either root-cyclic (= the RTs) or cyclic (= the SPTs).

The hypothesis, as stated in (10), assumes a prior classification of rules as either RT or SPT. This may be restated, however, so as to see clearly the feature used by Emonds to assign a rule to one of the two rule-types explicitly allowed in his system.

(11) SPTs: rules whose outputs are structures that could have been generated by the base rules

RTs: rules that produce un-baselike structures.

According to this criterion (one originally due to Kimball), a rule may be identified as either root-cyclic or cyclic by comparing its output with the set of PS rules.

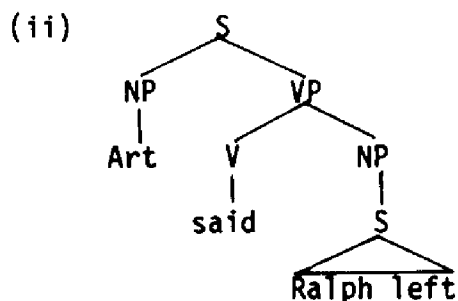
The usefulness of (11) as a diagnostic for rule-type assignment is questionable, however; the bases for criticism are similar to those raised against Postal's in (2): first, the rules considered by Emonds

to belong necessarily to the set of root-cyclic transformations in fact do not. And second, the rules of English that have been seen to be non-cyclic are neither root-cyclic nor uniquely characterizable in terms of the contrast in (11).

As discussed above in section II.B.4, the 16 rules claimed in Emonds 1970 to be root-cyclic for the most part actually require no marking for noncyclic application whatsoever. The 10 rules in (276a) of the preceding chapter have been shown to be restricted in their application not to a given, strictly syntactic configuration (i.e., to a root S),⁵ but to the quality of the verb in the next higher sentence. This higher verb need not be an abstract performative, for these 10 RTs occur in certain embedded sentences, as well as in certain (surface) main clauses. The two inversion rules in (276b) have earlier in this study been argued to be necessarily postcyclic. Insofar as this is true, this means that they must be able to 'look down' in the tree, applying to any S where their structural description is satisfied, and not

5. Actually it is not clear that 'root S' is definable only on examination of the interstructuring of the major categories. In particular, whether or not a complement of a verb of saying represents direct discourse (i.e., whether such a complement is a 'root S' or not) seems to be determinable only in terms of some performative-like feature included in the deep structure representation of saying verbs. That is, I assume with Emonds (see his p. 14) that the sentences in (i) both have (ii) as the underlying structure. The two must differ, then, in some feature assigned to said.

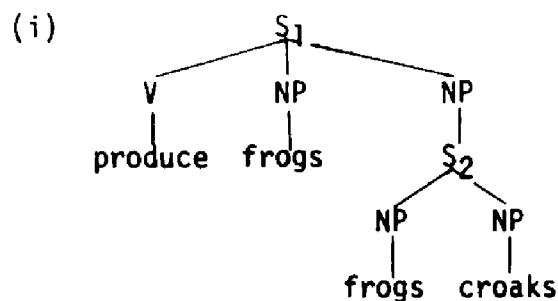
- (i) a. Art said [uttered the sounds], "Ralph left."
 b. Art said [asserted the truth of the proposition] (that) Ralph left.



restricted to root S's or any other specified cyclic node. Finally, the four rules in (276c) were seen to have a natural formulation with reference to a certain subset of performative verbs. These rules will thus in fact apply in derivations only on root S's. Such an applicational restriction is wholly a function of their respective structural descriptions, however, and in no way justifies any explicit marking for root-cyclicity. Assuming the arguments reviewed in chapter II are both representative and correct, it seems that none of Emonds' rules require a feature [+root-cyclic], nor have any other transformations been found which would support adding such a feature to the metatheory.

Not all of the rules considered in II were found to be consistent with cyclic application, so it could be asked whether the criterion for rule-type differentiation in (11) might not be useful for predicting the cyclic-postcyclic (-anywhere) distinctions found to be necessary. The answer is that (11) does not seem to represent a relevant structural feature. For three of the rules that apparently must be noncyclic - P-DEL, DO-GOB, and S-DEL/S-PRO - their application results in no structures that would not be generated by the base rules.⁶ The rule AF-HOP is structure-preserving in Emonds' system, and apparently in analyses

6. Given Ross's (1972a) base rules, the output of DO-GOB is unbaselike only if DO-GOB precedes EQUI. The structure in (i) results under such an ordering.



If DO-GOB operates on the output of EQUI, however, then after pruning the baselike (ii) results.

where auxiliaries are main verbs, although it deranges Syntactic Structures-type base P-markers. DO-SUP (although not DO-DEL, its converse), SAI-fr, and SVI apply only to structures that have already become un-baselike, which makes them hard to evaluate for structure-preservingness. The seven rules here discovered to be noncyclic thus in general do not have the effect of producing un-baselike structures in their application.

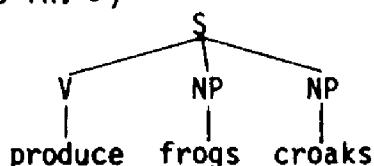
Given the rules surveyed in chapter II, and given the conclusions there of the respective arguments for noncyclicity, it appears that the distinction outlined in (11) will not be usable as a criterion for assigning transformations to different rule-types nonidiosyncratically.

III.C. Kimball 1972b, 1973b.

A more explicit discussion regarding predicting the rule-type of a transformation is given in Kimball 1972b and 1973b. In these two places the author mentions several examples of rules taken to be cyclic and of those held to be 'last-cyclic', where this latter class apparently is meant to include both postcyclic and last-cyclic rules, in the sense defined here. Six or seven features are listed, whereby these two groups of rules can be differentiated in a natural way; the need for marking each rule idiosyncratically for rule-type would thus be eliminated.

The 17 transformations that Kimball identifies as either cyclic

(continues fn. 6)
(11)



Given an underlying SVO order, an assumption tacitly made throughout this study, DO-GOB is most simply described if it applies after EQUI (see (12b) in chapter IV below); thus formulated it yields only baselike structures.

or last-cyclic are listed here in (12).

(12) a. cyclic rules

DAT
EQUI
PASS
(subj-) RAIS
THERE

b. 'last-cyclic' rules

APPOS
EX-NP
EX-PP
EXTRA
H-NP-SHIFT
L-DISL
QUEST
R-DISL
REL
REL-RED
SAI
TOPIC

This twofold division of transformations is correlated by Kimball with distinctions in respect to the following six properties.⁷ These are copied here from Kimball 1973b:42.

7. In Kimball 1972b, and in a preliminary version of Kimball 1973b (distributed by the Indiana University Linguistics Club), the author includes a seventh distinguishing feature:

- | | | |
|-----|---|-----------------------------------|
| (i) | <u>Cyclic</u> | <u>Last-cyclic</u> |
| (7) | Are essentially ordered with respect to one another | In general, no essential ordering |

This conflicts both with McCawley's (1970:286) assertion that postcyclic rules constitute a strictly ordered set, and with recent suggestions (e.g., Postal 1970a:44; Lakoff 1972a:83, 1972b:114) and arguments (e.g., Koutsoudas 1972, 1973 [see, especially, the references listed there]; Ringen 1972) that extrinsic ordering is unnecessary in grammars. Discussion of cases of purported extrinsic ordering among cyclic (or, for that matter, last-cyclic) rules would take us too far afield; I simply assume here with Kimball 1973b that a feature such as (i) will not be relevant in distinguishing among rule-types.

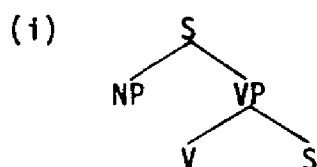
(13) a. Cyclicb. Last-cyclic

- | | |
|--|--------------------------------------|
| (1) Preserve form of input structure | Derange input structure |
| (2) Make no essential use of variables | May make essential use of variables |
| (3) May have lexical exceptions | No lexical exceptions |
| (4) Several may apply within one S | Only one global transformation per S |
| (5) Seem not to introduce structural ambiguities | May introduce structural ambiguities |
| (6) Apply working upwards in tree | Apply only on top S |

We need to ask, then, to what extent the features of (13) may be useful in predicting how the rules in (12) should apply with respect to the cycle. We consider these here in order.

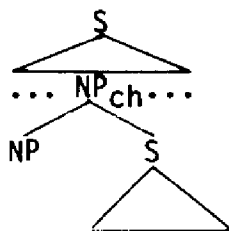
1. Output of the rule and baselike structures. This feature, most commonly associated with Emonds' (1970) 'structure-preserving hypothesis', was discussed in section III.B, where it was seen to be irrelevant in distinguishing the six rules found in chapter II to be postcyclic. Even with respect to the rules listed by Kimball, however, it seems that this property is not entirely reliable in correctly predicting rule-type assignment. On the one hand, the output of the application of the purportedly last-cyclic rule APPOS apparently does not produce un-baselike structures, at least where pruning is assumed,⁸ where some

8. While in this study I have been assuming that pruning takes place immediately after the application of the relevant rules, Kimball (personal communication) holds pruning to be a postcyclic operation. As such, a last-cyclic APPOS would not represent an exception to principle (13.1). Also, if Kimball 1973b allows underlying structures of the form of (i), then (subj-) RAIS would be consistent with (13.1).



relative clauses arise from embedded structures, and where 'baselike structure' is defined only with respect to the highest S in the output of the rule. That is, I take APPOS to derive structures such as (14), one entirely compatible with a commonly accepted set of base rules.

(14) output of APPOS:

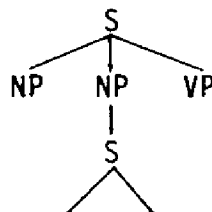


In addition, neither does the application of QUEST (when defined on a higher [+Interrogative] verb) or REL result in deranged structures on the S on which these rules apply.⁹

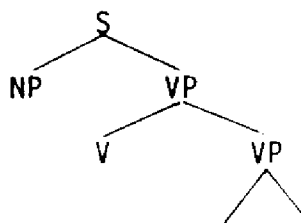
On the other hand, at least a couple of the cyclic rules do seem to produce un-baselike structures. This is illustrated in (15).

