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Deletion
in Coordinate Structures

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This essay represents the virtually unchanged first three chapters of my Ph. D. Dissertation (Yale University, 1971) Constraints on Deletion in Syntax, plus a somewhat abridged version of the fourth and last chapter. The concern of these chapters is an investigation of the various reductions to be observed in coordinate structures, classically attributed to such deletion processes as Conjunction Reduction, Right Node Raising, and Gapping.

Following the classical approach to such phenomena, I assumed that the relations between full forms and their "reduced" variants were to be accounted for by transformational rules deriving the latter from the former, and consequently involving deletion under identity. Within the framework of these assumptions, I was concerned with establishing the proper formulation of these rules, discovering the respects in which they could vary from one language to another, and postulating universal constraints on their application which would account at once for certain restrictions on the rules as they apply in particular languages and for observations about the distribution of coordinate reduction patterns across languages.

The thesis began as a reaction to Ross (1967a) ("Gapping and the Order of Constituents"). Ross had observed some systematic holes in the cross-linguistic paradigm of coordinate reduction patterns involving verb deletion, and had advanced a bold hypothesis to account for them. The verb deletions were due to a universal rule of Gapping, and its different effects in different languages were attributable to its sensitivity to constituent order and its interaction with movement transformations. The hypothesis led to some remarkable conclusions about deep structure word order in particular languages. As were many others, I was rather skeptical about these conclusions, and I set out to show that there was an alternative account of the facts that did not have the same consequences. I then proceeded to attack Ross's proposal at its roots, arguing that its key assumption (that forward and backward "gapping" can
be attributed to one bidirectional rule, with the direction of gapping determined by the branching configuration of the input structure) cannot be maintained in any case.

At a more fundamental level, however, I followed precisely in Ross's footsteps. The problem he had posed was to account for a set of regularities in the distribution of coordinate reduction patterns across languages. I accepted the premise that these observations had to be accounted for, and that the explanation would involve the postulation of a universal rule of grammar.

Exactly what psychological reality can be attributed to such a rule is a mystery to me, but one of the more intriguing mysteries. It is of course quite possible that such an approach is nonsense, that such theoretical constructs as "universal rules" have no chance whatever of corresponding to anything real, and that the deeper regularities are only obscured by the postulation of such constructs. Time, presumably, will tell.

Meanwhile, the approach has been fruitful, to a degree. This decade has seen an explosion of research into the universal syntactic properties of language, and most of it has involved the (explicit or implicit) assumption that at least some transformational processes can be abstracted from the grammars of particular languages and investigated as if they were independent entities. A great deal has been learned about the nature of language as a result of this intellectual trick, if that is what it is.

The structure of the thesis, though it was not clear to me at the time of writing, is fairly logical, though far from tidy. The first chapter is largely devoted to showing that Ross's conflations of forward and backward "gapping" was wrong, and that backward "gapping" should be regarded as an instance of Right Node Raising. The second chapter develops an alternative explanation for the restrictions on coordinate reduction patterns which Ross's analysis was an attempt to account for.

A crucial feature of the account that emerges from the first two chapters is the postulation of a very general universal rule of Coordinate Deletion, which deletes constituents from following conjuncts in coordinate structures under conditions of identity and parallel structure with the initial conjunct. Chapter one is in part concerned with the proper formulation of this universal rule, and the nature of the identity and parallelism conditions that govern its application; chapter two develops a set of hypotheses regarding its interaction with other rules, particularly the discourse-sensitive movements; and chapter three investigates the effect of independently motivated constraints, some language-particular and some universal, in inducing superficially divergent behavior in the operation of Coordinate Deletion in different languages.

The fourth chapter is an attempt to place the rule of Coordinate Deletion in the perspective of a general theory of deletion in syntax, arguing that many of its properties are predictable within such a theory from the kind of rule it is. A class of deletion rules is identified (here called "structural-identity" (SI) rules) which have in common the deletion of variable portions of a target domain under identity with corresponding portions of an antecedent domain, and it is shown that some of the constraints on Coordinate Deletion are general constraints on rules of this class. The properties of SI rules are contrasted to those of several other identifiable classes of deletion rules.

The main thrust of the thesis thus proceeds from the particular consideration of coordinate reduction patterns and the formulation of the rules involved in their generation to the properties of and constraints on deletion rules in general. Had I known when I started what I knew when I got done, I would probably have written it in roughly the reverse order, and it would have been shorter and clearer. In retrospect, also, it is apparent that certain aspects of the proposal worked out in chapter one (such as the mechanics of conflating conjunction reduction with gapping, by means of a reduction convention) are non-essential to the explanation of the facts under study, and consequently not well enough motivated to warrant the devotion of so much attention to them.
I have elected, however, to leave the first three chapters essentially intact, since it would be impossible to attempt any major revision without altering the whole perspective of the work; and that perspective, naive and at times clearly mistaken as it was, is nevertheless, in this thesis, organically vital.

The alterations which I have made are largely confined to minor cosmetic deletions in the first three chapters, the correction of typographical errors and a few infelicitous phrases, and the deletion of several sections from chapter four which were too bad to repair, fortunately also nonessential.

I have appended a set of lettered footnotes to each chapter, providing a sort of minimal commentary on the text from a more advanced perspective. Hopefully these footnotes will also serve to help guide the reader through some of the more confused sections, especially in the earlier parts.

Acknowledgments

My major debt is to David Perlmutter, who advised me during the writing of the thesis. Many others, but notably Guy Carden, Roger Higgins, and Paul Postal, have given me valuable comments on the finished product, most of which, regrettable, are not incorporated into this version; but their effect is present in the "advanced perspective" of the letter footnotes.
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4.0 Introduction

As linguistic theory is currently formulated (I refer to "Standard Theory", in the sense in which that term has become current), there is a level of "deep structure" which serves as input to the semantic component. P-Markers on this level must explicitly contain all information necessary for semantic interpretation; these P-Markers are mapped by a set of transformational rules onto the class of "surface" P-Markers which directly underlie the phonological realizations of sentences.

One difference between the P-Markers of the deep structure level and those of surface structure level is that deep structure P-Markers contain many constituents which are not present in the surface structure P-Markers derived from them. These extra constituents are "redundant" in some sense, although exactly what constitutes redundancy is very difficult to define.

Every natural language has in its grammar devices which allow the reduction of redundancy in surface structure: that is, which allow surface structures to contain far fewer redundant constituents than their underlying deep structures.

Every reduction of redundancy necessarily involves deletion of redundant constituents. It is precisely in order to allow reduction of redundancy that it is necessary to have deletion among the permissible elementary transformations. In fact (still begging the question what "redundancy" is exactly), we can say that non-redundant constituents...
are never deleted.

This is the force of the general constraint on recoverability of deletion, which was first extensively discussed in Chomsky (1965):  

(1) All syntactic deletion must be recoverable.

Informally, the effect of the recoverability condition is that no constituent may be deleted in such a way that after the deletion has occurred, we have no idea what it is that has been deleted. Thus a rule like

(2) \[ X \text{ NP} \rightarrow X \emptyset \]

"delete all final NP's" is prohibited from appearing in the grammar of any natural language.

Chomsky gives considerable attention to the notion of recoverability, and proposes the following restriction on deletion in syntax in order to assure recoverability and give the notion a precise characterization:

"We are proposing the following convention to guarantee recoverability of deletion: a deletion operation can eliminate only a dummy element, or a formative explicitly mentioned in the structure index (for example, you in imperatives), or the designated representative of a category (for example, the Wh-question transformations that delete Noun Phrases are in fact limited to indefinite Pronouns - cf. Chomsky, 1965, § 2.2), or an element that is otherwise represented in the sentence in a fixed position."

(Chomsky 1965 pp. 144-5)

Note that all but one of the restrictions which Chomsky proposes have the effect of restricting deletion to the deletion of specified formatives; the last restriction, however, allows deletion of a constituent "that is otherwise represented in the sentence in a fixed position". In the case of deletions of this last kind, the class of deletions which require identity of the deleted constituent with another constituent elsewhere, the recoverability condition as stated is inadequate. It can be shown that the formulation of the restriction proposed by Chomsky is not sufficiently precise to account for the kind of recoverability that is empirically observed in the operation of this class of rules. In particular, a precise reconstruction of the notion "recoverability" for such rules requires a more precise characterization of the notions "otherwise represented" and "fixed position".

It is the purpose of this thesis to investigate the phenomenon of deletion in syntax and to show that the constraint (1), powerful though it is, is not the only universal constraint on deletion rules, for the class of possible deletion rules is much more strictly constrained than the class of deletion rules allowed by (1) alone.

It will also be argued that (1) itself is a much stronger condition than it appears to be; this conclusion will follow from empirical considerations which lead to a precise characterization of the notion "recoverable deletion" under which characterization the effect of (1) is extended, so that it must be interpreted not as a constraint on the formulation of deletion rules, but rather on their effect.

0.1 In Chapter 1, I discuss the rule of Coordinate Deletion (CD). The general results reached in the later chapters are all crucially dependent on the nature of this rule, and considerable space is devoted to establishing the validity of some universal...
usal generalizations about deletion in coordinate structures.

Chapter 2 deals with the interaction between CD and certain other rules, chiefly those effecting "stylistic" reordering of constituents and generally lumped together under the term Scrambling. It is argued in this chapter that there is a universal ordering relation between CD and certain of the Scrambling rules. The establishment of this universal ordering relation is crucial to the arguments of Chapter 1 which establish the nature of CD, and to the explanation of certain universal facts about the interaction between CD and Scrambling. These facts are the Gapping phenomena first observed by John Ross and discussed in his paper "Gapping and the Order of Constituents" (Ross 1967a).

Chapter 3 develops certain constraints on CD, and argues that CD has a universal formulation and no language-specific conditions, except for general output constraints of a specific type holding for all transformations in the grammar of a particular language, or for a well-defined subset of its transformations.

Two types of such constraints are discussed: output constraints on the presence of certain constituents in surface structure, and the No-Ambiguity Constraint, which is an extended version of the recoverability condition (1).

0.2 The nature of this investigation is such that the arguments involved cannot be based entirely on language-particular analyses of particular phenomena. In order to establish universally valid generalizations about the phenomenon of deletion, it is necessary to argue from universal evidence. This is of course impossible, if "universal evidence" is taken in the strictest sense, and in fact many of the arguments presented in this thesis will be based on evidence from a minute collection of languages, the ones which I happen to have some familiarity with or have been able to get reliable information about.

I have tried to make explicit in every case exactly what evidence I take to constitute support for a given proposal, and exactly what the empirical consequences of every universal claim must be. In the end, any universal argument must rest on the verifiability (that is, the falsifiability) of its predictions, and I feel justified in proposing most of the universal claims in this thesis only because if they are false or inadequate, it is easy enough in principle to prove them so.

Thus arguments of the following form will appear frequently in this thesis:

(a) Given the following empirical fact: no known language has feature X, how can this fact be explained?
(b) Hypothesis A (which must be more general than the mere statement of the fact itself in order to be interesting) would account
for (a).

(c) The more general hypothesis A also makes other predictions of a universal nature.

(d) There are languages for which these predictions are verified, and no known languages falsify the predictions.

(e) Conclusion (tentative, as are all universal conclusions): hypothesis A is validated.

This type of argument is uncommon in most current work in linguistic theory, which is typically restricted to the investigation of particular languages in isolation. Arguments of this type have been used, however, in recent work in universal grammar, particularly in Ross (1967a,b), Perlmutter (1969), Orešnik and Perlmutter (1972), Bach (1971), and Postal (1970). It is clear that if a theory of universal grammar is to be built, it must be based on arguments like this; and if the goal of linguistic theory is to constrain the notion "possible natural language" (or, more accurately, "possible grammar of a natural language"), which is to say to discover and explicitly state as much as possible about the nature of language in general, the formulation of tentative universal hypotheses in this manner is the only way to approach that goal.

Another type of argument which is not common in linguistic literature will occasionally appear, which is also based on universal considerations:

(a) There is a phenomenon in language A which has to be accounted for, and there are two hypotheses, R and W, which both seem to be adequate, but the evidence from language A does not provide the basis for a choice between them.

(b) A similar phenomenon in language B can be accounted for by hypothesis R or by a hypothesis consistent with R but not by W or any hypothesis consistent with W.

(c) Hypothesis R is validated for both languages.

This kind of argument appears in Orešnik and Perlmutter (1972) and has been appealed to on occasion in the study of the syntax of English, using dialects of English as the two "languages" involved.

The justification of this method of syntactic investigation has been argued for principally by Guy Carden (1970), where he points out that it is often possible to gain insight into difficult theoretical issues only by seeking a unified analysis of differing dialects. What I propose in appealing to arguments like this based on entirely different languages is that in no other way is it possible to gain insight into the unified phenomenon of language. Thus I propose as a heuristic principle:

(3) A hypothesis which accounts for similar phenomena in two different languages at once is better than two language-particular hypotheses which account for the same phenomena. When faced with a choice between one general hypothesis and two language-particular hypotheses consistent with the same empirical facts, we can reject the latter and accept the former.
choices, generally described by optional transformations (in the case of determiners, sometimes as an option between alternate expansions in the base). 4

Clearly such a description is not wrong; but it is just as clearly incomplete. Judgements about the grammaticality of texts consisting of more than one sentence are just as definite as those about the grammaticality of one-sentence texts:

*Your father is here. She wants to talk to you.
*A beggar came to the door. I gave a beggar some food.

*The maid was here today. The floor was waxed by her.

In fact, judgments of the grammaticality of multi-sentence texts are frequently appealed to in arguments about particular syntactic analyses.

A description which represents these features as free choices is ignoring facts which are obviously grammatical in nature. One is led to inquire what extensions, if any, of linguistic theory would be forced by a decision to try to account for these phenomena; and whether such extensions might not lead to a revision of the analysis of any other aspects of linguistic structure.

It has been assumed in most versions of the theory of transformational grammar that transformational rules are constrained to operate within sentence boundaries. The notion "sentence" is defined formally only in terms of the grammar itself, namely as a well-formed pairing of one well-formed deep structure with one well-formed surface structure. Since the base generates sentences in isolation, i.e., one at a time,
a time (except for conjoined sentences, which are formally represented in the theory as actually constituting a single sentence), the "deep" P-Markers generated by the base represent isolated sentences. The constraint on transformational rules is simply that the input P-Marker to any rule be either a base-generated P-Marker or an output P-Marker from some rule, and that no rule "splits" a P-Marker into P-Markers underlying separate sentences. This means that both the input P-Marker and the output P-Marker for every application of a transformational rule are underlying representations of exactly one sentence. Thus the structural index of a transformation specifies a proper analysis of the input P-Marker which can only be satisfied by P-Markers which underlie exactly one isolated sentence, and the structural change of every transformation is such that the class of output P-Markers is composed of P-Markers which likewise underlie exactly one isolated sentence.

Thus if a rule is formulated with a variable, the variable is presupposed not to contain an internal sentence boundary. The effect of this presupposition may be stated concisely as follows:

(4) The domain of transformational rules does not extend across sentence boundaries.

There are several rules, however, which have the same effect whether applied within a sentence or across sentence boundaries. The most obvious of these is Pronominalization:

(5) a The boy who gave Harry a football wants it back now.
    b That boy gave Harry a football. Now he wants it back.

But there are many other processes which are clearly syntactic in nature which are conditioned across sentence boundaries, such as Definitivization, Topicalization, Extraposition, and "Sentence Accent", and deletions of various kinds.

There have been proposals (principally in Jackendoff 1969 and Chomsky 1958) for treating these discourse phenomena in terms of interpretive rules rather than syntactic transformations, but there seems to be no empirical difference between such proposals and the modifications of transformational theory to be proposed here. The empirical regularities are the same in either case, and it is clear that some formal extension of the theory is required to allow these regularities to be accounted for in an explicit manner.

In this thesis, I presuppose the following simple extension of transformational theory:

(a) what the base generates is not isolated sentences, but texts i.e. sequences of sentences separated by sentence boundaries.

The internal structure of these sentences is just that presumed by the present Standard Theory.

(b) while most transformational rules are constrained to operate
within sentence boundaries, there is a small class of rules which are not so restricted. Thus the domain of a transformational rule may in general extend across sentence boundaries.

Such an extension of the basic theory has been proposed elsewhere in recent literature. Persuasive arguments for the necessity of its assumption are to be found in Ross (1969b), Pope (1971), and Orenšnik and Perlmutter (1972).

This proposed extension immediately raises the question of what formal property distinguishes rules which are not constrained to operate within sentence boundaries from those which are. An obvious guess would be that cyclic rules might be strictly sentence-bounded, though this is not necessarily true a priori. I make no attempt to answer this question, although some of the results of Chapter 4 bear on it.

Footnotes to the Introduction

1. For a characterization of Standard Theory and a discussion of alternate theoretical frameworks see Chomsky (1955, 1970) and Lakoff (1969c).

2. The Chomsky–Jackendoff proposals for semantic interpretation rules which operate at other levels of derivation do not affect the present discussion. Some of the arguments in this thesis are inconsistent with the Extended Lexical Hypothesis under which there is no deletion under identity. But such a drastic revision of the theory would have to incorporate devices equivalent to the deletion transformations treated here. Any generalizations established in the present discussions of deletion in syntax must be matched by generalizations of corresponding empirical effect in any other framework, if that framework is to be descriptively adequate.

3. Previous discussion of this condition is scanty, although its necessity was recognized: see Lees (1950), Matthews (1961), and Chomsky (1965) § 2.2.

CHAPTER ONE

The Rule of Coordinate Deletion

1.0  In this chapter, I will investigate the universal character of rules which effect deletion in coordinate structures. I will show that in order to account for certain empirical facts it is necessary to pos-
tulate a universal rule of Coordinate Deletion which effects deletion under identity from left to right in coordinate structures; and that there is no rule which deletes from right to left in coordinate struc-
tures.

I will then propose a universal formulation of Conjunction Reduction under which this rule will be collapsed with the rule of Coordinate De-
letion; and show that some instances of reduction in coordinate struc-
tures which have been attributed to Conjunction Reduction, namely when the "reduced" constituent is the rightmost constituent, are due to an entirely different rule, so that the bidirectional formulation of both Conjunction Reduction and Gapping (the formulation of Conjunction Reduction by Ross and Lakoff and the Gapping rule proposed by Ross) will be shown to be wrong.

In subsequent chapters the properties of the rule of CD will be investigated further: in Chapter 2 I will discuss its interaction with Scrambling rules, and in Chapter 3 certain language-particular and universal constraints on this rule will be established.

1.1 The Structural Identity Requirement

1.1.0

There is a subclass of deletion rules which effect deletion only in a specific class of structures, the class of coordinate structures. Rules of this type occur in the grammars of all languages, and the formal nature of these rules has important theoretical implications. Any approach to an adequate theory of deletion must depend on an understanding of the nature of these rules, which I will call Coordinate Deletion rules. It is with rules of this class that I will be concerned in the first three chapters of this thesis.

It is generally agreed that sentence (2) is derived from sentence (1) by a rule called Conjunction Reduction (CR):

(1) Marvin plays the mandolin and Harry plays the mandolin.
(2) Marvin and Harry play the mandolin.

This rule obviously involves deletion of the redundant VP play the mandolin. Whatever else is done by this rule, one of the things it does is delete one of the two underlying occurrences of this phrase.

A rule which is generally assumed to be the same rule of CR gets (4) from (3):
(3) Marvin plays the mandolin and Marvin plays the fiddle.
(4) Marvin plays the mandolin and the fiddle.

This time the deleted constituents are Marvin and plays.

The CR rule produces sentences with conjoined constituents from conjoined sentences identical except for these constituents. The same rule, it seems, can delete redundant constituents from either end of a sentence. This rule must also be assumed to produce conjoined constituents which are internal to a sentence:

(5) Marvin sent the clerk into hysteric's and Marvin sent his lawyer into hysteric's.

(6) Marvin sent the clerk and his lawyer into hysteric's.

It is generally presumed that sentences like (2), (4), and (6) are derived from sentences like (1), (3), and (5) respectively by the same rule of CR. This rule has two peculiar properties:

(a) It applies only in coordinate structures, i.e. structures conjoined by and and or (nor):

(7) Marvin plays the mandolin \{because\} Harry plays the mandolin.
(8) \*Marvin \{because\} Harry play(s) the mandolin.

(b) It applies to convert indefinitely many conjoined sentences into a single sentence containing that many conjoined unlike constituents:

(9) Marvin plays the mandolin \{because\} Marvin plays the fiddle.
(10) \*Marvin plays the mandolin \{because\} the fiddle.

(11) Marvin sent the clerk into hysteric's \{because\} Marvin sent his lawyer into hysteric's.
(12) \*Marvin sent the clerk \{because\} his lawyer into hysteric's.

(13) Marvin sent the clerk, his lawyer, the judge, his wife, and the victim into hysteric's.

(coming from the obvious source.)

This rule applies in conjoined NP's as well as in conjoined sentences:

(14) John likes (both) tall and short girls.
(15) John has one large and one small testicle. a

One might ask whether (14) and (15) might not be derived by the same rule directly from sentences, and whether the rule actually ever need apply to conjunctions of constituents other than S. It will be seen below that one proposal for this rule, due to Ross and Lakoff, requires that it be able to apply to any kind of conjoined constituent in order to derive sentences like (6); but independently of that formu-
lation, it can be shown that a rule like this must exist at least for conjoined NP's, for there are conjoined NP's which cannot be derived from conjoined sentences:

(16) Three old radicals and two young radicals

\[
\begin{align*}
\text{met} \\
\text{quarrelled} \\
\text{collided} \\
\text{shook hands} \\
\text{conspired to assassinate Agnew.}
\end{align*}
\]

in an alleyway.

But these NP's can still be reduced:

(17) Three old and two young radicals

\[
\begin{align*}
\text{met} \\
\text{quarrelled} \\
\text{etc.}
\end{align*}
\]

in an alleyway.

There is another rule, the rule of Gapping (cf. Ross (1967a,b), Jackendoff (1971)) which effects deletion in coordinate structures:

(18) Alfonse stole the emeralds, and Muggsy stole the pearls.
(19) Alfonse stole the emeralds, and Muggsy the pearls.

This rule deletes a redundant verb from a coordinate structure; in English, the verb of the right conjunct(s).

This rule too is confined to coordinate structures conjoined by and or (nor), and effects deletion of identical constituents in indefinitely many conjuncts:

(20) *Alfonse stole the emeralds

\[
\begin{align*}
\text{because} \\
\text{if} \\
\text{although} \\
\text{while} \\
\text{unless} \\
\text{whenever}
\end{align*}
\]

Muggsy the pearls.

(21) Alfonse stole the emeralds, Muggsy the pearls.Judge the dis-

1.1.1 The statement of these rules presents certain formal problems
which are of particular significance to linguistic theory, in that they
seem to require devices which are not used by other transformations.

The Gapping rule, for example, as Ross pointed out (in Ross 1967b),
although it can delete indefinitely many occurrences of an identical
verb in conjoined sentences, cannot be simply formulated with a variable,
for not only must the rule be prevented from applying in other than co-
ordinate structures, but it must also be prevented from applying to
(22) to get (23):

(22) Alfonse stole the emeralds, and I think (that) Muggsy stole
the pearls.
(23) *Alfonse stole the emeralds, and I think (that) Muggsy the
pearls.

Gapping does not "go down into" subordinate clauses.

The rule likewise does not apply if both verbs are in embedded
sentences which are not directly conjoined with each other:

(24) *I think (that) Alfonse stole the emeralds, and {Harvey thinks

\[
\text{(that) Muggsy the pearls.}
\]

But if the embedded sentences are directly conjoined with each other,
Deletion can occur:

(25) Alfonse stole the emeralds, Muggsy the pearls, Judge the di-

monds, Sally the eggplant, and Max the anaconda.
(25) I think that Alfonse stole the emeralds, and Muggay the pearls.

Thus Gapping can delete non-embedded verbs from conjoined sentences, even if the sentences are embedded. Note that Gapping, like CR, must be able to apply to embedded conjunctions since the gapping cannot occur in (25) before CR has caused the sentences to be directly conjoined.

Note that (25) cannot be interpreted as coming from an underlying sentence in which 'I think that Alfonse stole the emeralds' is conjoined directly with 'Muggay stole the pearls'. The "antecedent" verb cannot be in an embedded sentence, either.

The Gapping rule, however it is to be formulated in particular, has to be constrained to operate strictly in structures directly conjoined with each other. This constraint can be viewed as a kind of bounding;² we can say that the rule is downward bounded since it does not go down into subordinate clauses, and upward bounded since it does not work up out of subordinate clauses either. That this use of the term bounding does not correspond exactly to that of Ross should be obvious, since under his formulation of this notion a rule which is upward and downward bounded cannot have an effect across any sentence boundary; whereas this rule has effect exactly across the boundary between conjoined sentences. Clearly a new formal notion is necessary for the statement of this rule.

Gapping also obeys the various island constraints demonstrated in Ross (1967b) to constrain deletion and movement transformations:

(a) the Coordinate Structure Constraint:

*Alfonse ate the rice, and Harry and ate the beans.

(b) the Sentential Subject Constraint:

*Alfonse ate the rice, and that Harry the beans is fantastic.

(c) the Complex NP Constraint:

*Alfonse ate the rice, and I was stunned by the fact that Harry the beans.

The fact that Gapping obeys constraints (b) and (c), which prohibit deletion in specific types of embedded sentences under identity with a constituent outside the embedded sentence, follows from downward boundedness, which prohibits Gapping from deleting in any embedded sentence.

A restriction very similar to this is necessary for the formulation of the rule of Reflexivization. Reflexivization must be prevented from applying to constituents not "in the same simplex sentence" as the coreferent antecedent; (26) must be prevented from becoming (27) by Reflexivization:

(26) Marvin dislikes girls who call Marvin a sissy.

(27) *Marvin dislikes girls who call himself a sissy.

But the restriction on Gapping, unlike that on Reflexivization, cannot be formulated in terms of the more primitive notion of command,³ since the deleted constituent in this rule neither commands nor is commanded by its antecedent.
It is in any event going to be necessary to recognize the notion bounded in a coordinate structure. Thus we must have not only the notion "in some simplex", which is the crucial notion in the formulation of Reflexivization, but also the notion "in coordinate simplexes", which is required for the formulation of the Gapping rule.

1.1.2 There is a further constraint on Gapping which is of even greater significance for the theory of formal properties of rules. Gapping cannot apply unless the conjoined sentences are "identical in structure". What this means can best be seen from some examples.

Gapping can delete the verb from a wide variety of structures, although there are restrictions which will be taken up in a later chapter:

(29) Marvin maintained that the stuff was still hot, and Harry that it was time to dump it.

(30) Marvin went to Mexico, and Harry to the pen.

(31) Marvin carried the emeralds in his waistcoat pocket, and Harry the pearls in the heel of his boot.

We can conjoin sentences of widely differing structure, and the result is grammatical; although the effect is sometimes strange, because of the unexpectedness of the juxtaposition:

(32) Marvin stole the emeralds, and Harry stole away in the dark.

(33) Marvin stole the emeralds, and Harry stole five cents from his mother.

(34) Marvin ate bagels, and Harry ate too much.

(35) Marvin stole with caution and Harry stole diamonds.

But Gapping is impossible in these structures:

(36) *Marvin stole the emeralds, and Harry away in the dark.

(37) *Marvin stole the emeralds, and Harry five cents from his mother.

(38) *Marvin ate bagels, and Harry too much.

(39) *Marvin stole with caution, and Harry diamonds.
Gapping can occur in sentences with complex NP's, even if the internal structure of the NP's differs greatly:

(41) Marvin said that Harry was full of bull, and Harvey that Cuba was a nice place to visit, but he wouldn't want to live there.

(42) Marvin wants to buy a black Cadillac, and Harry a large apartment building in Manhattan with a view of the East River.

This indicates that the internal structure of NP's is immaterial, but Gapping cannot apply if the structure of the sentences down to NP's is not identical.

With a VP complement sentence, we find the same situation:

(43) Marvin likes wine, and Harry likes to listen to music.

(44) *Marvin likes wine, and Harry to listen to music.

(45) Marvin wanted to go to Camel's party, and Harry wanted to dress up in a Bull suit and tell dirty stories to the ladies at the literary tea.

(46) Marvin wanted to go to Camel's party, and Harry to dress up in a bull suit and tell dirty stories to the ladies at the literary tea.

With transitive VP complements and with sentential subjects another restriction, which will be discussed in Chapter 3, blocks Gapping.

Again identity of structure is required in the conjoined sentences, but only in the "topmost simplex" sentence, in the obvious sense of that term. The internal structure of the VP complement sentences in the two simplexes may differ.

This apparently also means that neither conjunct may contain a constituent that is not present in the other:

(47) John despises cheating, and Peter despises cheating the poor. b

(48) *John despises cheating, and Peter the poor.

(However, this is good on the reading '...and Peter despises the poor.')

It appears that the formulation of the Gapping rule must contain the following condition:

(49) The conjoined sentences must be structurally identical simplexes.

where "structurally identical simplexes" are structurally identical down to highest NP's and S's; the internal structure of NP and embedded S nodes is immaterial.

It is not surprising that the constituent deleted from the right conjunct should have to be identical to some constituent in the left conjunct. There is no other way the recoverability condition could be met. But it is striking that the deleted constituent must also be embedded in a structure identical to the structure in which its antecedent is embedded.
The notion "structurally identical" clearly includes both identical tree structure and identical node labels. But there are cases where even this notion of structural identity is inadequate. Consider sentences like (50), which is ambiguous:

(50) Harry likes flying airplanes.