(15) a. output of (subj-) RAIS:

(1972b:68-69)



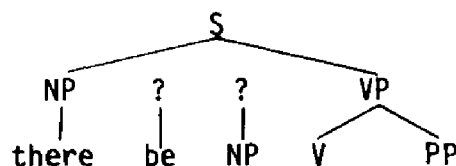
(1973b:43)



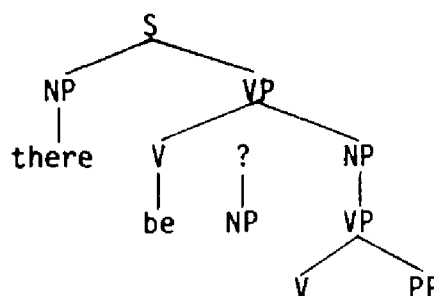
9. The application of QUEST and REL certainly may result in constituents being moved to non-base positions. These constituents will all be dominated by some lower S, however, a context which Kimball (see 1973b:43) apparently disregards in defining property (13.1).

b. output of THERE

(Aux not main verb)



(Aux as main verb)



If Rais does not also include the extraposing of the VP, then there are too many NPs immediately dominated by S for its output to conform to (13a.1); if the rule does adjoin the embedded predicate onto the main VP, then an un-baselike predicate results.¹⁰ And when THERE applies to a string with a progressive aspect be (e.g., There is a man working in the field), then it seems there is no natural place to attach the underlying subject, regardless of whether auxiliaries are treated as main verbs or not.¹¹

10. An expansion of VP into V + VP is consistent with the following base rules proposed by Emonds (1970:165, and 39, 120, 140, 141, 162, 180):

(i) $S \rightarrow \text{COMP} + \text{NP} + (\text{AP}) + (\text{M}) + \underset{\text{TENSE}}{\text{AF}} + (\text{NEG}) + (\text{EMP}) + \text{VP}$

$\text{VP} \rightarrow \begin{matrix} (\text{AP}) \\ -\text{PRED} \end{matrix} \begin{matrix} \text{V} \\ (\text{AUX}) \end{matrix} (\text{AF}) (\text{PRT}) \left(\begin{matrix} \text{NP} \\ +\text{PRED} \\ \text{NP} \\ \text{AP} \end{matrix} \right) (\text{VP}) (\text{PP})^* (\text{S})$

I will not attempt to justify the rules of (i) here, but could note only that these seem to be a direct reflection of the essentially unconstrained base that Emonds assumes, the fact of which tends to render as somewhat vacuous the hypothesis (10) that Emonds wishes to advance, as McCawley (1973:93), for example, has observed.

11. If Kimball is assuming a higher-verb analysis of THERE, as per McCawley 1970:293-94, then the output with respect to the S containing the higher verb is in fact completely baselike.

It thus seems to be the case that a comparison of base structures with the structures resulting from the application of a transformation does not provide an infallible guide to dividing the rules the way Kimball intends in (12).

2. Variables. The definition of this feature has been relaxed from that given by Postal in (2a). According to (13.2), nothing may be learned about a rule which does not have an essential variable; if there is one present, however, then it would be predicted that the transformation would operate last-cyclically. Thus neither DAT nor EXTRA, for example, has an essential variable (in the sense of Postal 1971:105f), and in terms of this second property, could not be distinguished.

If the structural description of a rule includes this kind of variable, then the prediction would be that it must be last-cyclic. Thus APPOS, L-DISL, QUEST, R-DISL, REL, and TOPIC should all be last-cyclic rules. This prediction is not completely accurate, however, for REL - as Kimball himself argues (see section II.A.1) - must in some cases apply cyclically, and in no cases is required to operate last-cyclically. That is, Kimball now would apparently put it in (12a) and not (12b). Thus, inspection of a rule for an essential variable is not a wholly reliable basis on which to assign rule-type features; it is not relevant to rules without variables, and is itself not sufficient to correctly divide variable rules.

3. Lexical exceptions. As in Postal 1971, so in Kimball 1972b:75 it is apparently assumed that this feature is tied closely or necessarily with the preceding one. Insofar as this is true, this does not represent a more reliable criterion for assigning rule-type than (13.2). Further, given the considerations mentioned in footnote 4 in this chapter, this is a difficult feature to utilize. The class(es) of verbs that govern

the application of such rules as APPOS and TOPIC is just not sufficiently characterized at present to be able to state confidently whether or not these rules have exceptions.

4. Number applicable per S. This is a property which manifestly cannot be used as a diagnostic to assign any particular transformation its rule-type feature. If the sets of rules (12a) and the global rules in (12b) - those that move constituents over a variable (1973b:42) - do exhibit the contrast indicated, this would not be of any use in deciding the rule-type of any single transformation.

It is not clear, however, that Kimball's global transformations are restricted in that only one can apply on a given S. Consider the following counter-examples:

(16) a. EXTRA and REL

It surprised the boy who loved her that Lulu loved licorice.

b. EX-PP and REL

A review came out yesterday of the book that Joe paid
\$30 for.

c. H-NP-SHIFT and REL

The boy who always stays in the library gave to Berta the
book that was about the skinning of cats in Alberta
between 1898 and 1901.

d. TOPIC and REL

The man who lives upstairs said that Jill, Jack was planning
to propose to.

e. L-DISL and QUEST

The hat, who should I give it to?

f. R-DISL and QUEST

When did she come, Mary?

Certainly there are restrictions on the cooccurrence of transformations that produce emphasis, as Hooper and Thompson (1973), for example, have pointed out. Thus it is generally quite awkward to divide foregrounding in a sentence between both a fronted and a postposed element, as in (17).

(17) a. L-DISL and R-DISL

??John, he loves her, Mary.

b. TOPIC and R-DISL

??Mary he loves, John.

Such restrictions seem to be most easily accounted for in terms of communicative function and not by restricting the set of relevant rules in (12b) to only one application per S. This latter constraint is certainly too severe; in relaxing it, the crucial parameters would seem to be just those notions utilized by Hooper and Thompson, thus indicating that the simple statement of this feature in (13b.4) is inadequate.

If certain pairs of rules held to be last-cyclic cannot both apply on a given S, the same is certainly true of certain pairs of cyclic rules. Thus, for example, EQUI and RAIS cannot apply on the same S.

The conclusion to these considerations must be that this fourth property for nonidiosyncratic rule-type assignment is not adequate for distinguishing among transformations in the manner intended.

5. Structural ambiguities. This is another property which is difficult to apply to any particular transformation, as it seems to require knowledge of all base rules and all other transformations before being able to come to a decision. Kimball (1972b:75) describes this property as follows:

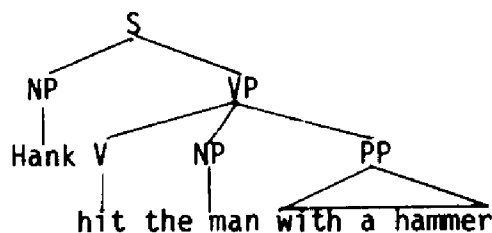
- (18) If T_i is an all-cyclic transformation, then it is not the case that after T_i has applied to a structure K , the result $T_i(K)$ could also have been produced from a different deep structure by a different sequence of operations.

Conversely, if the application of a given transformation produces an ambiguous string, then it is not all-cyclic - i.e., given a system with 'all-cyclic' and 'last-cyclic' as the only two rule-types, it is last-cyclic.

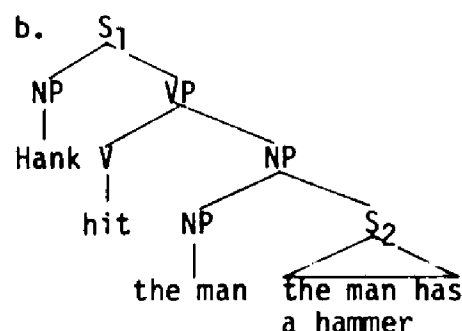
This may be illustrated most simply by an ambiguous sentence such as (19), two different deep structures for which are shown in (20).

- (19) Hank hit the man with a hammer.

- (20) a.



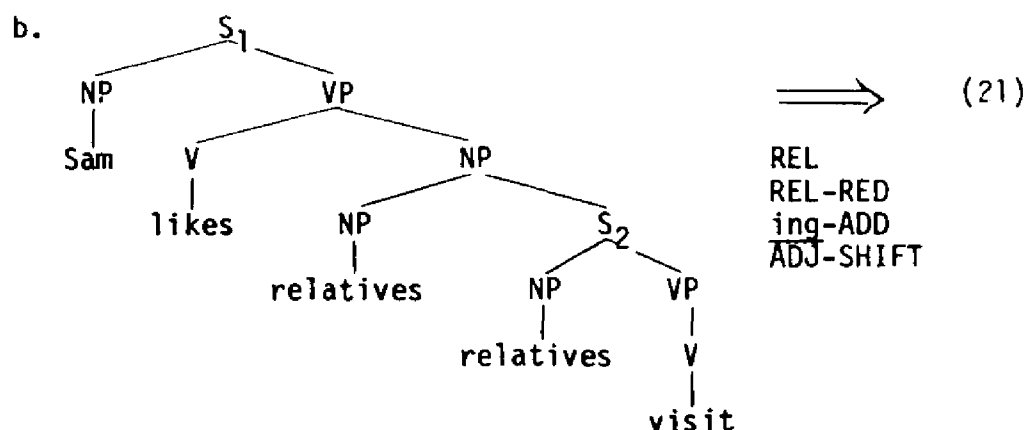
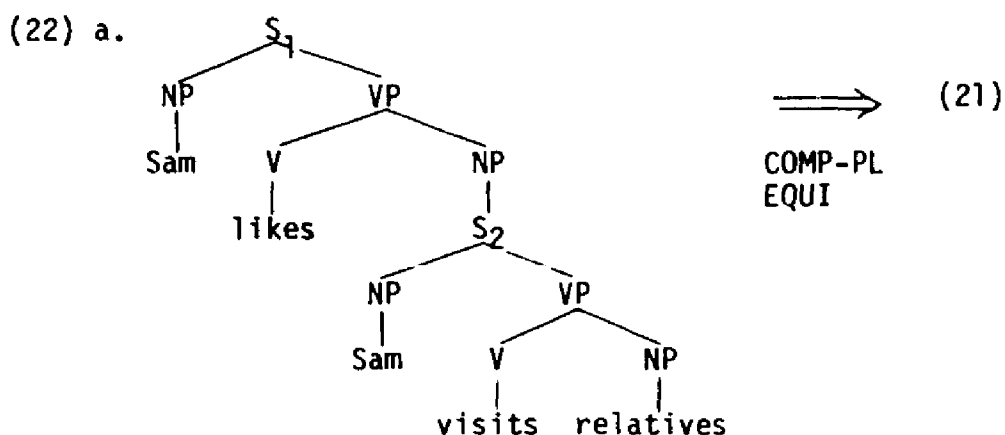
- b.