So, if you think about it, is (51):

(51) Harry likes flying airplanes, and Marvin likes stealing jewels.

And (52):

(52) Harry likes flying airplanes, and Marvin likes crawling insects.

But after Gapping in (51) or (52), the ambiguity disappears:

(53) Harry likes flying airplanes, and Marvin stealing jewels.

(54) Harry likes flying airplanes, and Marvin crawling insects.

Since conjoining the sentences does not remove the ambiguity, but Gapping does, we can only conclude that Gapping is blocked on one reading in (53) and on the other in (54).

The structural identity requirement (49) will not have this effect, for although (50) has two possible structures, one identical to that of 'Marvin likes stealing jewels':

And one identical to that of 'Marvin likes crawling insects':

the differences in structure are internal to NP's. If the structural identity requirement could be made to refer to NP-internal structure, we could account for the disambiguation on the grounds that in (53) the structure of the left conjunct must be (55), because the fact that Gapping has occurred shows that the structure of the left conjunct must have been identical to the structure of the right conjunct, and the structure of the right conjunct is represented by (55).

Likewise, in (54), the structure of the left conjunct, in order to be identical to that of the right conjunct, has to be (56).
But we have seen that there are cases where the internal structure of NP's is irrelevant to the operation of Gapping. It appears that some kinds of structural differences between NP's are significant, while others are not.

The structural identity condition, in fact, must somehow be made sensitive to the difference between (55), where the NP is a reduced sentence, and (56), where the NP is an ordinary NP with a head noun and a modifying adjective.

One possibility is that the structure represented in (55) is wrong, although the evidence that 'flying airplanes' in that sentence is an NP is strong: it passivizes with some felicity, although not too well with 'like'; it topicalizes and clefts; it can answer the question 'what does Harry like?' and so on.

Ross (1967b) has suggested that certain rules involving deletion require a particularly strong kind of identity between the deleted item and its antecedent. For example (57) is ambiguous and (58) is also ambiguous, but only two ways, not four:

(57) Marvin wants to marry a tobacco heiress.
(58) Marvin wants to marry a tobacco heiress, and so does Muggay.

The same with (59) and (60):

(59) Marvin claimed he was sick yesterday.
(60) Marvin claimed he was sick yesterday, and so did Muggay.

And with (61) and (62):

(61) I don't know which sister John wants to marry.
(62) I don't know which sister John wants to marry, and neither does Harry.

It is clear that the deletion involved in these sentence pronominizations requires identity between the deleted and antecedent sentences not only in constituent structure ((59) and (60)), but also in de-terational history ((61) and (62)); and in the case of (57) and (58), the sentences may not even differ in the presence or absence of the feature [specific] on the NP 'tobacco heiress', a feature which is neutralized in the surface form of the sentence (57).

It is not at all clear how such a strong identity requirement is to be formulated. The question of identity in linguistic theory will be taken up in greater detail in Chapter 4. For the present, it will have to suffice that an identity condition at least as strong as (49) must be a part of the formulation of Gapping; and that some stronger identity condition is clearly needed in certain cases of Gapping as well as for other deletion rules.

The unusual fact about Gapping is not that it requires the formulation of such identity conditions, since they are required anyway in order to account for deletion phenomena in general. What is unusual is that for Gapping to apply, the identity conditions must be satisfied by parts of the sentences which are not deleted from the right conjunct.

1.1.3 This identity condition is also satisfied by the rule of Con-
junction-Reduction:

(63) Flying planes can be dangerous.
(64) Flying planes ought to be prohibited.
(65) Flying planes can be dangerous and flying planes ought to be prohibited.
(66) Flying planes can be dangerous and ought to be prohibited.

(63) is ambiguous two-ways. So is (64); and (65), as expected, is ambiguous four-ways, if you think about it; but (66) is ambiguous only two-ways again.

Thus we must conclude that CR is blocked if the deleted constituent is not identical to the antecedent, in the strong sense of identity. Furthermore, CR, like Gapping, requires identity not only between the deleted constituent and its antecedent, but also in the remaining portion of the sentence as well:

(67) I like flying planes.
(68) I like flying reptiles.

(67) is ambiguous, like (63); (68), unless you have a very fertile imagination, is unambiguous. (69) is still two-ways ambiguous:

(69) I like flying planes and I like flying reptiles.

But (70) is unambiguous:

(70) I like flying planes and flying reptiles.

which can only be explained if CR requires structural identity between the non-deleted parts of the conjoined sentences as well as between the deleted parts. (71) is also unambiguous, where the other reading of (67) must be taken:

(71) I like flying planes and driving sports cars.

This requirement is stated in the grammar books, usually phrased in terms of something like 'parallel constructions'. The injunction is usually not to conjoin constituents which do not exhibit 'parallel construction':

(72) *I like flying airplanes and to swim.
(73) *I like to eat and Susan.

1.1.4 I know of no rules other than those involving deletion in coordinate structures (except for a class of formally related rules which effect deletion across sentence boundaries, which will be discussed in Chapter 4) which have this requirement of identity of structure. Other deletion rules require identity between the deleted constituent and its antecedent, but not identity of the entire structure. The structural-identity requirement is particular to coordinate deletion rules.

There are cases of coordinate reduction, however, in which structural identity is not required. These are cases of right conjunction-reduction, where the "reduced" identical constituent is at the rightmost end of the two conjoined sentences:
(75) Marvin thought, and Muggsy was sure that the fuzz would be able to prove, that Harvey was a pervert.

This is just one of many differences between Right and Left CR (RCR and LCR) which will be considered in detail later in this chapter.

1.2 Ross's Gapping Proposal

1.2.0 In Ross's article on Gapping (Ross 1967a), he presents a number of arguments concerning the relation of underlying order of sentence elements (subject, object, and verb) to certain surface phenomena which he subsumes under the term Gapping. He also attempts to relate these phenomena to the existence of extraposition rules (rules which permute elements rightward around a variable) in a particular language. One conclusion of his argument is that Turkish must have SVO order in deep structure, with an obligatory rule, applying after the rules which effect Scrambling and Gapping, placing the verb in final position where it is required to be in (most) surface structures.

I will present an alternative proposal to account for the regularities which Ross discusses. In particular I will try to relate Gapping to more general processes of reduction of redundant information in surface structures and to examine more closely the interrelation of these processes with processes which effect reordering of constituents.

1.2.1 Ross considers like-verb deletion from conjoined sentences in several languages, among them English and Japanese. In these two languages the deletion patterns are as follows:

(A) (English) SVO SO

(1) I ate fish and Bill ate rice.
(2) I ate fish, and Bill rice.
(Numbering commences anew at the beginning of each section.
References to examples in preceding or following sections will be prefaced with section numbers. E.g. (1.2.1) refers to (4) in §1.2.)

(C) (Japanese) SO SOV

(3) watakushi wa sakana o tabeta to, Biru wa gohan o tabeta.
I fish ate and Bill rice ate

"I ate fish, and Bill ate rice."

(4) watakushi wa sakana, Biru wa gohan o tabeta.
I fish Bill rice ate

Ross proposes:

(a) to consider these deletions as instances of application of the same rule, which he calls Gapping,

and to account for the different directions of Gapping, he proposes as a linguistic universal:

(b) the directionality constraint on Gapping: that elements on left branches gap forward (following identical items are deleted) and elements on right branches gap backward (preceding identical items are deleted).

He then observes that a language like Russian, which has relatively free order order, exhibits both kinds of Gapping ((A) and (b)) as well as a third pattern:
(5) ja pil vodu, i Anna pilu vodku.
I drank water and Anna drank vodka.

(6) ja pil vodu, i Anna vodku.
I drank water and Anna vodka.

(7) ja vodu, i Anna vodku pilu.
I water and Anna vodka drank.

(8) ja vodu pilu, i Anna vodku.
I water drank and Anna vodka.

Finally, he notes that no language appears to have the other logically possible pattern:

(b) *SO  SVO
(9) (English) *I fish and Bill ate rice.
(10) (Japanese) *watakushi wa sakana o, Biru tabeta gohan o.
I fish Bill ate rice
(11) (Russian) *ja vodu, i Anna pilu vodku.
I water and Anna drank vodka

In order to explain these facts, Ross hypothesizes that:

(c) Russian underlying word order is SVO.
(d) Gapping is an "anywhere" rule; in particular, it can occur either before or after Scrambling.
(e) no language with SOV order in deep structure can have Scrambling of object and verb (nor even any extraposition rule, i.e. any rule which permutes an element rightward around a variable.

With these hypotheses, it is possible to account for the three Gapping structures in Russian: (A) is got by simply gapping the underlying order, as in English; (C) is got by first scrambling the underlying order to get SOV order in both conjunctions and then gapping backwards as in Japanese; and (B) is got by first gapping to get pattern (A), and then scrambling the first conjunct.

The assumption of underlying SVO order for Russian is necessary to prevent the generation of the impossible sequence (b), since if Russian had underlying SOV order, (D) could be generated by gapping backwards and then scrambling the second conjunct. But with the assumption of underlying SVO order, this is impossible, since backward Gapping is possible only after Scrambling, and then rescrambling cannot occur.

Assumption (c) is necessary for the same reason. If any language had SOV in deep structure and allowed Scrambling or anything like it, which could effect a permutation of elements after backward Gapping had applied. (D) would be generated by the rule ordering Ross proposes; and he implies that no other explanation is available for the existence of patterns (A), (B), and (C) in Russian.

By this time Ross has proposed a number of questionable hypotheses: (c), (4), and (e) above, with (a), the assumption that Gapping is one rule, and (b), the major hypothesis about the directionality constraint on Gapping. The consideration of further data requires the addition of yet another hypothesis:

(f) Turkish has underlying SVO order.

This is forced because Turkish has two gapping patterns: (C) SOV and (B) SOV SO:
Thus in spite of the fact that the 'basic order' in surface structure appears to be SOV in Turkish, forward Gapping occurs. Turkish is thus a counterexample to Ross's universal (b), unless the underlying order is SVO and an obligatory rule ordered after Gapping places the verb in final position.

This result is one of the major points of Ross's paper. He argues that since hypotheses (a) - (e) account for the observed gapping phenomena in Russian, Japanese, and English, and since no other explanation is available for these phenomena, we are forced to accept the hypotheses as established. We are consequently also forced to accept (f), which is the consequence of hypotheses (a) - (e).

1.2.2 More will be said about Turkish later; at this point I will present an alternative to Ross's explanation of the facts of gapping distributions. Note that a crucial point in Ross's argument is the assertion that no alternative explanation exists for the gapping patterns in English, Japanese, and Russian. If a defensible alternative proposal can be advanced, the conclusion (f) that Turkish is an SVO language is no longer forced; and since this conclusion is supported by no other evidence, rather the assumption of other than SOV order entails otherwise avoidable complexity in the grammar of Turkish, this conclusion will have to be rejected.

Consider first the assumption (a): that forward Gapping and backward Gapping are the effects of one Gapping rule. Ross points out in his paper that there is evidence that at least some speakers of Japanese feel the major constituent break in gapped structures to be directly before the verb; thus: SO SO // V, indicating that the derived constituent structure after Gapping should not be (15), as predicted by the Gapping rule he proposes, but (16):
He also points out that an independently necessary rule of Conjunction-Reduction could produce the structure (16).\(^f\)

It is not clear how much weight can be given to the intuitions of native speakers about constituent structure; however, in the absence of contrary evidence, it would seem that the structure (16) is at least not less likely than that of (15). And since the Conjunction-Reduction rule is available and there seems to be no convincing reason to assume that the structure (15) is correct as opposed to (16), we are led to ask what motivates the introduction of a backward Capping rule at all. It would be possible to seek evidence that (16) is correct, such as whether there are transformations which refer to the S-node dominating the conjunct in (16), or whether V is within a conjoined structure, as indicated in (15), or raised out of it, as indicated in (16). Such evidence will be considered later.

We are also led to wonder why forward and backward Capping are collapsed into one rule, when with the other hypotheses Ross proposes, backward Capping can apply only after Scrambling (in a language that has Scrambling) since no SOV language has Scrambling and no language that has any other order can gap backward until after Scrambling has applied. Furthermore, forward Capping can apply only before Scrambling since it cannot apply at all in SOV languages and cannot apply after Scrambling in SVO languages.\(^7\)

By making assumption (a), that forward and backward Capping are effected by the same rule, Ross has forced himself to further assume (d), that Capping is an "anywhere" rule. But the facts that forward Capping must apply before Scrambling and not after, and that backward Capping must apply after Scrambling and not before, argue against both of these assumptions.

Jackendoff (1971) observes that there is no clear way to state the restrictions on Capping if it is assumed to be an "anywhere" rule, since it apparently must follow Adverb Placement and precede Neg-Placement in any analysis which makes use of such rules and Capping has critical restrictions with respect to adverbs and negation which require interaction with these rules or some equivalent.

Suppose we discard assumption (a) and regard forward and backward Capping as two rules ordered with respect to Scrambling as Ross in fact has them applying:

\[
\text{forward Capping} \quad \text{Scrambling} \quad \text{backward Capping}
\]

This renders assumption (d) unnecessary as well. Let us further assume that backward Capping is not distinct from RCR, and consequently results in a structure like (16).

Consider now forward Capping ((A) SVO SO). Forward Capping, unlike backward Capping, is a special case of a very general process which I will refer to as the process of Coordinate Deletion: with certain restrictions, some universal and some language particular, stuff may be deleted from the second of two conjoined structures if there is identical stuff in the preceding structure. What the restrictions are, and consequently what "stuff" is deletable and what is not, is not of
immediate concern; but note that whereas forward Deletion in conjoined or otherwise concatenated structures is a general process, which is effected by many transformations (Gapping, VP Deletion, NP Deletion, Sluicing, and more), only backward Gapping deletes backwards. Note that I am referring here only to deletion in conjoined structures; deletion from embedded structures is another matter. Aside from Ross's proposed rule of Gapping, there is only one other transformation that effects backward deletion into a non-subordinate clause, and that is RCR; and it is questionable whether RCR actually deletes backwards or only appears to delete backwards, for in effect, it deletes from both conjuncts and attaches one copy of the deleted item to a higher node.

This rule, as formulated by Ross and Lakoff ([Ross 1967b], [Ross and Lakoff forthcoming]) reduces identical constituents at either end of two or more conjoined structures, producing a structure like that of (16), in which the "reduced" constituent is Chomsky-adjoined to the node dominating the original conjunction, and both instances of the identical constituent are deleted from the conjoined structures. (cf. Ross 1967b § 4.2.4.1)

This rule is so formulated that if the identical constituents are on the right in the conjoined structures, the raised copy is Chomsky-adjoined to the right, as in (16). If the identical constituents are on the left, the raised copy is Chomsky-adjoined to the left. The rule cannot apply to identical constituents which are neither rightmost nor leftmost in the conjoined structures. The exact formulation of this rule will be considered in detail below. For the present, it suffices to assume that backward Gapping and RCR are one and the same rule.