To (20b), REL and then some kind of REL-RED rule must apply, the result being a structure (= 20a) that could be produced from a different underlying source. By criterion (13.5), then, REL and REL-RED are last-cyclic rules.

Prediction of rule-type by means of this diagnostic, however, is not always so straightforward. Consider (21), the output of different sets of rules applying to (22a) and (22b).

- (21) Sam likes visiting relatives.



Here, given the statement of this property in (18), there seems to be no way to avoid assigning all six rules to the category of last-cyclic rules. With respect to (22b) and (21), COMP-PL and EQUI would be marked last-cyclic and not cyclic, for they produce a structure that could have been produced from a different deep structure and with different rules. On the same grounds, REL, REL-RED, ADJ-SHIFT, and the rule that adds -ing to the verb in S_2 in (21b) would be assigned last-cyclicity.

Clearly this yields the wrong results, at least given the twofold distinction of the rules of (12). The same indeterminacy of rule-type assignment that exists for the rules in (22) will apparently be present in all cases where non-null sets of transformations are involved in deriving the same surface structure from different deep structures.

It is possible that cases like (19)-(20), where the relevant transformations apply to only one of the underlying structures, will uniformly distinguish only the rules that Kimball wants to include as last-cyclic. As a general criterion, however, it seems to run afoul of what must be the more usual case, namely, where different rules apply to each deep structure that underlies an ambiguous string.

6. Domain of application. The final feature proposed by Kimball for distinguishing between rules that should be marked for cyclic application and those that presumably must apply last-cyclically considers whether the rule is restricted to applying on the topmost S, or whether it can apply "working upwards in [a] tree." As stated, it is not clear that there is a significant formal property of a rule one could examine to determine whether a restriction to applying only on the highest S obtained. If the restriction were an intrinsic one (e.g., if a rule referred to a performative verb, for example, as SAI(-q) must), then it would be trivial to mark the rule as last-cyclic, for, regardless of rule-type assignment, it could apply on no S other than the highest S. If the restriction intended is an extrinsic one (e.g., if the rule as formulated could apply on any S, as for example EXTRA or REL, but for some reason was allowed to apply only on the top S), then there is circularity, for the only way to correctly mark such a rule for last-cyclic application would be if it was known ahead of time that it must be last-cyclic; nothing about the statement of such a rule would point to its being noncyclic.

As I understand (13.6), then, this is not a significant property in dividing rules into 'cyclic' and 'last-cyclic'. It can serve to segregate rules according to what S's they in fact (i.e., intrinsically)

may apply on,¹² but it does not seem equipped to go beyond this to assign features governing the S(s) on which a rule must apply. To do the latter, prior knowledge of rule-type assignment is necessary.

These six features proposed as distinguishers of rules (12a) from rules (12b) thus do not clearly effect the appropriate marking. On the criterion of preserving baselike structures, the rules APPOS, QUEST, REL, RAIS, and possibly also THERE would be assigned a rule-type value opposite of that intended by Kimball. The five or six rules in (12) that have an essential variable generally do belong to the 'last-cyclic' set, as predicted, with the exception that REL apparently must rather be marked as a cyclic rule. Given this fact, even this clearest formal property is not an accurate measure of rule-type. The third feature is perhaps only a function of the second; in any case, I have found it a difficult one to use in dividing rules and thus am not sure of its present usefulness. The fourth and fifth properties are ones that apparently cannot be used as diagnostics for assigning particular transformations to a rule-type. Even as generalizations about the sets of cyclic and last-cyclic rules, however, they do not seem correct: among both sets of rules there are pairs of rules that can and other pairs of rules that cannot both apply on the same S; and, the fact that a transformation is involved in the derivation of a string that could arise via a different underlying structure does not seem to represent a sufficient basis for rule-type differentiation. Finally, the last

12. Actually, this property applied in its broadest manner would yield a threefold division of rules:

- (i) a. those that must apply on a top S (e.g., APPOS (for some dialects), SAI(-q))
- b. those that must apply on a non-bottom S (all 'two-story' rules, e.g., EQUI, RAIS)
- c. those that may apply on any S (e.g., PASS, DAT).

criterion apparently allows no non-trivial distinction among rules.

In chapter IV formal criteria, including some of these discussed here, will be considered further with respect to the rules of (12) and many others. For now, though, we note only that Kimball's six properties do not seem able to form the basis of a nonidiosyncratic rule-type assignment that would result unequivocally in the division represented in (12) above.

Even if these were adequate, however, the significance of the result would be questionable. This is because, just as with the rules considered by Postal (1971) and Emonds (1970), the rules Kimball divides according to rule-type in fact require no such division. Where his SAI is taken to be SAI-q, all 17 rules in (12) are fully consistent with a strictly cyclic application; as such, any marking for rule-type would be irrelevant.

Leaving aside REL for the moment, it is conceivable, however, that someone could argue that the rules in (12b) are consistent with 'last-cyclic' application and that the rules in (12a) are not so consistent, and thus leave some place for marking of rules.

While it might be interesting to know for each rule the range of rule-types its application would be consistent with, it is certainly more significant to ask about the necessity of rule-type assignment. In the present study I am assuming a transformational cycle and am seeking to determine how much deviation from this cycle - in terms of rule-types and their respective member rules - is necessary. A different (and perhaps more far-ranging) approach would be to assume no cycle at all and then to ask what general conventions will be necessary to ensure proper derivations. In either case, however, the investigator must be concerned with necessary elaborations of his

starting schema, an essential point that Postal (1972a) has made most strongly.

Given an assumption of an Aspects-type cycle, then, there can be no intrinsic interest in marking rules with some value of a feature [consistent-with-last-cyclic-application], that is, of dividing the cyclic rules into those that could and those that could not apply last-cyclically. Our interest, rather, will be in trying to characterize in some nonidiosyncratic fashion the processes that we have found to require noncyclic application, a matter that will be taken up further in the next chapter.

III.D. Perlmutter and Postal (unpublished work).

In an Indiana University Linguistics Club lecture (19 February 1974), David Perlmutter outlined an approach to the general problem of governing the order of application of syntactic rules currently under investigation by himself and Paul Postal. This approach relies crucially on the notion of grammatical term or relation (i.e., subject, object, indirect object), in terms of which rules are to be divided as follows:

- (23) a. those that relate in some essential way to a grammatical term
 - a1. those that create a new term (e.g., PASS, RAIS)
 - a2. those that do not create a new term (e.g., EQUI, REFL)
- b. those that do not relate in some essential way to a grammatical term (e.g., Spanish Cliticization)

Rules that fall into category (23a) are the cyclic rules, those in (23b) are postcyclic. The distinction within the rules of type (23a) represents a universal principle of rule application, for the rules of (23a1) apply in a block before those of (23a2). Within each of the three blocks of rules, there presumably is no need for extrinsic ordering restrictions.

While a careful test of this diagnostic for rule-type assignment is obviously dependent on a more precise characterization of what it means for a rule to 'relate essentially' to a grammatical term, still it may be possible to make some initial observations. Of the seven rules found in chapter II to require noncyclic application in derivations, the two inversion processes (SAI-fr and SVI) both seem to refer explicitly to a subject NP, while the other five rules do not mention in their structural descriptions any NP that is necessarily a grammatical term. Of rules that have sometimes been argued to be cyclic, CONJ-RED and NEG-RAIS would appear to fall into category (23b), while PART and TAG, rules for which noncyclicity arguments have been made, apparently belong in (23a2), for their structural descriptions mention, respectively, NPs that must be an object and a subject.

This criterion of making reference to a grammatical term will be utilized further in the concluding chapter, but for now we may say that it is not clear how it would function to predict the kind of rule-type distinctions found to be necessary for rules of English syntax.

IV. Conclusions.

In this study we have examined the assignment of transformations to various rule-types, one of the mechanisms for governing the order of application of rules in derivations. This device was first proposed (albeit with very little comment) in Fillmore 1963, but then in Chomsky's Aspects was eliminated, along with all double-base transformations. Following close behind Aspects were works by Lakoff and Ross, where it was argued that in fact not all transformations could apply consistent with the transformational cycle proposed for the generalized Phrase-markers. These authors thus suggested that various other rule-types were necessary, these defined in relation to the Aspects cycle, the member rules of which would apply in ways variously inconsistent with strict cyclicity.

Since the time these different noncyclic rule-types were elaborated, a great many transformations of English have been argued to be necessarily noncyclic, that is, requiring some mark to indicate that in derivations they apply other than in an upward cyclic manner. There has been a sensitivity to the 'cost' of such marking, an unwillingness to add to the structural description of the rule itself some otherwise ad hoc rule-type feature, and thus several have attempted to establish a correlation between some independently motivated property of the structural description of each rule and the particular rule-type to which it must belong; this would allow rule-type assignment to be determined by some general algorithm and not by a rule-specific mark.

The results of this critique of the post-Aspects proliferation of syntactic rule-types and of attempts to predict rule-type assignment nonidiosyncratically are largely negative. Contrary to the current general acceptance of many of the more important transformations of

English as being necessarily noncyclic, a careful review of the relevant facts and arguments reveals that the great majority of purported non-cyclic rules in fact may apply in strict conformity to the Aspects cycle with no loss of generality in statement of the rule, and with no reduction in observational adequacy. Where it cannot be shown that a given rule is required to apply noncyclically in derivations, then there can be no justification for marking such a rule to belong to any noncyclic rule-type.

Not all the transformations considered here, however, are compatible with an upward cycle. Specifically, it was found in chapter II that at least six intuitively minor or low-level rules of English must be guaranteed to apply postcyclically in derivations, and at least one must be allowed to apply as an anywhere rule. We are interested, then, in attempts to find a relation between rule-type assignment and some already needed feature(s) of the formulation of these seven rules. Unfortunately, the four proposals for predicting rule-type assignment surveyed in chapter III do not seem to be directly useful here. As pointed out, these schemes are deficient in that the rules they attempt to segregate into different rule-types in fact do not require such differentiation.¹ Further, when applied to the rules that do apparently require noncyclic application, the properties isolated in the different proposals do not serve to uniquely identify the relevant rules.

In this concluding section, then, we will first make a new attempt to correlate difference in rule-type assignment with difference in some property intrinsic to the rules themselves. Following this, we discuss some implications of the grammar containing noncyclic rules. Finally,

1. Perlmutter and Postal's proposal should be excluded from consideration on this point, for I do not know what (if any) rules of English they would argue to be necessarily noncyclic.

we consider generally the Aspects cycle itself, and suggest directions of further inquiry in the study of the interrelations of transformations as these apply in derivations.

IV.A. Nonidiosyncratic assignment of rule-type features.

The conclusion of chapter II was that the following rules of English need to be marked somehow with features indicating that they must apply noncyclically:

(1) <u>postcyclic</u>	<u>anywhere</u>
AF-HOP (or Affix Lowering (AF-LOW))	S-DEL/S-PRO
DO-GOB	
DO-SUP (or DO-DEL)	
P-OEL	
SAI-fr	
SVI	

The question pursued in this section is whether there exists some set of features, in terms of which these rules form a natural class, contrasting with respect to the rules that may (or must) apply cyclically. If the rules in (1) can be so characterized, then an algorithm can be constructed by which rules may be appropriately classified with respect to rule-type, and the structural descriptions of transformations themselves will not have to bear directly any extrinsic marking for this feature.

We consider, then, several formal properties of transformations, and of the relations of the rules to the base structures (per Kimball 1972b, 1973b, and Emonds 1970) and to grammatical terms in the relevant input and output trees (following Perlmutter and Postal). The eight features I have selected here for consideration certainly do not

to more than one formulation, this reflecting, for example, different ways of handling auxiliaries.

(3)	<u>obl/opt</u>	<u>variable</u>	<u>trigger</u>	<u>morphemes</u>	<u>operation</u>	<u>output</u>	<u>terms</u>	<u>role of V</u>
<u>a. postcyclic rules</u>								
1a. AF-HOP				en, ing, have, be	move	-b	-	crossed over
1b. AF-LOW	obl	-	-	-				
2. DO-GOB	obl	-	-	do	subs	+b	-	moved, deleted
3a. DO-SUP	obl	-	-	do	add	(-b)	-	added
3b. DO-DEL					del	-b		deleted
4. P-DEL	obl	-	-	that,for	del	+b	-	-
5. SAI-fr ²	obl/opt	-	fronted NPs	(have,be)	move	(-b)	S	moved
6. SVI	opt	-	fronted NPs	-	move	(-b)	S	moved
<u>b. anywhere rule</u>								
7a. S-DEL				it	del			
7b. S-PRO	opt	Xe	=S	-	feat	+b	-	-
<u>c. rules commonly held to be postcyclic</u>								
8a. ADV-PRE (Ross)		Xa	-	-				-
8b. ADV-PRE (Geis)	opt	-	V [-Log]	it	move	-b	-	trigger
9. EX-NP	opt	Xa	-	-	move	-b	-	-
10. EX-PP	opt	Xa	-	-	move	-b	-	-

2. Under "morphemes mentioned" for SAI-fr, SVI, SAI-q (#24), NEG-EMP-PL (#42), and NUMB (#43), note that it is necessary to refer to have and be (and M and, for SVI and NUMB, also V) if auxiliaries are not treated as main verbs.

	<u>obl/opt</u>	<u>variable</u>	<u>trigger</u>	<u>morphemes</u>	<u>operation</u>	<u>output</u>	<u>terms</u>	<u>role of V</u>
11. EXTRA ³	opt	Xa	-	(it)	move	-b	-	-
12. IT-DEL	obl	-	-	it	del	-b	-	-
13. PART	opt	Xa	-	-	move	-b	0	-
14. QUEST	obl	Xe	V [+Inter]	-	move	-b↓	-	trigger
15. REL	obl	Xe	=NP	-	move	-b↓	-	-
16. REL-RED	opt	-	-	be [+Prog]	del	-b {-S,-0}	deleted	
17. ADJ-SHIFT	obl	-	-	-	move	(-b)	-	moved
18. TOPIC	opt	Xe	V [+Assert]	-	move	-b↓	-	trigger

d. rules commonly held to be last- or root-cyclic

19. APPOS	opt	Xe	=NP, V [(+Perf) +Assert]	-	move	+b	-	trigger
20. Emonds' (276a)	opt	Xa	V [+Assert]	-	move	-b↓	-	trigger
21. Emonds' (276c)	opt	Xa	V [+Perf +Assert]	-	move	-b↓	-	trigger
22. PERF-DEL	obl/opt	-	-	-	del	+b -S,-IO	deleted	
23. SAI-i	obl	Xa	V [+Perf +Imp]	-	move	-b↓	S	trigger, moved
24. SAI-q	obl	Xa	V [+Perf +Inter]	(have,be)	move	-b↓	S	trigger, moved
25. TAG	opt	Xa	V [+Perf +Suppose]	NEG	add	-b↓	S	trigger

3. I assume that EXTRA, as well as EQUI (#31) and RAIS (#35), must refer to the complementizer present in the relevant intermediate structure, although this will not be spelled out here under "morphemes mentioned" for these three rules.

	<u>obl/opt</u>	<u>variable</u>	<u>trigger</u>	<u>morphemes</u>	<u>operation</u>	<u>output</u>	<u>terms</u>	<u>role of V</u>
26. WHETHER-DEL	obl	Xa	V [+Perf]	whether	del	+b	-	trigger
27. YOU-DEL	obl/opt	Xa	V [+Perf] [+Imp]	you	del	-b↓	-S	trigger
<u>e. rules commonly held to be cyclic</u>								
28. COMP-PL	obl	Xa	V [-Perf] [xComp]	that,for	add	-b↓	S	trigger
29. CONJ-RED	opt	Xe	-	-	del	-b	-	-
30. DAT	opt	-	V	to	move, add/del	+b	0,10	trigger
31. EQUI	obl	Xa	V	-	del	-b↓	-S	trigger
32. NEG-RAIS	opt	Xa	V	NEG	move	(-b)	-	trigger
33. PASS	opt	-	V	be -en, by	move, add	+b	±S,-0	trigger
34. PSYCH-MOVE	opt	-	V	to,with	move, add	+b	±S, {±0 -0}	trigger
35a. RAIS (to subj)							±S	
35b. RAIS (to obj)	obl/opt	-	V	-	move	-b	-S,+0	trigger
36. REFL	obl	Xa	=NP	-	feat	+b	{S,0,10}	-
37a. THERE (2-story)			V [+Exist]			-b↓		trigger, crossed over
	opt	Xa		be,there	add, move		±S	
37b. THERE (1-story)			-			-b		crossed over
38. TOUGH-MOVE	opt	Xa	V	it	subs	(-b)	±S	trigger
<u>f. other rules</u>								
39. AG-DEL	opt	Xa	-	by	del	+b	-	-
40. GAP	opt	Xa	=V	-	del	-b↓	-	deleted
41. INDEF-INCOR	obl	Xe	[+Affect]	-	feat	+b	-	-

	<u>obl/opt</u>	<u>variable</u>	<u>trigger</u>	<u>morphemes</u>	<u>operation</u>	<u>output</u>	<u>terms</u>	<u>role of V</u>
42. NEG-EMP-PL	obl	-	-	(have,be), NEG	move	-b	S	crossed over
43. NUMB	obl	-	-	(have,be)	feat	+b	S	feature added
44. POSS-FORM	opt	-	-	have	del,add	-b	S,-0	deleted
45. POSS-SHIFT	obl	-	-	of	move, (-b) del	-	-	-
46. PRO	obl/opt	Xe	=NP	-	feat	+b	-	-
47. VP-DEL	opt	Xe	=VP	-	del	-b ↓	-	-

In an initial attempt to sort out the facts here, it may be helpful to tabulate for each of the subgroups in (3) the values shown for the respective distinguishing features. Below, the group of rules found to be necessarily postcyclic will be indicated by 'Po', the anywhere rule by 'A', the rules thought to be postcyclic but actually not requiring such application by '(Po)', etc. In cases where different formulations of a rule were considered, the totals for some of the feature values will vary. Thus, for example of the six rules of (3a), there will be either one example of a deletion process and one of addition, or two deletions and no additions. This variance is indicated by slashes in the tables, where the numbers above the slashes will in every case equal the total of those below.

With respect to optionality and obligatoriness, then, the six subsets of rules showed the distribution in (4).

(4) Application requirement:	<u>obl</u>	<u>obl/opt</u>	<u>opt</u>
Po	4	1	1
A	-	-	1
(Po)	4	-	7
(L)	3	2	4
(C)	3	1	7
(-)	4	1	4

The presence of variables in the structural description was the single property of those utilized here with respect to which the six rules found in chapter II to be postcyclic patterned as a group.

(5) Presence of a variable:	<u>(none)</u>	<u>Xa</u>	<u>Xe</u>
Po	6	-	-
A	-	-	1
(Po)	3/4	5/4	3
(L)	1	7	1
(C)	4	6	1
(-)	4	2	3

The absence of a (non-end) variable is not sufficient to characterize uniquely the rules of (3a), however, for clearly many other rules share this feature.

Next we consider the question of rule-trigger. Here we will group all rules that make use of identity restrictions together, and also all those that refer to any kind of verbal trigger. Given such a classification, two triggers have been entered for a rule such as APPOS.

(6) Trigger:	<u>(none)</u>	<u>V</u>	<u>=</u>	<u>other</u>
Po	4	-	2	-
A	-	-	1	-
(Po)	7/8	3/2	1	-
(L)	1	8	1	-
(C)	1/2	9/8	1	-
(-)	5	-	3	1

The mention of some specific morpheme(s) in rules is covered in (7). The second column lists those cases where [+Aux] will be referred to if auxiliaries are treated as verbs, but have, be, etc. otherwise. The third column combines rules that refer to specific complementizers and those that mention some preposition. When one rule refers specifically to more than one kind of morpheme (e.g., PASS), then all are listed.