Thus forward Gapping, under these assumptions, is an entirely different rule from backward Gapping, applying at a different point and having a different structural effect. I am going to argue that all cases of forward deletion under identity in coordinate structures i.e. all cases of coordinate deletion, are effected by a single rule, which may have a complex set of entry conditions and constraints, but has a fully predictable effect on P-Markers and applies once at one point in any derivation.

1.2.3 Consider now the English sentences:

(17) John cooked the eggplant and ate the mushrooms.
(16) John cooked the eggplant and Harry the mushrooms.
(19) John cooked the eggplant and (a) Harry ate it.
(b) *Harry ate.
(20) John cooked, and Harry ate, the eggplant.

(18) is an instance of English verb Gapping; (17) is an instance of RCR; and (19a) is an instance of Pronomalization.

Note that there is a similarity between object Gapping in English and verb Gapping in Japanese. Namely forward Gapping is impossible, but backward Gapping is allowed. There is also a similarity between verb Gapping in English and object Gapping in Japanese, for both proceed forward and never backward:
(21) watakusi wa sakana o tabeta to, Biru wa gohan o tabeta.
    I fish ate and Bill rice ate.
(22) watakusi wa sakana o, Biru wa gohan o tabeta.
    I fish Bill rice ate
(23) watakusi wa sakana o ryouri-sita, Biru wa sakana o tabeta.
    I fish cooked Bill fish ate
    "I cooked fish and Bill ate fish."
(24) watakusi wa sakana o ryouri-sita, Biru wa tabeta.
    I fish cooked Bill ate
    "I cooked fish, Bill ate (it)."

There seems to be no good reason to consider object Gapping a
different process from verb Gapping; and the evidence so far is
consonant with Ross's universal (b): elements on right branches gap
backwards. It is not, however, reconcilable with his assumption that
there is something special about SOV languages. For if we consider
object Gapping in various languages, we find

(25) SV SVO (English, Turkish)
    Mehméet pisirdis, Hasan yedi yumurtayı.
    Mehméet cooked Hasan ate the egg
    "Mehmet cooked (and) Hasan ate the egg."
(26) SOV SV (Japanese, Turkish)
    Mehméet yumurtayı pisirdis, Hasan yedi.
    Mehméet the egg cooked Hasan ate
    "Mehmet cooked the egg (and) Hasan ate it."

And in Turkish we also get

(27) SVO SV
    Mehméet pisirdi yumurtayı, Hasan yedi.
    Mehméet cooked egg, Hasan ate

(Ross was apparently unaware of this fact; it presents a further diffi-
cy for his analysis of Turkish, which included a late obligatory
rule moving the verb to final position.

But we never get (28):

(28) *SV SOV
    *Mehmet pisirdi, Hasan yumurtayi yedi.
    Mehméet cooked Hasan the egg ate

And the same argument that led Ross to claim that no SOV language could
have extraposition rules would lead us too, to conclude that no SVO
language has such rules; and that the underlying order in Turkish (and
in Russian too) is SOV. To reproduce this argument simply substitute
0 for V and V for 0 in Ross's argument (and Turkish for Russian).

Clearly, there is something to be explained here; but it needs
to be formulated in a more general way than that which Ross proposed.
Rather than asking what it is about verb-final languages that makes them
gap verbs backwards, we need to ask what it is about certain languages
that makes them gap final elements backwards. When the question is for-
mulated in this way, it is clear that Ross's hypothesis (c) that SOV
languages can't have extraposition rules will be of no help. It is also
clear that some of the assumptions which forced the positing of (c)
will have to be abandoned. The crucial assumptions are (a) that Gapping
is a single rule and (d) that Gapping is an anywhere rule (in particular
that it can apply before Scrambling, so that after backward Gapping,
Scrambling could produce one of the ungrammatical gapping patterns:
*SO SVO or *SV SOV, depending on what the underlying order is assumed
Thus it appears that assumptions (a) and (d) are not only unnecessary, as suggested above, but untenable as well.

1.2.4 Thus I advance the following alternate proposal:

(29) Forward Gapping is simply Deletion of following identical elements in conjoined structures.

(30) Backward Gapping is RCR.

(31) The ordering of transformations is

Deletion
Scrambling
RCR

(32) Every language has both Deletion and RCR; but there may be language particular constraints on Deletion; in particular it may be constrained not to delete a sentence-final element. h

Note in particular that I have abandoned not only Ross’s assumptions (a), (d), and (e), but also his proposed universal (b): that the direction of Gapping is determined by the order of constituents at the time Gapping applies. I propose to allow in general e.g. for an SOV structure, either forward Gapping (henceforth Deletion) to get SOV SO, or backward Gapping (henceforth RCR) to get SO SOV. What I have done is to keep half of Ross’s universal (b): elements on left branches gap forward and never backwards. This is so because RCR reduces identical elements only on right branches, and hence cannot apply to elements on left branches. Note that whereas Ross had to state this, under the hypothesis advanced here, it follows automatically from properties of RCR.

Let me propose in addition to the preceding general assumptions the following language-particular assumptions:

(33) in the grammar of Japanese, there is a restriction (R) on Deletion; it does not delete sentence-final elements (which happen to be verbs).

(34) In the grammar of English, (R) also holds.

With these assumptions, it is possible to account for the verb and object gapping patterns in English, Japanese, Turkish and Russian as well as for the non-occurrence of both of the ungrammatical patterns *SO SVO and *SV SOV, and for the peculiar distribution of gapping patterns among languages noted by Ross, which will be discussed immediately below.

Consider English: verbs gap forward only, and objects gap backward only. Forward Gapping of verbs is simple Deletion and requires no explanation. The absence of backward gapping of verbs also requires no explanation, since backward gapping is restricted to RCR of final element, and verbs in English don’t normally occur following the object. (The phenomenon of object preposing, and topicalization in general and its relation to Gapping will be discussed below.)
1.2.5 The Distribution of Gapping Patterns

With the hypotheses outlined above, it is also possible to explain the distribution of verb gapping patterns in languages. These facts were first noted by Ross, and it is the major contribution of his Gapping paper to have pointed out that their explanation requires a universal hypothesis about the nature of Gapping. What needs to be explained is why there are no languages with only the gapping patterns B : SOV SO; AB : (A) SVO SO and (B) SOV SO; and AC: (A) SVO SO and (C) SO SOV.

A major part of the empirical support which Ross claimed for his gapping hypothesis was that it successfully accounted for this distribution of gapping patterns, or more specifically, for the absence of languages with the combinations AC and AB, and of languages with only the pattern B.

I will first outline how the hypothesis which I propose accounts for the combinations of gapping patterns which do occur. Then I will show that this hypothesis also predicts the non-occurrence of B, AC, and AB languages.

Strict SVO languages like Japanese (C), which have no object-extraposition rule (verb-object Scrambling) and which do have (R) can only gap verbs backwards (and objects forward). Strict SVO languages like English (A), which have no verb-object Scrambling rule and do have (R) can only gap verbs forward (and objects backward).
Turkish (BC), which has SOV order, no Scrambling rule, and no (R), can gap verbs in the patterns SOV SO and SO SO SOV by Deletion and RCS, respectively.

Russian (ABC), which has some unspecified order, Scrambling, and no (R), gets all three patterns, as outlined above.

It remains to explain the non-existence of languages with the pattern combinations R, AB, and AC. The explanation is fairly simple in each case. (B): In order to get gapping pattern (B), it is necessary that (with or without Scrambling) the verb must occur in final position. Then by hypothesis (32), it follows that you must also get pattern (C). So every (B) language is (BC). (AB): same argument.

(AC): In order to get both (A) and (C), it is necessary that the language have Scrambling, and pattern (A) can only result from forward Gapping, which precedes Scrambling in the ordering of transformations; so it must be possible to get the pattern (B) from (A) by a subsequent Scrambling. Thus, any language that has (A) and (C) must have (ABC).

1.2.6 It is clear that the set of hypotheses (29)-(32) can account for the same set of facts that Ross's hypotheses (a)-(d) are designed to account for. I will now compare the two sets of hypotheses in three respects: (a) simplicity, (b) generality, and (c) empirical verification. This section and the next two will be concerned with (a) and (b). The matter of empirical verification will be the subject of the rest of this chapter.

In regard to simplicity, there are two varieties to consider. One is coherence with existing linguistic theory, i.e. lack of strain on established presuppositions, which, to the degree allowed by the primary requirement that observed linguistic structures be accounted for, ought to be minimised. The second is simplicity in particular grammars, i.e. if one hypothesis requires a complication in the grammar of a particular language, which under another hypothesis is unnecessary, the second hypothesis is to be preferred, other things being equal.

Consider the two hypotheses under consideration with regard to strain on established theory. First, Ross's hypothesis requires that Gapping be an "anywhere" rule. I will not go into the question of justification for the existence of such rules; however, I think it cannot be said that the existence of any such rule has been definitely established. Therefore the existence of an explanation of the given data which does not require such a rule is in itself an argument against the hypothesis which contains it. Second, Ross's hypothesis proposes two linguistic universals (b) and (e), for which there is no evidence other than the supposition, falsified by the preceding argument, that only this set of hypotheses could account for gapping patterns. 1

If these universal hypotheses made other empirically verifiable predictions, then it would be possible to establish their validity independently of the distributional paradigm of Gapping; but hypothesis (b), which asserts the directionality constraint on Gapping, and hypothesis (e), which asserts that SOV languages never have extrapolation rules, are both directly falsified by languages like Turkish, which is SOV, has Gapping both ways, and has extrapolation rules. Since Ross is willing to conclude from this that Turkish is a SVO language
in deep structure, a conclusion that is otherwise unsupported, the hypotheses (b) and (c) are without empirical content aside from the explanatory power of the whole set of assumptions in accounting for gapping phenomena.

My hypothesis not only does without an "anywhere" rule, but also accounts for the distribution of gapping patterns without recourse to Ross's universals (b) and (c), both of which are apparently too strong. I have postulated two universals which play no role in Ross's hypothesis: that RCR is a rule in the grammar of every language and that Deletion is available to every language.

The important difference between these two assumptions and those of Ross is that they can be shown to be independently necessary aside from the particular explanation of the facts of gapping.

There is no known language which does not have a rule of CR; and there is no known language in which this rule cannot apply to reduce identical constituents on the right in conjoined structures, whether there identical constituents are verbs or not. (Cf. object Gapping in English, which was shown above to be nothing more than RCR of the final constituent.)

As for the proposed universal rule of Deletion, the forward deletion of objects in Japanese and Turkish shows that some rule of forward deletion in coordinate structures is necessary in those languages, and I will show in the following sections that such a rule deleting identical constituents from following conjuncts in coordinate structures is necessary in these and other languages to account for deletion not only of verbs and noun phrases, but also of adverbs and other constituents. Thus the two universal rules I propose to account for gapping phenomena are independently necessary rules.

In the next section I will propose a formulation of CR under which LCR is an automatic result of the application of Deletion, under certain conditions, so that Deletion and LCR will be shown to be the same rule, and consequently that there is no need for a rule of Gapping at all.

The third universal I proposed is that the rule of RCR follows, and that Deletion precedes, the rule of Scrambling. This hypothesis, as noted above, is different in kind from any universal hypothesis ever before proposed, in that it makes an empirical claim about the universal ordering relation between universally formulated transformations. Its novelty, however, is no argument against it. This is an extremely strong claim; if it can be successfully added to linguistic theory, the class of possible grammars will be constrained in a way that has never before been contemplated. This kind of novelty should be contrasted with the novelty of allowing "anywhere" rules, which enlarges the class of possible grammars and weakens linguistic theory. It is precisely in this sense that Ross's hypothesis is more "complex" than mine. My hypothesis requires no new devices in the grammar of any language, it simply asserts the universality of two rules and an ordering relation between the rules. Clearly if a hypothesis this simple can adequately account for the data being considered, it should require additional data unexplainable by this hypothesis to confirm any more complex hypothesis.
The theoretical implications and empirical validity of this hypothesis will be examined in detail in Chapter 2. There it will be shown that consideration of further empirical facts force certain modifications in this hypothesis, principally because these facts require a more accurate reformulation of the rules involved; but the essential claim that there is a universal ordering relation between certain transformations will be shown to be supported rather than refuted by consideration of further data.

1.2.7 As for the second kind of simplicity: Ross's hypothesis seems to allow for a simple account of verb gapping in English and Japanese; my hypothesis requires the grammars of these languages to be complicated in one respect: the constraint (R) on Deletion. It will be argued in Chapter 3 that this constraint or an equivalent one is independently necessary in the grammars of these languages. Ross's hypothesis, however, requires for more complication in the analyses of Russian and Turkish (and all languages with other than "strict" SVO and SOV orders) than mine does. And in fact, as will be shown below, since English and Japanese are not strict order languages, his hypothesis requires the same complications in these languages as well.

For example, consider the complications introduced into the grammar of Turkish under Ross's hypothesis. For the reasons given above, Turkish must be assumed to have underlying SVO order. The gapping pattern SVO SO is produced by forward Gapping of this underlying order; but a subsequent obligatory rule moves the verb in the first conjunct to final position. This rule is otherwise unmotivated in Turkish; its only function is to allow Ross's hypothesis to stand. If Gapping, which is optional, does not apply before the verb-Postposing rule, then it gets another chance to apply afterward, to the pattern SOV SOV; This application of Gapping, obeying the directionality constraint, produces SO SOV. However, (and Ross was apparently unaware of this fact) in isolated sentences the object may optionally be extraposed under certain discourse conditions, so that the order SVO is grammatical:

(38) Hasan yedi yumurtayı.
Hasan ate the egg.

Thus in the analysis proposed by Ross, the object yumurtayı in this sentence must have started out in final position in underlying structure, been permuted with the verb by the verb-Postposing rule, and then optionally replaced in final position. But the rule which extraposes objects would have to be made sensitive to whether the sentence affected is in a conjoined structure in which Gapping has applied to delete the verb of the other conjunct, for the pattern SVO SO does not occur in Turkish:

(39) *Hasan yedi yumurtayı, Mehmet patentini.
Hasan ate the egg Mehmet the eggplant.

This pattern, in fact, does not occur in any SOV language so far as I know, whether such a language has an object Extraposition rule or not. The implications of this fact will be considered in Chapter 2 in connection with a detailed investigation of the universal ordering hypothesis.
1.2.8 As for generality: whereas Ross's hypotheses are specific to the operation of his Gapping rule and to properties of "strict" SOV languages (of which the only example he discusses is Japanese), mine are of a more general nature: (29) claims that only final elements can be gapped "backwards", and that the resulting structure is that of RNR; (32) claims that the two processes of Deletion and RNR are available to every language; and (31) makes a claim about the ordering relation between Scrambling and certain kinds of redundancy reduction. (In the discussion to follow, this claim will be replaced by a more general one.)

As a result of the fact that my hypotheses are stated in more general terms than Ross's, they are able to account for a wider range of phenomena than his are. I.e., not only can I account for peculiarities of verb Gapping more economically, but in addition the related phenomena of object gapping can be accounted for by the same set of hypotheses. Furthermore, as I will show in the following sections, a reformulation of the rule of CR will allow all cases of reduction of redundancy in coordinate structures to be accounted for in a unified manner under these hypotheses.

1.3 The Reduction Convention

1.3.0 As the first step in considering the question of empirical verification of hypotheses (29)-(32) I will investigate in detail some consequences of the claim that forward Gapping is an instance of a more general deletion process, and present some elaboration of this hypothesis.

1.3.1 Let us first consider whether there is any difference between forward Gapping and LCR. I.e., can (17) and (18)

(17) John cooked the eggplant and ate the mushrooms.
(18) John cooked the eggplant and Harry the mushrooms.

be accounted for by a single rule, or do we have to have two? 10

Suppose that we consider (17) to result, like (18), from a simple deletion operation: i.e. deletion of the second of two identical corresponding constituents in a conjoined structure. The underlying structure is (40):

(Ross (1967b) gives persuasive arguments for the attachment of the conjunction and to the second conjunct. I assume this structure here, although it does not crucially affect what follows.)

The derived structure after deletion of John from the right conjunct is (41):
(41)

\[
S \\
\text{NP} \quad V \quad \text{VP} \quad \text{and} \quad V \quad \text{VP} \\
\text{John} \quad \text{cooked} \quad \text{the eggplant} \quad \text{ate} \quad \text{the mushrooms}
\]

And after S-Pruning, this reduces to (42):

(42)

\[
S \\
\text{NP} \quad V \quad \text{VP} \quad \text{and} \quad V \quad \text{VP} \\
\text{John} \quad \text{cooked} \quad \text{the eggplant}
\]

There is, however, another way to do it. If the deletion producing (42) is followed by Chomsky-adjunction of the VP hanging on the right to the VP of the left conjunct, precisely the same structure will result:

(43) (same as (42))

\[
S \\
\text{NP} \quad V \quad \text{VP} \quad \text{and} \quad V \quad \text{VP} \\
\text{John} \quad \text{cooked} \quad \text{the eggplant}
\]

And (42) is clearly not the correct structure, since there are rules which have to follow CR that treat NP as the subject of the conjoined VP's; e.g. Clefting ('it was John who sang and danced'); also VP Deletion ('John doesn't sing and dance but Harry does'); and Do-So Replacement, if it is different from VP Deletion ('John sang and danced and Harry did so too').

The usual formulation of the CR rule, proposed by Lakoff and Ross, Chomsky-joins to the right or left of the coordinate node a copy of some constituent which occurs in all the conjuncts, on the right or left branch, respectively, and then deletes the original nodes.\(^{11}\) This results after S-Pruning and node-relabeling in the structure (43):\(^{12}\)

(44) (same as (43))

\[
S \\
\text{NP} \quad V \quad \text{VP} \quad \text{and} \quad V \quad \text{VP} \\
\text{John} \quad \text{cooked} \quad \text{the eggplant}
\]

Chomsky proposed in *Syntactic Structures* a formulation of CR essentially equivalent to such a procedure:
If \( S_1 \) and \( S_2 \) are grammatical sentences, and \( S_1 \) differs from \( S_2 \) only in that \( X \) appears in \( S_1 \) where \( Y \) appears in \( S_2 \) (i.e., \( S_2 = \ldots X \ldots \) and \( S_1 = \ldots Y \ldots \)), and \( X \) and \( Y \) are constituents of the same type in \( S_1 \) and \( S_2 \), respectively, then \( S_1 \) is a sentence, where \( S_3 \) is the result of replacing \( X \) by \( X + \) and \( Y \) in \( S_1 \) (i.e., \( S_3 = \ldots X + \) and \( + Y \ldots \)).

(Chomsky 1957 p. 36)

This informal statement of the process of CR clearly involves the following two requirements:

(a) The two conjoined \( S \)'s must be identical except for one constituent;
(b) The unlike constituents must be of the same 'type', i.e. must have the same node-label;

and has the following two effects:

(a) The identical parts of one of the \( S \)'s are deleted
(b) The remaining constituent is conjoined to the "corresponding" constituent in the other conjunct sentence.

There seems a priori to be no principled reason to choose to delete the identical stuff from the right sentence rather than from the left, or from the left rather than the right; and Chomsky's informal statement is noncommittal as to which way the deletion proceeds.

What I propose is that the same Deletion rule which is involved in Gapping also effects the deletion which occurs in CR. Since this rule applies universally from left to right (i.e., deletes material from following conjuncts, the direction of deletion in CR must also be from

left to right.

1.3.2 But in order to get reasonable derived structures it is necessary that this Deletion rule be supplemented by some restructuring convention such as that suggested above, which will have the effect of conjoining the unlike constituent left after deletion in the right conjunct, or in all the following conjuncts if there are more than one, with the corresponding constituent in the left conjunct.

This convention must not, however, conjoin the subject and object after Deletion has applied to a conjunction with identical verbs, with the subject and object in the left conjunct:

(46) John ate the rice, and Harvey the beans.
(47) *John and Harvey ate the rice and the beans.

unless it also adds respectively:

(48) John and Harvey ate the rice and the beans, respectively.

In this case, however, the restructuring convention would have to be optional, whereas in general it must be obligatory. I will leave such cases as these out of consideration for the time being, and suggest the following formulation:

(49) The Deletion-Reduction Convention:

Whenever, as a result of Deletion in coordinate structures, a constituent is left exhaustively dominated by \( S \), that constituent is automatically conjoined with the corresponding con-
With the convention thus stated, it will not apply to a structure like (50), where Deletion has applied to produce the Gapping pattern SVO-SO:

(50)

since neither NP nor VP in the right conjunct is exhaustively dominated by S.

If, however, the entire VP's are identical, so that Deletion results in (51):

(51)

the convention applies, conjoining the (subject) NP left hanging on the right after Deletion with the subject of the left conjunct sentence:

(52)

Note that since Deletion applies only in conjoined structures which obey the structural identity condition discussed in §1.1, the conditions of application of this convention are easy to make explicit; in particular, the notion of 'corresponding constituent' is well-defined.

1.3.3 If such a formulation of CR can be justified, a very important generalization becomes possible: that Gapping and LCR are the same rule. And this is precisely what I propose:

(53). All instances of forward deletion in coordinate conjoined structures result from a single rule of Coordinate Deletion; and all instances of LCR are the automatic result of this Reduction convention after Deletion.

I will refer to structures like (50), in which Deletion has applied but the Reduction convention cannot apply, as gapped structures; I will refer to structures like (52), where the Reduction convention has applied, as reduced structures.

It should be noted that in (53) I am making two claims. One, that all left-to-right deletion in coordinate structures is effected by a single rule; and two, that some of these deletions are automatically reduced. The latter is a proposal for the theory of derived constituent structure, like the pruning convention proposed by Ross. The Reduction convention is not a transformational rule, and it cannot be stated as such a rule, for it applies to a class of structures which cannot be characterized in terms of Boolean conditions on analyzability. It is also a universal convention: it cannot be missing from the grammar of any lan-
Note also that I claim only that left CR is effected by the Deletion-Reduction rule. The hypothesis advanced above to account for gapping phenomena requires that RCR be universally ordered later than Deletion, so if Deletion and LCR are the same rule, LCR and RCR are not the same rule.

In the following sections I will present evidence for these claims. I will show that the Ross-Lakoff formulation of CR is inadequate and that, independently of the Capping hypothesis, RCR and LCR cannot be formulated as one rule; and I will present evidence that the correct formulation of LCR is that proposed here.

1.4 Empirical Consequences of the Deletion-Reduction Proposal

1.4.0 The difference between the two proposed formulations of CR is not merely notational; there are different empirical claims. For although the derived structures are the same for subject reduction in an SOV or SVO language, they would be different for verb reduction in a VSO language. Assuming that the constituent structure is just VSO (the argument is not affected if there is no VP in such languages) my attachment convention would not apply after Deletion of the second V because no constituent would be left exhaustively dominated by S. Thus I would predict that in such languages, LCR of the verb is impossible and the derived structure after Deletion is simply a gapped one:

\[ (54) \]

whereas CR as formulated by Ross and Lakoff predicts:

\[ (55) \]

Since the order of constituents predicted is non-distinct, however, it might be difficult to test which hypothesis is correct. If native speakers of a VSO language felt the largest constituent break to be immediately after the verb, this would argue against my solution. More conclusively, the existence of a transformation that had to refer to the compound subject-object pairs as a unit, i.e. had to refer to a node \( S_2 \) in (55) would argue against it.

In this section I will examine several cases in which my Deletion-Reduction proposal has empirical consequences different from the Ross-Lakoff proposal, and show that there are formal and empirical difficulties with their proposal which mine avoids; and I will show that the Deletion-Reduction formulation has explanatory power that the Ross-Lakoff rule lacks.
1.4.1 In the case of deletion of a constituent internal to the second sentence, e.g., verb-Gapping in English, the structure resulting from Deletion is the following:

![Diagram](image)

and since the right conjunct contains no constituent exhaustively dominated by S, the Reduction convention does not apply and the gapped structure remains.

It is obvious that a gapped structure will result from any Deletion that removes only part of the VP of the right conjunct, leaving the subject and a remnant of the VP. Note that this result is unaffected if there is no VP node, since the Reduction convention fails to apply whether the VP node is there or not. Thus all cases of forward Gapping of verbs and objects will have such gapped structures: e.g. forward object-Gapping in Turkish:

![Diagram](image)

(57) (the structure corresponding to (58))

![Diagram](image)

(58) Ahmet yumurtayı pişirdi, Mehmet yedi. Ahmet the egg cooked Mehmet ate
"Ahmet cooked the egg and Mehmet ate it."

and forward verb-Gapping in Turkish:

![Diagram](image)

(59) (corresponding to (60))

![Diagram](image)

(60) Ahmet yumurtayı pişirdi, Mehmet patlıcanı. Ahmet the egg cooked Mehmet the eggplant
"Ahmet cooked the egg and Mehmet the eggplant."

However, any deletion which strips away everything from the right conjunct except for a single constituent, leaving that constituent exhaustively dominated by S, will automatically result in a reduced structure. Thus all cases of conjoined constituents, whatever they are, automatically result from Deletion in conjoined sentences. There are, of course, cases of constituent conjunction which cannot be derived from conjoined sentences, e.g. 'John and Hildegarde got married' with the usual reading, i.e. that they married each other. Even if (as I suppose to be the case) such conjunctions have to exist as conjoined
constituents in deep structures, we clearly want to derive all the constituent conjunctions that we can from conjoined sentences; if for no other reason, so that they can be given a semantic interpretation different from those that cannot be so derived.\textsuperscript{15} Thus, for example, conjoined verbs can be derived from conjoined sentences identical except for the verbs:

\begin{itemize}
\item[(61)]
\begin{itemize}
\item NP
\item S
\item VP
\item S
\item NP
\item V
\item NP
\item V
\item NP
\end{itemize}
\end{itemize}

cooked the eggplant ate the eggplant

is converted by Deletion to (62):

\begin{itemize}
\item[(62)]
\begin{itemize}
\item NP
\item S
\item VP
\item S
\item NP
\item V
\item NP
\item V
\end{itemize}
\end{itemize}

cooked the eggplant ate

which is reduced automatically to (63):

\begin{itemize}
\item[(63)]
\begin{itemize}
\item NP
\item S
\item VP
\item S
\item NP
\item V
\item NP
\item V
\end{itemize}
\end{itemize}

Note that the Reduction convention as stated in (49) is insufficiently precise: it is necessary to insure that the verb ate is conjoined with the verb cooked in the left conjunct, and not with the VP cooked the eggplant, which would yield

(64) *John cooked the eggplant and ate.

In Chapter 4 a node-pruning convention will be proposed and justified which will allow the erasure of the VP node above ate in (62). Ross's S-Pruning convention will also be modified so that the S-node on the right branch is also erased, even if, as Ross proposes, the conjunction and is dominated by that S. Note that if this assumption about conjunctions is correct, Ross's Pruning convention will not erase the S-node, since it still branches after Deletion by virtue of dominating both and and ate.

Leaving this problem aside for the moment, and assuming that the Reduction convention can be stated so that the correct result will be obtained, it is clear that the Deletion-Reduction rule can convert conjoined S's identical except for one constituent, whether internal to the S's or on either end, into a single S containing the conjunction of the non-Identical constituents. Thus this rule is a reconstruction of the informal statement of CR given by Chomsky and quoted above.

Note that in order for this rule to work it is necessary to assume that the Deletion rule is completely unrestricted as to what constituents it can delete. The only condition on it is that the two conjoined S's have structural identity as defined in § 1.1 and that some corresponding constituents in the two (or more) S's be identical; then the rule...
can delete the identical constituents from some conjuncts.

If there were a restriction to the effect that Deletion could not delete a particular constituent, e.g., a verb, or the subject, it would be impossible to derived conjoined constituents of any other type by application of the Deletion rule.

In Chapter 3, certain constraints of a different kind will be shown to restrict Deletion - but it will be argued that all constraints on Deletion are output constraints, i.e., constraints on the permissible form of a structure resulting from Deletion-Reduction; not on the application of the Deletion rule itself.

It appears, however, that to derive conjoined verbs this way requires a violation of the restriction (R) on Deletion, which was assumed to hold for English; for in such a derivation the object, which is in final position, must be deleted. At this point we can either look for another way to derive conjoined verbs (and VP-internal conjunctions generally) or investigate the possibility of a modification of the restriction (R) which allows the deletions we want while prohibiting deletions we don't want. The latter course seems reasonable, since the assumed formulation of (R) was proposed with only a restricted class of deletion phenomena in view, namely verb and object-Gapping; there is no reason to assume it will not need modification.

Note that it is the proposed convention for converting gapped structures into reduced structures that makes it possible (and desirable) to modify (R): without this convention (62) could not be converted to (63), and the restriction on Deletion would have to stand. Further-

more, since under the present proposal Reduction is an automatic concomitant of Deletion, any restriction on Deletion is really a restriction on Deletion plus Reduction, or (henceforth) Deletion-Reduction. A detailed argument will be given below concerning the precise nature of this restriction. For the moment, let it stand that any deletion which does not automatically result in a reduction must leave the final element.