(7) Specific morpheme(s) mentioned:

	<u>(none)</u>	<u>(have,be)</u>	<u>V</u>	<u>comp/prep</u>	<u>it</u>	<u>NEG</u>	<u>other</u>
Po	1	2	2	1	-	-	-
A	1	-	-	-	-	-	-
(Po)	7/9	-	1	-	3/1	-	-
(L)	5	1	-	-		1	2
(C)	4	-	2	4	1	1	1
(-)	4	2	1	2	-	1	-

Fifth, the kind of structural change called for by each rule is summarized. Here I consider only what seems to be the most important operation performed by each rule (e.g., PASS is treated as a movement rule, although it also adds certain specific morphemes).

(8) Kind of operation:	<u>move</u>	<u>delete</u>	<u>add</u>	<u>substitute</u>	<u>feature</u>
Po	3	1/2	1/-	1	-
A	-	-/1	-	-	1/-
(Po)	9	2	-	-	-
(L)	5	3	1	-	-
(C)	5	2	2	1	1
(-)	2	4	-	-	3

With respect to a rule's preserving or distorting baselike structures, notice that less than one-third of all the rules surveyed here result in structures that are compatible with some output of the PS rules (as these are conceived of rather conservatively). Given the four-way distinction utilized here, these 47 rules showed the following behavior on this point:

(9) Relation to base structures:	<u>+base</u>	<u>-base</u>	<u>-base↓</u>	<u>(-base)</u>
Po	2	1/2	-	3/2
A	1	-	-	-
(Po)	-	7	3	1
(L)	3	-	6	-
(C)	4	2/3	3/2	2
(-)	4	2	2	1

Seventh, we consider mention in the rules of a grammatical term, in Perlmutter and Postal's sense. Over half of the rules referred to no NP that was necessarily a subject, object, or indirect object NP, while several mentioned more than one such NP. In the latter cases, all terms mentioned are counted separately for the purposes of the chart in (10).

(10) Reference to grammatical term:

	<u>(none)</u>	<u>S</u>	<u>0</u>	<u>IO</u>	<u>+S</u>	<u>+0</u>	<u>+IO</u>	<u>-S</u>	<u>-0</u>	<u>-IO</u>
Po	4	2	-	-	-	-	-	-	-	-
A	1	-	-	-	-	-	-	-	-	-
(Po)	9	-	1	-	-	-	-	1	1	-
(L)	4	3	-	-	-	-	-	2	-	1
(C)	2	2	2	2	5	1	-	7	3	-
(-)	6	3	-	-	-	-	-	-	1	-

Finally, we tabulate the various roles (if any) played by a verb in the given transformations. For most rules, either there was no verb mentioned, or the verb functioned as a trigger of the operation. In a few cases, the structural description refers to more than one verb; all are included in (11).

(11) Role of verb:

	<u>(none)</u>	<u>crossed over</u>	<u>moved</u>	<u>added</u>	<u>deleted</u>	<u>trigger</u>
Po	1	1	3	-/1	2/1	-
A	1	-	-	-	-	-
(Po)	6/7	-	1	-	1	3/2
(L)	-	-	2	-	1	8
(C)	2	1	-	-	-	8/9
(-)	5	1	-	1	2	-

What use, then, is to be made of the classification of these rules with respect to these eight features? From (4)-(11), are there generalizations to be noted about the relation of rule-type membership and some formal property or properties of these rules?

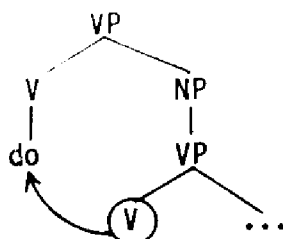
The answer here seems to be somewhat, although not altogether

negative. With respect to application requirement (4), trigger (6), kind of operation (8), and relation to base structures (9), I can see little correlation with rule-type (purported or, following the arguments in chapter II, actually demonstrated). Perhaps a statistical analysis more sophisticated than the casual one followed here, aided by judicious reanalysis of certain relevant transformations could indeed demonstrate the desired relation. Given our general ignorance of the exact formulations of these rules, however, such an effort seems to me imprudent.

With the properties of variables in the structural description (5), the mention of specific morphemes (7), reference to grammatical terms (10), and the role of the verb (11), however, there is a more obvious correlation with rule-type. As pointed out above, the six rules here considered to be necessarily postcyclic are 'local' rules in the sense of being defined strictly in terms of adjacent categories and/or morphemes. That is, I assume the simplest formulation of these rules to be as schematically indicated in (12). For convenience, auxiliary rules are illustrated only with auxiliaries as main verbs.

(12) a. AF-LOW [+Aux] [+Verb]
 1 2 \Rightarrow
 \emptyset 2 # 1

b. DO-GOB⁴



4. In structures to which DO-GOB applies, the subject of the lower S will always be deleted by EQUI. We may use this fact, plus pruning, to formulate the rule to apply to adjacent verbs only.

- c. DO-DEL do $\begin{bmatrix} +\text{Verb} \\ -\text{Tns} \end{bmatrix}$
- 1 2 \Rightarrow
- \emptyset 2
-
- d. P-DEL
-
-
- e. SAI-fr⁵ [A NP Tns ([+Aux])
- 1 2 3 \Rightarrow
- 1 3 + 2 \emptyset
-
- f. SVI [B NP Tns [+Verb]*
- 1 2 3 \Rightarrow
- 1 3 + 2 \emptyset

Besides these six, twelve other rules of those surveyed here have no internal variable in their formulation.

Most of the rules in (12) are alike in another respect, namely, that they refer to some specific morpheme, or to the set of specific morphemes abbreviated by '[+Aux]'. The one exception is SVI, which must be written a little more generally, to account for the movement of all the verbals in a sentence such as (13).

(13) Around the far turn should be coming the red Maserati.

Outside of SVI, though, the necessarily postcyclic rules are 'low-level' in the sense of mentioning specific morphemes in either their input or

5. In these two inversion rules, A and B represent the classes of fronted constituents that function to trigger the structural change.

output. As with the property of being written without a variable, however, so from (7) no unique characterization of a rule-type is possible.

Turning to the feature of mentioning grammatical terms in rules, we see that the only transformations that create a new term in the course of their application are those that have been commonly argued or asserted to be cyclic. This much agrees with Perlmutter and Postal's hypothesis, whereby such rules could be only cyclic. However, with respect to the distribution of rules that destroy terms, or mention them without adding or deleting them, little generalization seems possible. That is, outside of rules that create new terms, there seems to be little correlation between rule-type and behavior with respect to this feature. Whether this represents an essential defect in this hypothesis, or simply reflects a deficiency to be remedied with fuller elaboration of this postulated correlation remains to be seen.

Finally, there is a certain similarity to the six rules in (12) in that they generally make some essential reference to a verb, where 'essential reference' means any mention of V where V does not function as a trigger of the transformation. Only P-DEL is an exception to this generalization, a generalization, again, that tends to characterize the class of rules that must apply postcyclically, but does not do so uniquely.

The strongest statement that emerges, then, from these considerations is the following:

- (14) Transformations (a) that are formulated with some essential reference to a verb, (b) that mention explicitly some specific morpheme, and (c) that contain no abbreviatory or essential variables tend to be those processes that must apply postcyclically in derivations.

Given that SVI and P-DEL deviate from this tendency, and given the few rules (e.g., REL-RED, POSS-FORM) that manifest the three features in (14) but for which there do not seem to be arguments showing the necessity of postcyclic application, (14) seems to be the most specific statement possible correlating rule-type membership and certain formal features of the independently motivated structural descriptions of the rule. Unfortunately, since (14) is only a tendency statement, making no falsifiable predictions about given rules and how they should be assigned to rule-types, this means that no universal algorithm can be defined which would correctly mark rules as to whether or not they apply postcyclically solely on the basis of otherwise needed information contained in their formulation. To answer partially the question raised at the beginning of this section IV.A, then, I have not found any way that the six necessarily postcyclic rules may be characterized as a natural class of transformations.

To complete the answer, it remains only to admit that there can be no convincing characterization of the class of necessarily anywhere rules. It is not difficult to find combinations of features that describe uniquely S-DEL/S-PRO, at least given only the 47 rules considered here; a few such combinations are listed in (15).

- (15) 1. only S-DEL/S-PRO: is optional, has an essential variable, produces baselike outputs, and mentions no V

2. only S-DEL: has an essential variable and mentions a specific morpheme
3. only S-PRO: is optional, has an essential variable, and is a feature-changing rule.

The problem is simply that a set consisting of a single rule does not allow any nonarbitrary general characterization. Until further examples are found of transformations that require an anywhere application, then, it seems most reasonable to avoid speculations as to how S-DEL/S-PRO may be nonidiosyncratically marked to operate in the desired manner.

IV.B. Implications of some rules being noncyclic.

In this subsection we consider briefly the relevance of noncyclic transformations to other aspects of the grammar - to Ross's notion of bounding, and to a condition such as that proposed by Jackendoff (1972:374) to ensure strict cyclicity of all rules.

1. As a consequence of his conclusion that EXTRA and certain other rules had to be noncyclic, Ross (1968) proposed that the theory had to include 'bounding' as a primitive notion, by which the (non-end) variables in certain movement rules were to be constrained. Specifically, when rules like EXTRA and EX-NP, whose structural changes call for moving a constituent over a variable, are not restricted to strictly cyclic application, then this variable could include elements from other sentences. In such a case, the rule must be blocked from applying. This is illustrated in (16), where a grammatical string results only if the extraposed clause remains within its own sentence.

(16) that _S[it [that Ed was late] bothered Al] didn't surprise me. [↑]

The diagram shows a horizontal line starting under the word 'that' and ending under the word 'late'. An arrow points from the end of this line to the word 'me' at the end of the sentence. There are dashed lines and a double slash (//) after 'me'.

Ross found that the application of all rules that move elements rightward

over a variable is constrained in this way, as well as some of the leftward movement variable rules. Instead of complicating the formulation of all such processes in what would be exactly parallel ways, Ross suggested a general boundedness constraint on the interpretation of these variables. This constraint holds universally for rightward movement rules; the variable in leftward moving rules, however, may or may not be so constrained, which means that "rules which adjoin elements to the left of variables must be marked idiosyncratically, for some are upward bounded, and some are not" (Ross 1968:169).

In the present study we, like Ross, have found that some rules of English must indeed be restricted to postcyclic application. The rules that must so apply, however, are much more restricted than the many that Ross found to be noncyclic in this way. In the first place, we have found only a handful to be necessarily postcyclic. More important here, though, is the fact that all the rules argued to be postcyclic are ones that require no variable, their structural description specifying only two (or, counting the trigger in SAI-fr and SVI, three) adjacent elements.

Now if the tendency statement (14) above, regarding the prediction of rule-type assignment, is strengthened in that (14c) - specifying the absence of any variable - is made a necessary condition for membership in the postcyclic set of rules, then there will be no need to retain Ross's notion of bounding in the theory. Given the facts in (5), (14c) clearly may be strengthened in this way; although this is not sufficient to characterize postcyclic rules, still it seems to represent one feature of a yet-to-be-elaborated general algorithm that would assign rule-type features completely nonidiosyncratically. Where the set of postcyclic rules is thus restricted to being a proper subset of the rules that make no use of variables, then in principle there will be no place

for bounding. As we have attempted to show in section II.A.3 above, there does not seem to be any compelling evidence that would require EXTRA and such rules to be postcyclic, and thus not otherwise restricted from moving elements indefinitely far out of their cyclic domain. More specifically, these rules may apply strictly cyclically; this fact alone, then, is sufficient to ensure that the variable in the rule does not represent an inappropriately large domain.

2. The existence of noncyclic rules - in particular, ones that are postcyclic - also relates to recent proposals for restricting rules from applying too far down in the tree. Jackendoff (1972:374-75), for example, suggests that a condition such as that in (17) may be imposed as "a universal convention on applicability of transformations."

(17) For a transformation to be applied correctly, the main clause (relative to the present cycle) must play an essential part in its application.

He mentions that he knows of no derivations that represent necessary counter-examples to (17). In particular, he argues that adopting this constraint simplifies the description of certain sentences that involve the application of EXTRA, PASS, and other rules.

Note that a condition such as (17) has been assumed throughout this study as part of the definition of what it means for a rule to be 'in the cycle'. That is, (17) has been assumed to be relevant only for cyclic, last-cyclic, and root-cyclic transformations, and not for precyclic, postcyclic, or anywhere rules. If I read Jackendoff correctly, however, he seems to be contending that no rules at all need to violate (17), in other words, that no rules at all need to be postcyclic or anywhere.⁶

6. In his discussion of the rule-type of EXTRA and other rules, Jackendoff refers primarily to Ross 1968. There, while EXTRA, PART,

The evidence discussed in chapter II here for the noncyclicity of certain transformations of English thus constitutes evidence against (17), where this is taken as implying that the application of all rules will be defined in terms of some specific cycle. While Jackendoff replaces the anywhere rule S-PRO by a set of interpretive rules (pp. 265-76), he apparently would accept formulations of most of the six rules found to be postcyclic similar to those assumed here (see pp. 381-83). I conclude, then, that (17), at least in the form which would categorically exclude any rules that are 'out of the cycle', is too strong, and must be modified to take account of postcyclic rules, rules that are required to apply wholly within some lower cyclic domain.⁷

IV.C. On the necessity of the cycle.

In the investigation of rule-type arguments carried out in this study, an Aspects-type transformational cycle has been assumed; specific arguments have been tested as to whether or not they show a necessity for rules applying in some way inconsistent with such a cycle. The

(continues fn. 6) EX-NP, etc. are called 'last-cyclic' rules, we have seen that the author actually treats them as rules that are 'out of the cycle'. Insofar as (17) is meant to ensure that EXTRA and the other rules discussed in Ross 1968 apply strictly cyclically, it functions to eliminate postcyclic processes.

7. Chomsky (1971:13) has proposed a condition that is essentially identical to (17). He hedges a bit on its generality, however, stating in a footnote that "the condition should, perhaps, be restricted to major transformations in the sense of Bach [1965, 1971b], excluding his 'housekeeping rules'" (p. 63, n. 21). While I find no example given of such a housekeeping rule in Bach 1965 or 1971b, presumably these are rules that are not likely to appear on any list of universal rules (e.g., not QUEST, TOPIC, REL), i.e., intuitively low-level rules, such as those that mention specific morphemes. As pointed out in section IV.A, the rules found here to be postcyclic tend to refer to specific morphemes and otherwise have an intuitive characterization as 'low-level' processes. These noncyclic rules thus represent evidence for some relatively weaker form of Chomsky's condition, and are consistent with the direction of weakening he suggests.

result of this testing is that very few of the transformations of English so commonly asserted to be noncyclic actually are required so to apply, and that in almost all cases all the relevant facts may be accounted for by the rules applying strictly cyclically.

The reader will have noticed, however, that, with the exception of Kimball's argument for the cyclicity of Relativization (see II.A.1), none of the purportedly noncyclic rules that were shown to be consistent with an Aspects-style upward cycle actually requires cyclic application. Throughout we have tried to apply consistently Occam's razor to arguments for the noncyclicity of a rule, and have not been satisfied to accept an argument where it shows only compatibility with a noncyclic rule-type. The time has come here to suggest that this same intolerance of nonnecessity arguments be extended to claims that an Aspects-type cycle is necessary. If neither postcyclic nor cyclic application is in fact required for the likes of QUEST, EXTRA, TOPIC, and the approximately two dozen other rules examined in section II.A-C, then what are the necessary and sufficient conditions governing their application in derivations? If some set of conditions governing rule application other than the cycle is assumed as basic, for how many rules, if any, could it be demonstrated that cyclic application was necessary?

A careful examination of arguments for the cycle would entail a separate monograph. For the nonce, let me suggest what seems to me to be the most fruitful starting point for such an investigation, as well as for any continued study of the various rule-types considered here. In order to most directly uncover the restrictions on the interaction of rules in derivations, it will be simplest to start out assuming the least restricted conditions on order of application possible. Intuitively, (18) strikes me as perhaps the most general:

- (18) To a generalized Phrase-marker all obligatory rules apply and all optional rules are 'given a chance' to apply exactly at the point(s) in the derivation and in all places in the tree where their structural descriptions are satisfied.

In terms of the rule-types elaborated in this study, this represents an initial assumption that all transformations are anywhere rules.

Presumably (18) would not be specific enough to guarantee that all and only the relevant strings would be derived; cases of bleeding, counter-feeding, and mutual bleeding between rules would undoubtedly be recorded, for which (18) would not be sufficient. The examples that violate (18) then must be scrutinized, to see to what extent they fall into a general pattern. Where there is a correlation between a violation of (18) and some independently necessary feature of the rules in question, then a universally-stated qualification of (18) would be added to the conditions on rule application. Ideally, all modifications of (18) would be amenable to a language- and rule-general formulation, thus allowing all rules to be stated free of ad hoc and unnatural features indicating relative order of application.

Such an approach to the question of extrinsic rule ordering in both syntax and phonology has in fact been pursued in recent years by Koutsoudas and several of his students. The proposal for research outlined in this section IV.C would broaden the search for universal principles of rule application, for the cycle has sometimes been used to account for certain cases of purported extrinsic ordering (e.g., in Koutsoudas to appear and Borkin 1972). Without an initial assumption of a cycle, proposed principles of rule sequencing would have to be revised in as yet unknown ways.

In the present study I have sought to show that reliance on the

essentially unconstrained device of multiple rule-type assignment is in most cases unsupported by the relevant empirical data, and that rules may be assumed to apply consistent with nothing more complex than the simple upward cycle of Chomsky 1965. It has also been pointed out here that even the cycle represents a condition on rule application that is overly powerful to an unknown degree. Interest in constraining the power of the model should lead, I suggest, to the further step of questioning the cycle itself.⁸ Only in this way can a clear answer be given to the traffic-laws problem inherent in the transformational-generative model of grammar.

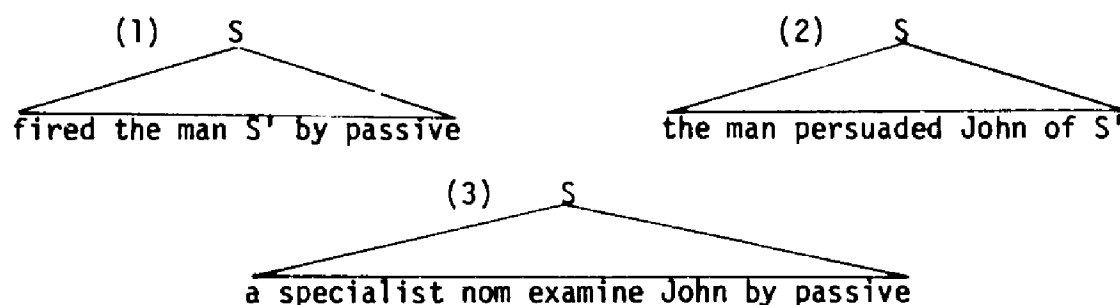
8. While Kimball (1972b) and Grinder (1972) have challenged the Aspects cycle, their alternative is what Perlmutter (Bloomington lecture, 19 February 1974) has called a 'multicyclic' grammar, one where each rule applies in order, cyclically up the tree; as such, it does not represent the wholesale reanalysis of the restrictions necessary on rule interrelationships suggested here as a valuable direction of inquiry.

Appendix A: The Aspects Argument for the Transformational Cycle.

An argument that the grammar must guarantee an upward cyclic application of syntactic rules in derivations is presented in Chomsky 1965: 128-35 and 1966:51-65. This is summarized in the first section here, following closely the exposition of the argument as it appears in Aspects. A second part points out certain critical questions and assumptions which the argument fails to note explicitly. Finally, it is concluded that Chomsky 1965 presents no clear case for the necessity of the upward cycle.

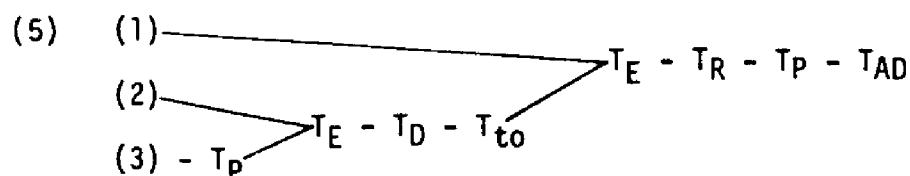
I. Summary.

A. (Chomsky 1965:128-31) The pre-Aspects theory may be illustrated by the derivation of (4) from underlying Phrase-markers (1)-(3).



(4) The man who persuaded John to be examined by a specialist was fired.

The underlying P-markers are the 'basis' of (4). The transformational history of (4) "might be represented," informally, by diagram (5).