Structures like (63) can also be derived from structures like (61) by repeated application of the Ross-Takoff CR rule. Copying and Chomsky-adjoining the subject John to the left of the topmost S-node and erasure of the original subjects of the two conjuncts yields (65):

(65)

```
NP
  S
  S
  VP NP VP NP
John cooked the eggplant ate the eggplant
```

The S-Pruning and node-relabelling conventions reduce this to (66):

(66)

```
NP
  S
  VP
John cooked the eggplant ate the eggplant
```
is reduced by repeated application of the Ross-Lakoff rule to the following structure:

(69)

\[
S \\
NP \quad VP \\
John \quad V \\
\quad V \\
\quad \text{the eggplant} \\
\quad \text{cooked and ate}
\]

(70) John carried the eggplant lovingly and nitroglycerin carefully into the kitchen.

The underlying structure is (I omit the conjunction and from now on):

(71)

\[
S \\
NP \quad VP \\
\quad NP \quad Adv \quad PP \\
\quad John \quad V \quad NT \quad PP \\
\quad \text{carried eggplant lovingly into the kitchen} \\
\quad \text{carried nitroglycerin carefully into the kitchen}
\]
Application of the CR rule to reduce the subjects yields:

(72)  
```
S
   NP
    John
   V NP Adv PP
     carried eggplant lovingly into the kitchen
   V NP Adv
     carried nitroglycerin fully into kitchen
```

Subsequent Reduction of the verbs yields:

(73)  
```
S
   NP
    John
   V
     carried eggplant lovingly into kitchen nitroglycerin carefully into kitchen
```

Finally, reduction of the PP's on the right yields (69):

Again, it is very difficult to test such a structure for correctness, but note that the major constituent boundaries do not coincide with major phonological junctures, which occur on either side of the right-most conjoined VP.

(74) John carried the eggplant lovingly / and the nitroglycerin carefully / into the kitchen.

Also, the derived constituent structure represented in (69) claims that carried the eggplant lovingly is not a constituent, which it clearly ought to be; and that the eggplant lovingly and the nitroglycerin carefully is a constituent, which it clearly is not.

The conjoining convention which I propose would yield, after Deletion of identical stuff from the right conjunct:

(75)  
```
S
   NP
    John
   V NP Adv PP
     carry eggplant lovingly into kitchen nitroglycerin carefully into kitchen
```

Then RCR yields:

(76)  
```
S
   NP
    John
   V
     carry eggplant lovingly into the kitchen
```

which has major constituent breaks in the right places.
1.4.3 Note that in either derivation, the RCR has to be done last. Otherwise the prepositional phrase gets attached to the topmost S instead of to the VP node, and has no way of getting lowered again. Since some people find conjunctions like this with a reduced final PP ungrammatical, let me illustrate with another example.

(77) The fox told Chicken Little that the sky was falling.
(78) Albert told Seymour that the sky was falling.
(79) The fox told Chicken Little, and Albert told Seymour, that the sky was falling.

(77) and (78) can be reduced to get (79), which has the structure (80):

But suppose the subjects are identical:

(81) The fox told Seymour that the sky was falling.

(81) and (77) can obviously be reduced to get:

(82) The fox told Seymour and Chicken Little that the sky was falling.

which should have the structure (83):

which it gets, by either Deletion plus Reduction, as in my analysis, or by LCR (repeatedly applied) followed by RCR. But if, in either derivation, RCR is applied first, the correct structure cannot result; for subsequent application of LCR (or Deletion-Reduction) must operate on the structure produced by RCR, which is like (80). And the result of Left Reduction of that structure is (84):

which is clearly wrong.

Thus in either treatment of CR, RCR must apply after LCR. This follows automatically from my assumptions about rule ordering and the identity of LCR with Deletion. But if, as Ross and Lakoff propose, RCR and LCR are the same rule, it is difficult to see how it is to
be constrained not to apply on the right until after it has applied on
the left, if it is going to.

1.4.4 These considerations, independently of the success of hypo-
theses (29)-(32) in accounting for gapping phenomena, cast some doubt
on the assumption that LCR and RCR are the same rule. There is other
evidence that they are not the same rule; notice that LCR can reduce
any amount of stuff with little restriction as to what constituent struc-
ture it has:

(85) a John called Seymour a liar and gave Max a dirty look.
  b John called Seymour a liar and Max a necrophile.
  c John called Seymour a liar and a necrophile.

But RCR in general cannot reduce more than the final constituent:

(86) a *John offered, and Harry gave Sally a cadillac.
  b *John asserted, and Harry denied, to Seymour that Sally
     was a virgin.
  c *John told, and Harry showed, Seymour that Sally was a
     virgin.
  d *Chomsky asserted, and McCawley denied, that a level of
     "deep structure" existed at the semantics conference last
     week.

Given some laxity in selectional restrictions (86 d) is grammatical
on one reading; namely when the PP’s are taken as internal to the senten-
tial complement, which is then the final constituent and can be reduced.

It is clear that a restriction must be placed on RCR, namely that it
reduce only a final constituent of the conjoined sentences. It does
not matter if this constituent is in an embedded sentence:

(87) John tried to force Harry to admit that Sally was, and Albert
succeeded in proving to Seymour that Kathy had once been, a
virgin.

But the reduction still doesn’t work on more than one constituent:

(88) *John tried to force Harry to admit that Sally, and Albert
succeeded in proving to Seymour that Kathy, was a virgin.

The reduced constituent can also apparently be the VP of the conjoined
sentences:

(89) John and Albert succeeded in proving to Seymour that Sally
was a virgin.

But note that sentences with conjoined subjects can also be derived
by Deletion with the attachment convention I have proposed. This would
mean that such sentences have two derivations, although they have only
one deep structure and are non-distinct on any grounds.

1.4.5 It is obviously desirable to make a choice between these two
derivations. It has heretofore been supposed without question that
sentences like (89) are derived by RCR. However, if this were the
case, it would be difficult to explain why (88) is ungrammatical. It
would appear that RCR can reduce final constituents of the VP, no mat-

ter how deeply embedded, but not the VP itself of an embedded clause
(unless it has only one constituent); and if (89) is to be derived by
RCR, it must in addition be able to reduce the VP of the highest clause.
This would require that RCR have, in effect, two disjoint structural
descriptions in its entry condition. But if the Deletion-Reduction con-
vention I propose is accepted, this complication is completely unnecessary.
I will henceforth assume that conjoined subjects are derived
by Deletion rather than by RCR. (Note that this forces a reanalysis of
(35)-(37), which will be considered below.)

This proposal is supported by the fact that in every other case
of RCR, a major phonological juncture appears between the conjoined
segments of the reduced structure, as in (87); but no such juncture
ever appears between two conjoined subjects.

I propose, then, that (89) is derived by Deletion-Reduction,
whereas (87) is derived by RCR.

This raises a question about the formulation of RCR. Note that
in order to prevent the derivation of conjoined subjects by RCR, and
to avoid the complication of the RCR rule noted above, it is necessary
to specify that RCR applies to final constituents of VP's, but not to
VP's. Since RCR can reduce a final constituent of any kind otherwise,
this would appear to be an odd constraint.

At present I can only suggest that for the purposes of at least
some rules, VP is not a constituent. There is scanty evidence for the
existence of VP as a constituent in any case (this topic will be taken
up again in Chapter 4); and the existence of rules like RCR, which
reduce a node out of any other kind, but not to VP, might be taken
as counterevidence to the existence of any such category as VP.

Whether or not the category VP can be shown to exist, it is
necessary to have available a characterization of a class of constituents
which I will call major constituents:

(90) A major constituent is any node other than VP which is im-
mediately dominated by S or VP, and which itself dominates
a lexical node.

(Here I use "dominates" in such a sense that every node dominates itself
as well as all of its lower branches; so that V, by this definition,
is a major constituent.)

If the node-label VP can be shown not to exist, this definition
can be greatly simplified; and there definitely are languages in the
grammars of which there is no use for a VP node (Turkish, for example,
has no transformational rules which refer to such a node). In such
languages a major constituent is any node immediately dominated by S
which itself dominates a lexical node.

In languages which have Scrambling, it is major constituents which
are permuted with each other. This notion is thus necessary for the
statement of Scrambling, or whatever set of rules accounts for the facts
of Scrambling.

In English, it seems that any major constituent except the verb can
be topicalized:

(91) The house, John bought yesterday.

(92) Yesterday, John bought the house.
But not the VP:

(93) *Bought the house yesterday, John.

So that the notion of major constituent is required anyway, for the proper statement of rules other than $CR$.

Given this notion, it is possible to state $CR$ so that any final major constituent identical in two conjoined sentences can be reduced. The question of what structure is assigned by this rule will be taken up below.

1.4.6 It has gone unnoticed that the derivation of conjoined subjects by RCR presupposes the existence of a VP node. However, without such a node, if the Ross-Iakoff CR rule is applied to produce a sentence with conjoined subjects from two otherwise identical sentences having the two different subjects, the derived constituent structure is hash.

Consider what results from repeated application of RCR if subject, verb, and object in a transitive sentence are all immediately dominated by $S$:

(94)

Suppose that in (94) the verbs and objects in the two conjuncts are identical, and the subjects are different.

The first application of CR Chomsky-adjoins a copy of the object to the topmost-S and erases the original objects, yielding (95):

(95)

The second application of CR Chomsky-adjoins a copy of the verb to the $S_2$ dominating the new conjunction of terms and deletes the original verbs, yielding (96):

(96)

And node-relabelling results in

(97)

And this derived constituent structure is clearly wrong. If there were no VP node, and conjoined subjects were derived in English by the Ross-Iakoff CR rule, the only effect of matching the subject antecedents would be the deletion of the second subject node in each conjunct.
Lakoff CR rule, this is the structure which that rule would assign to a sentence like

(93) John and Harry played snooker.

Since the structure of (93) is certainly nothing like (97), the Ross-Lakoff CR rule is crucially dependent on the existence of VP.

The question whether there exists a node-label VP in the grammar of English is still open. It seems to be supported by such rules as VP-Deletion, Clefting, and a few others which apply to VP.

Whatever the status of VP in English, there are languages, such as Turkish, which have no rule which could possibly be suspected of referring to VP. There is no VP-Deletion:

(103) Hasan çok kabak yedi, çünkü Mehmet çok kabak yedi.
    N. too much squash ate, because M. too much squash ate.
    "Hasan ate too much squash, because Mehmet ate too much squash."

(100) cannot be converted into any sentence lacking a verb in the second clause:

(104) *Hasan çok kabak yedi, çünkü Mehmet.

There is also no "pro-forma" for VP, like do-so in English.

(105) *Hasan çok kabak yedi, çünkü Mehmet yaptı.
    N. too much squash ate because M. (did? made?)
(Thus is actually grammatical, but in an unrelated vulgar sense.)

And there are in general no transformational rules in Turkish which refer to VP.

Since the statement of such rules as Scrambling in Turkish would only be complicated by the assumption of an underlying VP node, and since there is no evidence that such a node exists, it is clear that we must assume that the grammar of Turkish has no VP node.

But there are conjoined subjects in Turkish, just as there are in English:

(106) Hasan ve Mehmet geldiler.
    Hasan and Mehmet came (pi)

(107) Hasan ve Mehmet çok kabak yedi.
    Hasan and Mehmet too much squash ate

    "Hasan and Mehmet ate too much squash."

(the morpheme -la is a suffixed form of ile 'with'; it is the exact equivalent of our and in conjunctions of NP's. Note especially that the verb with such conjunctions is plural if the subjects are human, so that it cannot be argued that -la in such sentences is a preposition rather than a conjunction. There is also a suffixed -la which means with; but it is suffixed to the second of the two NP's: 'Hasan Ahmetle çok kabak yedi' - 'Hasan ate a lot of squash with Mehmet'; and in this case the verb is singular. The conjunctive use of -la is thus clearly distinct from its "concomitative" use.)

If these conjoined subjects are to be derived from conjoined sentences by the Ross-Lakoff CR rule, this rule will assign derived constituent structures which are clearly wrong, as outlined above:
(a) the major IC break is directly before the verb.

and

(b) *Hassana Mehmet çok kabak* is a constituent.

Both of these claims are clearly wrong.

Since the Ross-Lakoff CR rule is crucially dependent on the existence of VP in any language in which that rule is to be used to derive conjoined subjects, the correctness of the assumption that a rule so formulated is universally involved in the derivation of conjoined subjects can be justified only insofar as the universal existence of VP can be justified.

It is difficult to find evidence for VP in any language other than English that I know of, and this includes such languages as German and French, which in spite of the fact that they are closely related to English, lack any such rules as VP-Deletion.

The Deletion-Reduction proposal, on the other hand, meets with no such difficulties in the case of subject coordination, since it is insensitive to the presence or absence of a VP node in the derivation of a sentence like (107).

1.4.7 There are, however, cases where the Deletion-Reduction rule is sensitive to the presence of VP: that is, in the derivation of sentences with conjoined VP's:

(111) John ate a lot of pickles and John drank a lot of wine.
(112) John ate a lot of pickles and drank a lot of wine.
If (112) is to be derived from (111) by Deletion-Reduction, the absence of a VP node would prevent the Reduction convention from applying to produce a reduced structure. Deletion applying to the underlying structure of (111) yields:

(113)

\[
\begin{array}{c}
S \\
\downarrow \\
NP \\
\downarrow \\
\text{John} \\
\uparrow \\
V \\
\downarrow \\
\text{ate} \\
\downarrow \\
a \text{lot of pickles} \\
\uparrow \\
\downarrow \\
\text{drank} \\
\downarrow \\
a \text{lot of wine} \\
\end{array}
\]

which reduces to (114):

(114)

\[
\begin{array}{c}
S \\
\downarrow \\
NP \\
\downarrow \\
\text{John} \\
\uparrow \\
V \\
\downarrow \\
\text{ate} \\
\downarrow \\
a \text{lot of pickles} \\
\uparrow \\
\downarrow \\
V \\
\downarrow \\
\text{drank} \\
\downarrow \\
a \text{lot of wine} \\
\end{array}
\]

But if there is no VP node, the Reduction convention cannot apply as it is formulated:

(115)

\[
\begin{array}{c}
S \\
\downarrow \\
NP \\
\downarrow \\
\text{John} \\
\uparrow \\
V \\
\downarrow \\
\text{ate} \\
\downarrow \\
a \text{lot of pickles} \\
\uparrow \\
\downarrow \\
\text{drank} \\
\downarrow \\
a \text{lot of wine} \\
\end{array}
\]

Since there is not a single constituent hanging on the right, Reduction does not apply, and the structure remains as it is. This is not a very satisfying derived constituent structure, for several reasons: the right-hand sentence lacks a subject;

the rule of Agreement would have to be ordered before Deletion-Reduction if this structure is correct, and it seems unlikely that this ordering is possible, since in order to get plural agreement with conjoined subjects, it is necessary for Agreement to follow Deletion-Reduction. There are many problems with Agreement in reduced sentences which have never been satisfactorily accounted for. I will in general not attempt any definitive discussion of the problems of agreement, although it must be admitted that any adequate hypothesis about the nature of reduction in coordinate structures must take agreement into consideration. For some discussion of this topic see Lakoff and Peters (1965), Peters (1966), and Dougherty (1969).