The relative order of application of the T-rules is read from left to right; i.e., first T_p applies to (3), then (3) is embedded into (2)

by application of T_E , then T_D applies to the complex structure, etc.

B. (pp. 132-33) Research suggests that "a somewhat more restricted and conceptually simpler theory of transformations may be adequate."

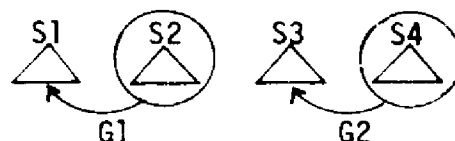
B1. First, syntactic evidence has been found that many optional singular T-rules (Negation, QUEST, PASS) should be made obligatory, triggered by a marker in the base. This led to the Katz-Postal principle that "the only contribution of transformations to semantic interpretation is that they interrelate Phrase-markers." Thus the only information from a T-marker necessary to semantic interpretation is how the P-markers are interrelated.

B2. Second, the theory of T-markers permits a number of different orderings of T-rules. Following is a summary of possibilities [implicitly assumed by Chomsky].

Given: a) underlying P-markers S1, S2, S3, and S4;

b) generalized T-rules G1 and G2;

c) singular T-rules R1 and R2;



There are at least 6 different kinds of relative ordering of rules theoretically possible:

1. G1 - G2 (one generalized T-rule is ordered before another)
2. R1 - R2 (one singular T-rule is ordered before another)
3. R(S2) - G1 (a singular T-rule applies to a constituent sentence before it is embedded)
4. G1 - R(S1) (a singular T-rule applies to a matrix sentence after a constituent sentence has been embedded in it)
5. R(S1) - G1 (a singular T-rule applies to a matrix sentence before a constituent sentence is embedded in it)

6. G1 - R(S2) (a singular T-rule applies to a constituent sentence after it is embedded)

B2a. Only some of the orderings allowed by the theory were actually utilized.

1. G1 - G2 "no known cases"
2. R1 - R2 "many examples"
3. R(S2) - G1 "many examples"
4. G1 - R(S1) "many examples"
5. R(S1) - G1 "no really convincing cases"
6. G1 - R(S2) [no comment on this possibility]

B2b. Present evidence suggests "the following restrictions on ordering of transformations."

1. G1 - G2 "there is no reason for imposing an extrinsic order on the generalized transformations"
2. R1 - R2 "linearly ordered (perhaps only partially ordered)"
3. R(S2) - G1 "may apply [in this way]"
4. G1 - R(S1) "may apply [in this way]"
5. R(S1) - G1 [presumably rules may not be ordered/may not apply in this way]
6. G1 - R(S2) "may apply [in this way]"

C. (p. 134) These observations suggest the theoretical simplification of eliminating completely the notions 'generalized T-rule' and 'T-marker'. With this change the base rules now (a) must introduce the string # S # where before the dummy symbol S' had been introduced; (b) must "apply cyclically, preserving their linear order."

A generalized (i.e., pre-transformational) P-marker formed in

this way "contains all the information contained in the basis as well as the information provided by the generalized embedding transformations."

D. (pp. 134-35) The singular transformations (ordered in "a linear sequence") apply in an upward cycle to the generalized P-marker. "In the case of (1)-(3), the effect of this convention is precisely what is described in the Transformation-marker (5). That is, singular transformations are applied to constituent sentences before they are embedded, and to matrix sentences after embedding has taken place."

With the principle of the cycle, "we have, in effect, converted the specific properties of the Transformation-marker (5) into general properties of any possible transformational derivation."

E. (p. 135) "The ordering possibilities that are permitted by the theory of Transformation-markers but apparently never put to use are now excluded in principle." That is, whereas in the pre-Aspects theory the following two ordering possibilities were permitted, they are now systematically excluded.

1. G1 - G2
2. R(S1) - G1

This same argument is presented in Chomsky 1966, only somewhat more discursively. In a summary paragraph (p. 65), Chomsky states explicitly the reasons for preferring the new version of the theory:

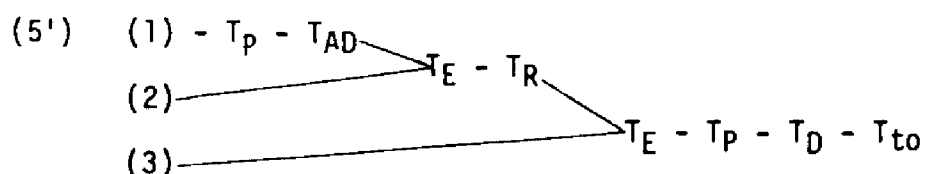
1. The modification provides "a more highly structured theory which is richer in expressive power; in other words, it excludes in principle certain kinds of derivational patterns that were permitted by the earlier version of transformational theory, but never actually found."

2. There is internal motivation for the changes in that the new

theory is "conceptually simpler" (i.e., now there is no need for 'generalized transformation' or for 'T-marker').

II. Comments.

on section A above: It is significant that T-marker (5) is not a unique representation of the transformational history of (4). For example, given any reasonable formulation of the T-rules involved, there is no reason why (5') could not also be a T-marker for (4).



For that matter, there are in fact altogether 840 different orders in which these eight T-rules may apply in order to correctly derive (4), and therefore 840 different possible T-markers. (The sentence in Chomsky 1966 used to illustrate the same point, I expected the man who quit work to be fired, has a relatively simpler T-marker. It is also nonunique, however, with a total of 180 different possible T-markers that may be constructed in deriving the desired string.) Chomsky nowhere claims that T-marker (5) is unique. His argument in section D, though, makes sense only if it is the case that (5) is necessarily the form the T-marker must take in deriving (4).

on C: It is clear how allowing # S # to be introduced by the branching rules of the base leads to these rules applying cyclically. Note, however, that this is a cyclicity imposed on the rules by the rules and underlying strings themselves - i.e., an intrinsic cyclicity.

on D: There is no explicit argument here as to why transformations must apply cyclically. The implicit argument is that the cycle is necessary

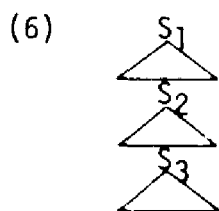
in order to guarantee a derivation like that described in T-marker (5). This argument would be valid if (5) were a necessary representation of (4), but it is not. In fact there appears to be no noncircular reason for Chomsky picking (5) as the T-marker for (4) over (5') or over any of the hundreds of other appropriate T-markers possible.

on E: It is true that the ordering possibilities:

1. G1 - G2
2. R(S1) - G1

are now "excluded in principle." What Chomsky does not spell out, in either Aspects or Topics, is exactly what feature of the new theory it is that excludes these possibilities. Specifically, is it the innovation of having S in the base rules, or is it the transformational cycle?

It seems clear that these possibilities - and all the other possibilities mentioned in B2 above (except R1 - R2) - are excluded by the elimination of generalized transformations and that the idea of the cycle plays no role here. Embedding sentences by means of the base rules means simply that now there is no possibility of ordering singular transformations before or after embedding (or generalized) transformations. Given the generalized P-marker in (6):



it is obvious that no rule can apply to S₁ before S₂ is embedded in it; no rule can apply to S₃ before it has been embedded in S₂.

What an upward cycle guarantees is that T-rules never apply to a matrix sentence without having already been allowed to apply to an S

embedded in it. The specific question of whether it is necessary for rules to wait to apply in a higher S until they have finished applying in a lower S is not raised in either Aspects or Topics. There the discussion concerns only the relative order of application of singular and generalized transformations.

III. Conclusion.

A. Due to the nonuniqueness of T-marker (5), the use of this in a discussion of the necessity of the cycle is only misleading.

B. The exclusion of certain unused ordering possibilities is a function of putting S in the base rules, not of introducing a transformational cycle. That is, the cycle plays no necessary role in this comparison of the older and newer versions of the theory.

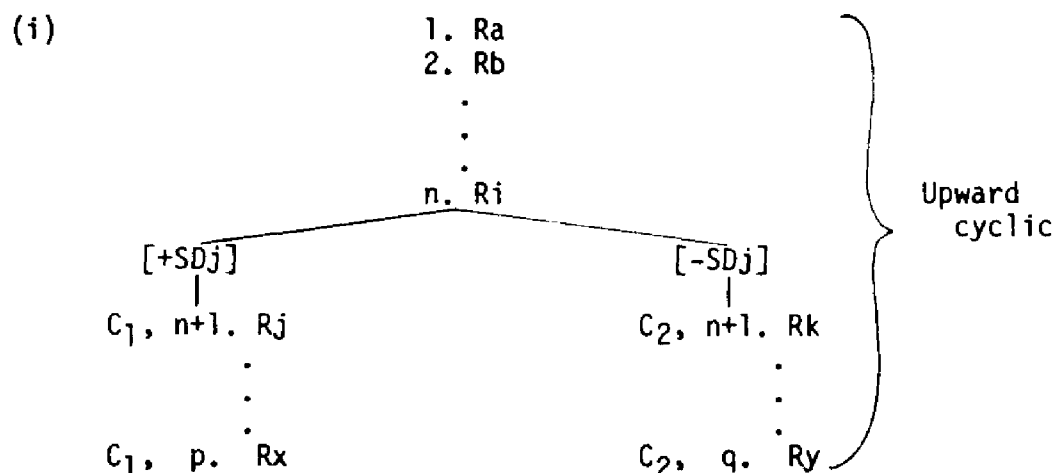
Appendix B: Noncyclicity Arguments for Rules of Other Languages.

In the present study I have been concerned only with syntactic rules of English that have been argued necessarily to apply in a manner inconsistent with Chomsky's (1965) transformational cycle. Discussion of the conventions required for governing the order of rules applying in derivations must ultimately be based on as wide a variety of languages as possible, however; at some point the arguments dealing with how transformations are required to apply in languages other than English must be evaluated to see to what extent they support the kind of rule-type distinctions discussed above. To this end I list here the 'foreign language' arguments that I happened upon while investigating rule-type arguments from English. This must constitute only the smallest sample of such arguments, but could represent a starting point for a broader research on the traffic laws question. All the examples here are arguments for postcyclicity.