If the Deletion-Reduction (DR) proposal for deriving conjoined constituents is to be upheld, either it must be assumed that the node-label VP exists and is present in the underlying structure of (112) and English sentences in general; or the Reduction convention must be modified in some way so that (115) can be reduced.
1.4.8 One more piece of evidence will be brought to bear on the question whether LCR and RCR are one and the same transformation. I mentioned at the time the DR convention was proposed that there is an empirical difference between my proposal and the CR rule proposed by Ross and Lakoff, namely that my convention will refuse to reduce a forward gapped VSO SO sequence, because the second conjunct is not a single constituent exhaustively dominated by S:

(122)  

\[
\begin{array}{c}
S \\
V \\
NP_S \\
NP_0 \\
S \\
NP_S \\
NP_0
\end{array}
\]

And since I claim that all cases of forward deletion are accounted for by Deletion, I predict that no language can have a reduced structure for this gapping pattern, as in (123):

(123)  

\[
\begin{array}{c}
S \\
V \\
S \\
NP_S \\
NP_0 \\
S \\
NP_S \\
NP_0
\end{array}
\]

whereas the Ross-Lakoff CR rule should be able to apply and produce such a structure. Note that it makes no difference whether the language is VSO or VOS; the above discussion is insensitive to position of subject and object.

I was able to get information about only two verb-initial languages: Tagalog and Biblical Hebrew. In both cases it appears from considerations similar to those appealed to in the argument above about the surface structure of Japanese gapped sentences, that the IC structure is as predicted by my hypothesis.

The evidence for this conclusion is largely phonological: in both cases, the major phonological juncture occurs after the first object; pause is possible there but not after the verb, etc. 21

Modern Hebrew, which has SVO as its unmarked order, has verb-initial sentences "for emphasis", and in these, verb-gapping can occur:

(124) bišal moše ba-orez, ve-yosef ha-khatsil.
    cooked Moshe the rice and Joseph the eggplant.
    "Moshe cooked the rice, and Joseph the eggplant."

And the major juncture, as indicated by the comma, is at the point predicted by the DR proposal; and this is a normally clause-final juncture. It is impossible to get a major juncture after moše, where the Ross-Lakoff CR rule predicts the major IC break to be.

I have not been able to find purely syntactic evidence for the structure of gapped sentences in these languages; but it should be possible to find such evidence, i.e. my hypothesis should be falsifiable.

In view of the fact that the DR hypothesis produces structures which are in accord with observable phonological juncture phenomena, and in view of the above argument that it should produce subject-reduction in English, I feel justified, pending the production of counter-evidence, in assuming that it also produces verb-gapping in verb-initial languages.
Note that I have only argued that the gapped structure in verb-initial languages is not produced by LCR. I have not claimed that the correct structure could not have been arrived at by Ross's Gapping rule; on the contrary, it is exactly what his rule would produce. But Ross's hypothesis neither explains why the resulting structure is a simple gapped one rather than a reduced one, nor why the structure resulting from an identical gapping of initial subjects is a reduced one, nor does it allow any generalization to be made about forward Deletion that includes both cases.

If these arguments are correct, no structure reduced on the left will ever have, on the right, conjoined S-nodes; for the attachment convention applies only when a constituent of the right conjunct can be adjoined to a constituent of the left conjunct. But the rule of RCR does produce structures with conjoined S-nodes on the left. RCR thus cannot be formulated as a backward Deletion followed by Reduction, analogous to LCR as I have formulated it; RCR must have a node-raising formulation, as proposed by Ross and Lakoff.

1.4.9 The evidence clearly indicates that at least

(a) LCR and RCR can't apply at the same place
(b) they don't have the same entry condition
and suggests strongly that
(c) they don't produce the same structural change.

Consequently, they are not one rule, but two. I will henceforth refer to LCR as DR, but it will not be considered a separate rule from Deletion, since the Reduction, where it can occur, is automatic and (for English, at least) obligatory. The question whether reduction is universally obligatory is an empirical question which I have not investigated.

In this section I will review the evidence that LCR and RCR are different rules and discuss some formal problems with the CR as formulated by Ross and Lakoff which disappear once this fact is recognized.

The following evidence has been presented that LCR (my DR) is a different rule from RCR:

(a) In cases where multiple application of CR is required, all possible applications of LCR must be effected before any applications of RCR. If my hypothesis that backward Gapping is

(b) DR can reduce any number of constituents, but RCR can reduce only the final major constituent.

(c) The derived constituent structure after DR cannot be the node-raised structure predicted by the Ross-Lakoff rule, but must rather be that predicted by my formulation; but the derived constituent structure after RCR is a node-raised structure.

These conclusions are based mainly on phonological evidence.

This evidence leads to the conclusion that Right and Left CR cannot be formulated as a single bidirectional rule, with the direction of application determined by the presence of a gapped constituent.
plication depending on whether identical elements are on left or right branches, as Ross and Lakoff have it formulated. There are also certain formal problems with such a rule which are due entirely to its formulation in this manner, and which disappear if it is formulated as two distinct rules.

Ross shows (Ross 1967b § 4.3.2.b) that RCR fails to obey one of the conditions on Pied Piping, namely that no NP should be moved to the right out of a PP, stranding the preposition. This constraint is violated in (125):

(125) I am confident of, and my boss depends on, a successful outing at the track.

He then concludes that an ad hoc condition must be placed on the constraint involved, because the conditions on Pied Piping do in general apply to CR. However, the example he provides in support of this claim is an instance of LCR:

(126) The university’s students are intelligent and the university’s faculty is committed to freedom.

cannot be converted to

(127) *The university’s students are intelligent and faculty is committed to freedom.

Ross attributes the ungrammaticality of (127) to the Left Branch Constraint, another constraint on Pied Piping which prohibits the movement of an NP from the left branch of a higher NP.

Under my hypothesis, the ungrammaticality of (127) is due to a stronger constraint on the Deletion rule itself. This rule was shown in § 1.1 to obey the structural identity condition, and to be downward bounded. The formal properties of rules obeying these conditions will be examined in Chapter 4. Here it suffices to note that one property of such rules is that they delete under identity, as noted in § 1.1, only in directly conjoined structures; in *(127) the two NP’s the university’s students and the university’s faculty are not directly conjoined. They are elements in larger conjoined structures.

To see that it is not the Left Branch Constraint that causes the ungrammaticality of *(124), observe that Reduction can occur if the NP’s in question are directly conjoined:

(128) The university’s students and faculty are intelligent.

If it is the Left Branch Constraint that blocks (127), it should also block (128). Ross notes this discrepancy, and proposes a rider, the adhocity of which he admits, on the Left Branch Constraint allowing it to be violated by CR, just in case the two NP’s involved are directly conjoined.

Since Deletion–Reduction is not a raising rule like the Ross–Lakoff CR rule, nothing is moved by this rule out of the coordinate structure. Since it is downward bounded and deletes only in directly conjoined structures, the Pied Piping constraints do not apply (or rather they are vacuous in this case), so that no evidence is available from LCR to show that Pied Piping constraints should apply to RCR.

The Pied Piping Constraints apply in general to movement rules.
Piping constraints to apply to it. However, the rule is not strictly a movement rule, at least not in the formulation informally stated in Ross (1967b § 4.2.4.1) (which I accept as correct for RCR). It is rather a copying-and-erasure rule, since a copy of the identical constituents is Chomsky-adjointed to a higher node, and the constituents subsequently erased. I see no other interpretation for Ross's characterization of this rule, which I gave in § 1.3.1 of this thesis. There is no reason to expect such a rule to obey conditions on Pied Piping, since it is clearly formally distinct from the movement rules to which those constraints apply. In another place in Ross (1967b § 6.1.2.3), Ross proposes a formulation of CR and suggests an interpretation of this formalism which differs from the original informal statement of this rule in § 4.2.4.1:

The rule of Conjunction Reduction, whose operation was described informally in § 4.2.4.1 above, is stated roughly in (6.58)

(6.58) Conjunction Reduction

a. \[ \text{[and} - [X - A]^n_B \] \rightarrow

\[
\begin{array}{ccc}
1 & 2 & 3 \\
\end{array}
\]

\[ \text{OPT} \]

\[ [1 2 0]_B \neq 3 \]

b. \[ \text{[and} - [A - X]^n_B \] \rightarrow

\[
\begin{array}{ccc}
1 & 2 & 3 \\
\end{array}
\]

\[ \text{OPT} \]

\[ 2 \neq [1 0 3]_B \]

Condition: all occurrences of A are identical.

This notation should be interpreted to mean that in any coordinate node of the category B, which dominates any number of conjuncts which are also of the category B, and each of which either ends or begins with a constituent of category A, where all occurrences of A are identical, all of these occurrences of A are superimposed, and adjoined to the conjoined node B.

His argument that CR must be formulated as a movement rule is based on very insecure evidence, in the form of grammaticality judgments on a set of sentences which are all more or less bad.

The argument is that the rule obeys the constraints on movement transformations, and therefore must be formulated as a movement rule; but there are other rules (discussed in Ross (1967b) § 6.1.3.) which obey the constraints and cannot be formulated as movement rules, so that this argument is invalid. The non-movement rules which obey the constraints are all deletion transformations; so that at most one could argue that CR should be formulated so as to incorporate either a movement or a deletion.

I showed in § 1.1 that the Coordinate Deletion rules obey a constraint stronger than any of the island constraints, in that they are downward bounded. In Chapter 4 I will show that this is a formal property of any rule which is formulated, as these rules are, with the structural identity condition. Thus the fact that DR should obey island constraints follows from its formulation as a structural identity deletion rule.

The evidence that \& CR\& obeys island constraints is likewise insecure foundation for its formulation as a movement rule. Little is known about the formal properties of copying-and-erasure rules; I will propose in Chapter 4 a characterization of the class of rules which obey island constraints under which copying-and-erasure rules will be included.

In order to formulate CR as a movement rule, Ross has to suggest
a structural process not known to be needed for any other rule: "All the instances of A are superimposed (my emphasis) and adjoined to a higher node". There is no elementary transformation in present linguistic theory which could accomplish this superimposition.

It thus appears that in an attempt to collapse DR and RCR into a single rule, a weird hybrid with strange formal properties was created. Everything about the rule as formulated by Ross and Lakoff is ad hoc: it requires a formal device for its statement which does not exist otherwise in linguistic theory; it requires that riders be placed on otherwise general constraints on Pied Piping; it cannot be allowed to operate on the right before it has had a chance to operate on the left, even though it is formulated as a bidirectional rule; and as noted in §1.1.4, LCR has to be formulated with a structural identity condition, but RCR must not be so formulated.

All of these problems disappear if, as I propose, there are two distinct rules effecting reduction in coordinate structures, DR operating as a structural identity Deletion rule followed by Automatic Reduction where allowed by the Reduction convention, and RCR operating as a copying-and-erasure rule to reduce only identical final constituents.

In view of the evidence presented in this section, I think that it can be considered established that LCR and RCR are not the same rule; that the formulation of LCR as Deletion followed by Reduction is empirically superior to the node-raising formulation proposed by Ross and Lakoff; and that RCR does have such a formulation, or at least is formally different from LCR.

Thus this much of the hypothesis I propose to account for gapping phenomena is independently validated. There are two distinct rules, Deletion and RCR, which can account for the Gapping patterns observed in natural languages; and independent considerations show that the rule of Deletion must precede the rule of RCR.

The reader may have noticed that much of the preceding discussion has consisted of destructive criticism of the Ross-Lakoff formulation of CR. I do not claim thereby to have established without reservation the correctness of my own proposal, merely to have established that it is superior in several respects to the Ross-Lakoff proposal. It has been possible to advance a new proposal incorporating what is correct in the Ross-Lakoff formulation, while at the same time explicitly rejecting what is wrong with that proposal, only because their CR rule was explicitly formulated in such a way that it had empirical consequences. The results of this section should be considered not a refutation of their proposal, but rather a continuing search for the underlying reality which is founded on and extends the investigation which led to that proposal.

In the following section I will show that not only are RCR and LCR two different rules, but forward and backward Gapping, on completely independent empirical grounds, must also be two different rules. I will then argue that backward Gapping can be shown to produce a derived constituent structure identical to that produced by RCR, so that the identification of these two rules is forced, pending the discovery of evidence that they must be distinct. Thus the rest of my hypothesis on the nature of Gapping will be validated independently of its expla-
notary power with regard to Gapping phenomena.

1.5 Gapping

1.5.0 I will now consider further empirical evidence for the hypothesis that Gapping is two rules.

1.5.1 Primary evidence for this is the fact that, as we have noted above, forward and backward Gapping, if considered to be one rule, must never be allowed to apply at the same place in a grammar. The ordering of these rules will be examined in more detail below.

There is other evidence as well, however, that there are two Gapping rules. Note that the verb-Gapping rule for English (which applies only forward) has certain peculiarities of effect (cf. Ross (1967a), Jackendoff (1971)). For one thing, if there are unlike adverbs in the conjoined sentences, Gapping cannot occur:

(1) *John quickly cooked the rice, and Mary slowly the beans.

and if there are like adverbs, the one in the right conjunct is deleted along with the verb, obligatorily:

(2) John quickly cooked the rice, and Mary (*quickly) the beans.

and the adverb remaining in the first clause is interpreted as applying to the second clause as well, i.e., an adverb must have been there and got deleted. Gapping cannot occur if one clause has an adverb and the other none.

This same restriction also holds for verb-Gapping in French, in non-subordinate clauses in German, and in general, in languages which have only forward Gapping of verbs.

In Turkish, which has both forward and backward verb-Gapping (SOV SO and SO SOV), the same restriction holds for forward Gapping:

(3) Nehmet şabuk yumurtayı pişirdi, Ahmet { *şabuk } patlıcanı. 

    Nehmet quickly the egg cooked Ahmet quickly/slowly the eggplant.

But if the verb is gapped backwards, the restriction does not hold, i.e., there may be unlike adverbs, and gapping of the adverbs is not obligatory:

(4) Nehmet şabuk yumurtayı, Ahmet { şabuk } patlıcanı, pişirdi. 

    Nehmet quickly the egg Ahmet quickly/slowly the eggplant cooked

Furthermore, if the adverbs are gapped, the gapping proceeds forward, never backwards, even if the verbs are gapped backwards:

(5) Nehmet şabuk yumurtayı, Ahmet patlıcanı, pişirdi. 

    Nehmet quickly the egg Ahmet the eggplant cooked

"Nehmet quickly (cooked) the egg (and) Ahmet (quickly) cooked the eggplant."