Bach 1970	Amharic Verb Shift
Hale 1966	German (Zürichdeutsch) (several rules)*
Kayne 1969	French Auxiliary Deletion, Clitic Placement, Gapping, Leftward <u>tous</u> Movement, Rightward <u>tous</u> Movement, Stylistic Inversion, Subject-Clitic Inversion
Perlmutter 1973	Spanish (Río de la Plata dialect) Cliticization Japanese Subjectivization
Yang 1973	Korean Complementizer Placement, Pro-Deletion, Pronominalization, S-Preposing, Scrambling

* 'Postcyclic' in Hale 1966 does not have exactly the meaning assumed for this rule-type throughout the present study. In Hale 1966, one of the first reasonably detailed grammars written within an Aspects framework, the author proposes a traffic laws scheme somewhat different from any of the elaborations of Chomsky's (1965) cycle more popularly adopted. While Hale divides rules into 'cyclical' and 'postcyclical',

the difference for him in their application is their relative ordering within any given cycle, not simply within the derivation as a whole. Although he is directly concerned only with describing the ordering conventions necessary in a grammar of Zürichtsch, it may be simplest here to present his scheme in a general fashion. Hale proposes a division of rules as in (i), where the rules as a whole apply upward cyclically, but where different classes of 'cyclic' transformations are distinguished.



At the start of each cycle, rule Ra is given a chance to apply, then Rb, and so on through Ri. If the structural description of Rj is satisfied at this point, then the C₁ subset of rules is chosen for application, with the rules applying in order, Rj, ..., Rx. If Rj could not apply after Ri, then the C₂ branch is selected, and rules Rk through Ry are given the opportunity to apply. In some cases, after the application of Rx the rules Ra-Ri will be scanned for application a second time on the same cycle. In this second pass through the rules the structural description of Rj will necessarily not be satisfied, and the derivation proceeds through Rk, ..., Ry. After Ry, the cycle will move upward to consider the next highest S in the tree. (The mechanisms for determining when the rules should 'recycle' on a given S, the guarantee that rule Rj will be able to apply only once in a given cyclic domain (thereby preventing an infinite loop problem), and the fact that Ry of the second cyclical subset is followed necessarily by the cycle moving upward to the next highest S in the tree are all involved with Hale's treatment of the # boundary, and will not be discussed further here.)

There are thus two paths that rules may take in applying on any given S in Hale's system. These are shown in (ii) in terms of the rules of (i).

- (ii) a. Ra, Rb, ..., Ri, Rj, ..., Rx
 b. Ra, Rb, ..., Ri, Rj, ..., Rx, Ra, Rb, ..., Ri, Rk, ..., Ry
 the 'cycle' proper the 'postcycle'

Rules of the postcycle here include such transformations as Aux Inversion, Imperative Deletion, rules marking inflections, Subordinate Clause Order, and several minor deletion rules.

This is not the place to discuss further Hale's traffic laws proposal, for his 29 base rules and 32 transformations (many having several subcases) for Zürichtsch form a tightly integrated set. It remains to be worked out whether the application of these rules may be governed by relatively simpler systems, such as those considered in chapter 1 here, or whether indeed some division of rules along the lines of (i) is necessary.

Rule Abbreviations

ABOUT-MOVE	<u>About</u> Movement	EX-NP	Extrapolation from NP; Extrapolation of Relative Clauses
ACT-NOM	Action Nominalization		
ADJ-SHIFT	Adjective Shift	EX-PP	Extrapolation of PP
ADV-DISL	Adverb Dislocation	EXTRA	Extrapolation
ADV-LOW	Adverb Lowering	f-GAP	Forward Gapping
ADV-PRE	Adverb Preposing	FOCUS-PL	Focus Placement
AF-HOP	Affix Hopping	GAP	Gapping
AG-DEL	Passive Agent Deletion	H-NP-SHIFT	Heavy NP Shift
ALL-MOVE	<u>All</u> Movement	INDEF-INCOR	Indefinite Incorporation
APPOS	Appositive Formation	IT-DEL	<u>It</u> Deletion
AUX-SHIFT	Auxiliary Shift	L-DISL	Left Dislocation
b-GAP	Backward Gapping	NEG-CNTR	Negative Contraction
COMP-PL	Complementizer Placement	NEG-EMP-PL	Negative/Emphasis Placement
COMP-PRE	Non-factive Complement Preposing	NEG-LOW	Negative Lowering
COMP-SUBS	Comparative Substitution	NEG-PRE	Negative Constituent Preposing
CONJ-RED	Conjunction Reduction	NEG-RAIS	Negative Raising
COOR-DEL	Coordinate Deletion	NOM-AF	Nominal Affix Reordering (Hidatsa)
COOR-RED	Coordination Reduction		
DAT	Dative Movement; To-I-O Movement; <u>For</u> -I-O Move.	NUM-ORD	Number Ordering (Hidatsa)
DIR-PRE	Directional Adverb Preposing	NUMB	Number Agreement
DO-DEL	<u>Do</u> Deletion	OBJ-PRE	Object Preposing
DO-GOB	<u>Do</u> Gobbling	P-DEL	Preposition Deletion
DO-SUP	<u>Do</u> Support	P-MOVE	Preposition Movement
EACH-MOVE	<u>Each</u> Movement	PART	Particle Movement
EQUI	Equi NP Deletion	PASS	Passive
		PERF-DEL	Performative Deletion

POSS-FORM	Possessive Formation	SAI	Subject Auxiliary Inversion
POSS-SHIFT	Possessive Shift; Genitive Preposing	SAI-fr	Subject Auxiliary Inversion with certain fronted constituents
PP-SUBS	PP Substitution		
PRED-RAIS	Predicate Raising	SAI-i	Subj. Aux. Inv. in imperatives
PRO	Pronominalization	SAI-q	Subj. Aux. Inv. in questions
PS-CLEFT	Pseudo-Cleft Formation		
PSYCH-MOVE	Psych Movement	SCRAM	Scrambling
PTCP-PRE	Participle Preposing	SUBJ-REPL	Subject Replacement
QUEST	Question; <u>Wh-Q</u> -Movement	SVI	Subject Verbs Inversion
QUOTE-PRE	Quote Preposing	TAG	Tag Question Formation
R-DISL	Right Dislocation	THERE	<u>There</u> Insertion
RAIS	<u>It</u> Replacement; Raising	TOPIC	Topicalization; Y-Movement
REFL	Reflexivization	TOUGH-MOVE	<u>Tough</u> Movement
REL	Relativization; <u>Wh-Rel</u> -Movement	VNPI	Verb-NP Inversion
REL-RED	Relative Clause Reduction	VP-DEL	VP Deletion
S-DEL	Sentence Deletion	VP-PRE	VP Preposing
S-PRO	Sentence Pronominalization	WHETHER-DEL	<u>Whether</u> Deletion
		YOU-DEL	<u>You</u> Deletion

Table of Noncyclicity Arguments

Below are catalogued all the instances I know of where a specific rule of English has been argued (not just suggested or asserted) to belong necessarily to some noncyclic rule-type. These arguments are listed here by rule, and then in terms of their various sources. (The rule-type arguments in Emonds 1970 appear in section II.B.4 in (276) and are not repeated here.)

Rules argued to be necessarily noncyclic:

1. ADV-PRE (2) Geis 1970:130-35, Ross 1968:168
2. AF-HOP (2) Matthews 1970:115-16, Stockwell et al. 1968:312
3. ALL-MOVE Ross 1970b:271
4. APPOS Lakoff 1968a:36-53
5. CONJ-RED Koutsoudas 1971:355-67
6. COOR-RED Tai 1969:128-29
7. DO-SUP Matthews 1970:115-16
8. EX-NP (3) Borkin 1972:70, Lakoff 1968b:28, Ross 1968:154
9. EX-PP (3) Ross 1968:163-64, 164-65, 165
10. EXTRA (4) Higgins 1973:177-81, McCawley 1970:288,
 Ross 1968:146-49, 150-52
11. GAP (2) Koutsoudas 1971:373-80, Ross 1970a:844-45
12. NUMB Borkin 1972:68-69
13. PART Ross 1968:151-52
14. PRO (8) Bach 1969:2, 3, Lakoff 1968b:28-29, 29-30, 30-31,
 Postal 1970b:453-57, 1971:83-85, 247-48
15. QUEST (2) Postal 1970b:454-55, 1971:74-76
16. REL Postal 1971:74-76
17. S-DEL/S-PRO (2) Kimball 1973a:55-56, Lakoff 1968a:35-36 and 66-74

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|-------------|---|
| 18. SAI (2) | Matthews 1970:115-16, Stockwell et al. 1968:311 and 923 |
| 19. SAI-i | Stockwell et al. 1968:685-97 |
| 20. TOPIC | Postal 1971:188 |
| 21. VNPI | McCawley 1970:294 |
| 22. YOU-DEL | Stockwell et al. 1968:685-97 |

Sources presenting arguments for noncyclicity:

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|-------------------------------|--|
| 1. Bach 1969 (2) | PRO (pp. 2, 3) |
| 2. Borkin 1972 (2) | EX-NP (70), NUMB (68-69) |
| 3. Geis 1970 | ADV-PRE (130-35) |
| 4. Higgins 1973 | EXTRA (177-81) |
| 5. Kimball 1973a | S-PRO (55-56) |
| 6. Koutsoudas 1971 (2) | CONJ-RED (355-67), GAP (and OBJ-PRE; 373-80) |
| 7. Lakoff 1968a (2) | APPOS (36-53), S-DEL (35-36 and 66-74) |
| 8. Lakoff 1968b (4) | EX-NP (28), PRO (28-29, 29-30, 30-31) |
| 9. Matthews 1970 (3) | AF-HOP, DO-SUP, SAI (115-16) |
| 10. McCawley 1970 (2) | EXTRA (288), VNPI (294) |
| 11. Postal 1970b (2) | PRO (453-57), QUEST (454-55) |
| 12. Postal 1971 (5) | PRO (83-85, 247-48), QUEST (74-76),
REL (74-76), TOPIC (188) |
| 13. Ross 1968 (8) | ADV-PRE (168), EX-NP (154), EX-PP (163-64,
164-65, 165), EXTRA (146-49, 150-52),
PART (151-52) |
| 14. Ross 1970a | GAP (844-45) |
| 15. Ross 1970b | ALL-MOVE (271) |
| 16. Stockwell et al. 1968 (4) | AF-HOP (312), SAI (311 and 923),
SAI-i (685-97), YOU-DEL (685-97) |
| 17. Tai 1969 | COORD-RED (128-29) |

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(IULC = Indiana University Linguistics Club mimeo)

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