And there is ambiguity as to whether the adverb applies to both clauses or only to the first one.
In Japanese and in Korean, which have only backward Gapping of verbs, the same phenomenon is observed. I give examples from Korean, but the facts in Japanese are exactly the same. 22

In a gapped sentence, unlike adverbs may appear:

(6) nayka kamcalul ppalli, Chelsau papul chenchenhi, mekessta. I potatoes quickly Chelsau rice slowly ate

And like adverbs may be gapped forward:

(7) nayka kamcalul ppalli, Chelsau papul, mekessta. I potatoes quickly Chelsau rice ate

with ambiguity as to whether the adverb applies to both conjuncts or just to the first. It is also possible, however, to get an adverb only in the right conjunct:

(8) nayka kamcalul, Chelsau papul ppalli, mekessta. I potatoes Chelsau rice quickly ate

But in (8), my informant felt that the adverb was unambiguously a modifier of the right conjunct only, in other words that the only possible reading of (8) is accurately glossed by:

(9) I ate the potatoes, and Chelsau quickly ate the rice.

This is precisely the result which is predicted by the assumption that backward Gapping in verb-final languages is effected by the rule of CCC, which has been shown to operate to reduce like final constituents, regardless of the structure of the conjuncts.

And in Russian, which has three Gapping patterns (SOV SO, SVO SO, and SO SOV) the like-adverb restriction holds for the two forward-gapped patterns, but not for the backward-gapped one.

Thus, it appears that forward Gapping always has the like-adverb restriction, whereas backward Gapping never does, even where both patterns occur in the same language. If only languages like English and Japanese had to be accounted for, this might not totally destroy the hypothesis that Gapping is one rule, although it would still seem strange that this Gapping rule should have the like-adverb restriction, and that like-adverb Deletion should furthermore be required to actually apply, whenever verbs are gapped forward, but not when they are gapped backward.

A language that has Gapping in both directions, however, provides conclusive proof that Gapping is not one rule, as Ross proposes. For according to his theory, the forward-gapped pattern SOV SO in Turkish has to be derived from an SVO SO gapping pattern by a subsequent Scrambling. But if this were the case, and if Gapping were a single rule in such languages, exactly the same restrictions on adverb likeness and adverb Deletion would have to be found in backward gapping patterns as in forward gapping patterns. And this is not the case.

It is by no means merely adverbs that exhibit this differential behavior. Note that in English like indirect objects (especially if they are pronouns) are also obligatorily gapped along with the verb:

(10) Paul Schacter has informed me that the basic order in Tagalog and related languages is VOS; Ives Goddard that the unmarked
order in Algonkian is OVS; and Guy Carden that the basic order in Aleut is OSV. [Ross 1967a p.2]

(11) "Paul Schachter has informed me that the basic order in Tagalog and related languages is VOS; Ives Goddard me that the unmarked order in Algonkian is OVS; and Guy Carden me that the basic order in Aleut is OSV.

And unlike indirect objects with or without contrastive stress prohibit Gapping:

(12) "Paul Schachter has informed me that the basic order in Tagalog and related languages is VOS; Ives Goddard you that the unmarked order in Algonkian is OVS; and Guy Carden him that the basic order in Aleut is OSV.

And precisely the same restriction holds for Turkish (and for Russian, German, Japanese and every other language I could check on), when the verbs are gapped forward:

(13) Nehmet bana geldiğini söyledi, Ahmet geldiğini söyledi. Nehmet to me his-coming told Ahmet his-not-coming "Nehmet told me he was coming, and Ahmet that he was not coming."

(14) Nehmet bana geldiğini söyledi, Ahmet bana geldiğini söyledi. Nehmet to me his-coming told Ahmet to thee his-not-coming

But not when the verbs are gapped backward:

(15) Nehmet bana geldiğini, Ahmet bana geldiğini söyledi. Nehmet to me his-coming, Ahmet to thee his-not-coming

And again, when there is no indirect object in the second clause, there is ambiguity as to whether it was never there or has been deleted.

Again, other languages which have backward Gapping (Japanese, Russian, Korean are the ones I checked) exhibit exactly the same behavior. 23 The result is no better if the indirect object is a NP rather than a pronoun:

(17) *Harry gave Seymour a cadillac, and Albert {Thomas} a purple onion.

It is even worse with three clauses:

(18) *Harry gave Seymour a cadillac, Albert {Thomas} a purple onion, and Jerry {Robert} a red necktie. {Seymour}

Note that it is better with the to/for dative:

(19) ? Harry gave a cadillac to Seymour and Albert a purple onion {to Thomas.} {to Seymour.}

But with like deleted direct objects, it is positively horrible:

(20) *Harry gave a cadillac to Seymour, and Albert {to Thomas.} {to Seymour.}

(21) *Harry gave Seymour a cadillac, and Albert Thomas.
In Turkish, there is a language-particular restriction on \textit{CR}, that does not hold for Deletion. If like verbs in conjoined sentences have unlike generic objects, forward Gapping of the verbs is possible, but not backward Gapping:

(22) Ahmet patlıcan pişiriyor, Mehmet yumurtayı.
Ahmet eggplant is cooking Mehmet egg
"Ahmet is cooking eggplant, and Mehmet egg."

(23) *Ahmet patlıcan, Mehmet yumurtayı pişiriyor.
Ahmet eggplant Mehmet egg is cooking

Again, if forward Gapping in Turkish is effected by the same rule as backward Gapping, it is impossible to account for this difference in restrictions. If, on the other hand, a restriction is placed on backward Gapping to prevent its operation when the object is generic, this is further evidence that there are two rules rather than one.\textsuperscript{24}

It is possible to make the following generalizations:

(25) When the verb gaps forward, there are certain restrictions on the occurrence and deletion of other elements in the conjoined sentences. I do not intend to attempt a precise formulation of the forward Gapping rule, but it clearly applies not to identical verbs alone, but rather to a chunk of identical stuff that includes the verb and certain things contiguous to it, among which are adverbs and objects. [cf. discussion of the English Gapping rule in Jackendoff (1977)]

(26) When the verb is gapped backward, it is only the verb which is affected by the rule which effects backward gapping.

(26) Adverbs, indirect objects, etc. not in final position gap forward even if the verb gaps backward but there is no requirement that they be like in order for backward verb-Gapping to occur, and no requirement that they be gapped if the verb is gapped.

These facts are automatically accounted for by my assumption that backward Gapping is universally identical to RCR. For RCR, as was shown above, reduces only final elements.

1.5.2 Finally, there is evidence that the structures created by backward Gapping are not the same kind as structures created by forward Gapping. I suggested above that since in Japanese (and in languages in general) there must be an independently motivated right-end CR rule, there was no good reason not to assume that it is this rule that effects backward Gapping. It is possible to demonstrate the validity of a stronger assertion, namely that backward Gapping must in general have the effect of producing exactly the structure produced by the right-end CR rule, and that consequently they are (i.e., must be) the same rule. This conclusion is forced unless evidence is found to contradict it, and I know of none.

As I pointed out above, the intuitions of native speakers about surface IC structure is not necessarily dependable enough to base syntactic arguments on. However, if back-gapped structures had the simple gapped structure that would be produced by Ross's Gapping rule (Fig. (1.2.15)), it is difficult to see why a native speaker would ever feel
an IC boundary to lie before the final verb in such a structure, just as it would be difficult to see why English speakers feel an IC break (and signal it by a phonological juncture) before the final object in a sentence like (1.2.20) 'John cooked, and Harry ate, the eggplant'.

In fact, in my investigation of gapping of verbs and objects in several languages with various base orders, I have found no informant who does not find such an IC break in backward-gapped structures; and in languages with Scrambling, this IC break is there (or felt to be there) no matter what sort of constituent is being gapped. It is unquestioned by anyone that all reduction of constituents other than the verb in final position is Q&Q; my point is that verbs are no different.

The only kind of syntactic evidence that could enable us to decide between the two proposed structures would be evidence bearing on whether the remaining SOV sequence is a sentence or not, i.e., whether in SO SOV, [SOV] is dominated by an S-node, or whether [SO SO] is dominated by an S-node. That is, whether the correct derived constituent structure after backward Gapping is that represented by (27) or that represented by (28):

(27)

\[
\begin{array}{c}
\text{S} \\
\text{NPS} \\
\text{NPO} \\
\text{NPS} \\
\text{VP} \\
\text{V}
\end{array}
\]

Such evidence is hard to come by. Ross notes that the final verb in Russian (and this is true in general), agrees in person and number (and gender for past tense verbs) with the subject of the second, not the first conjunct (and it does not become plural if the subject of the second conjunct is not plural). He takes this as evidence for his analysis, since (presumably) he supposes that the verb in a conjunction-reduced structure would have no reason to agree with the subject of the second conjunct only. There is, however, no reason it should not do so. All that is required is that the rules of subject-verb Agreement apply before the rule of Q&Q, and that this rule raise the verb of the final conjunct, deleting the verb from the preceding conjuncts. Since Q&Q has to follow Scrambling, which certainly has to follow subject-verb Agreement (since the Agreement rule needs to refer to the subject in terms of its position in some structure, in order to distinguish it from non-subject NP's), this requirement is met already.

This is equivalent to saying that the copying-and-erasure rule copies only the last of the "identical" constituents, with its agreement features; the erasure part then erases all of the original identical constituents. I know of no formal or empirical reasons to reject this formulation: it is possible that further investigation of the
properties of copying rules will provide some, but at the present state of knowledge I see no objection to assuming such a formulation.

The crucial evidence that the structure of backward-gapped conjunctions is a reduced one is provided by the behavior of such conjunctions when embedded. For example, in Turkish a sentence may be embedded, e.g., under an NP node, where a Nominalization transformation turns it into a nominalized clause by converting the verb into a verbal noun, affixing to it a possessive suffix agreeing in person with its subject, and affixing to that a case marker determined by the grammatical function of the nominalized clause in the matrix sentence. Nominalization also affixes a genitive suffix to the subject of the embedded clause.

Conjoined sentences can also be embedded, and embedded conjoined sentences can be gapped (but only backwards; the reason for this will be made clear later).

Thus a sentence like

(29) Hâsân, Nâhêmediîn yûmûrtâyî, Ahmediîn pûlîkanî, pisîrme-
Hâsân Nâhêmedî's the egg Ahmediî's the eggplant cooking

sînî istîyîr.

wants.

"Hassan wants Nhemet to cook the egg, (and) Ahmet the eggplant."

has a deep structure something like (30):

Note that if the embedded conjunction after backward-Gapping has the structure (31):

(31)

we would expect that the verb could not be affected by rules operating subsequently, for this would violate the Conjoined Structure Constraint; but this is exactly what happens under the Nominalization transformation, for the surface structure of (29) is (32):
(32)  

NP  
Hasan  

S  
pīsirmesi-ni  

S?  
SP  
%stiyor  

NP  
H-in yumurt-

tay  
A-in paltićani  

where the nominalized verb has a possessive suffix agreeing in person with the subject of the right-hand conjunct, plus a case marker signifying its grammatical function in the matrix sentence and both subjects in the conjunction have the genitive suffix.

The only way that both subjects can be marked genitive is if they are both subjects of embedded verbs at the time the Nominalization rule applies. If this rule precedes the application of Ross's Gapping rule, a structure like (31) can result, with both subject NP's marked genitive; but not if Gapping precedes Nominalization.

It is thus possible to maintain Ross's Gapping rule only by assuming that in (32) Nominalization applies first "across the board", and subsequent Gapping deletes the V from the first conjunct. The test comes when we consider cases of forward Gapping in embedded conjunctions. Ross's analysis would predict that such sentences would be grammatical, being derived by Gapping and subsequent movement of the verb to final position. Under top to be ungrammatical, because the structure of an embedded conjunction after deletion of a verb from the second conjunct is (35):

(36)  

S  

S  

NP  

NP  

V  

NP  

NP  

and the verb is in a coordinate structure and therefore cannot be nominalized.

This prediction is borne out:

(37) *Hasan, Mehmedin yumurtayı piširmesini, Ahmedin paltićani,  
Hasan Meinelt's the egg cooking, Ahmet's the eggplant  
%

Clearly Ross's Gapping rule cannot account for this fact. If Gapping is merely a Deletion rule, the direction of application of which is determined by the directionality condition, and if Gapping must occur after Nominalization (which it must), there is nothing to stop the generation of sentences like *(37), by forward Gapping and subsequent reordering in the first conjunct.

This constitutes empirical verification of the claim that backward Gapping assigns a node-raised structure. There seems to be no reason, then, not to collapse this rule with RCR, and attribute any reduction of final constituent to an application of Node Faising.
Since forward and backward Gapping, like Left and Right CR, cannot be maintained to have identical entry conditions, or to apply at the same place in derivations, or have the same structural effect, it is clear that they cannot be one and the same transformation.

In this and the preceding section I have established that Gapping is not one rule but two, and that CR is not one rule but two; I have suggested that forward Gapping can be considered to be effected by the same Deletion rule that results, after Reduction, in conjoined constituents; and that backward Gapping can be considered to be effected by the more general rule of CAR which reduces identical final constituents.

An important general conclusion can be drawn from these results. Gapping and CR were the only two rules in syntax which seemed to require a bidirectional formulation: i.e., a structural change which could have either of two effects, which are mirror images of each other, depending only on structural characteristics of the input P-Markers.

Langacker (1969) proposes a notational device for the conflation of such "mirror image" rules; however, of the rules he cites as evidence for the necessity of such a notational device, most are not mirror image rules in this sense, but rather rules which, like Pronominalization, appear not to be directionally constrained, that is, which effect a change in a given constituent when another constituent is in the same structure, whether the first constituent is to the right or to the left of the second. All that is shown by the existence of such rules is that it is necessary to be able to state rules non-directionally. This is something far different from having to state rules the directionality of which is determined by the structure to which the rule applies.

Furthermore, most of the rules cited by Langacker as "mirror image" rules have different constraints on their application, differ in optionality, or differ slightly in effect, depending on the direction of application.

Finally, his major examples are Gapping and CR, both of which have been shown to be non-conflatable, and Relative Clause Formation, which in a given language never operates in both directions. This rule, which moves a relativized NP to the right in relative clauses which precede the head and to the left in relative clauses which follow the head, shows that linguistic theory must have available a device for schematically representing the formulation of such rules, which may have one directionality or the other in a given language. But this is far different from allowing rules in individual grammars to be formulated as mirror image rules. Furthermore, if the far simpler notion "adjacent to" is available in linguistic theory, mirror image formulation is not even necessary for the universal schematic representation of this rule. It need only be specified that the relativized NP is moved to a position adjacent to the head.

The discussion in this chapter has led to the conclusion that Gapping and CR, the only two rules in syntax that seemed to require a mirror image formulation, could not in fact be so formulated on empirical grounds. In both cases, the mirror image formulation can be shown to be incorrect.

One of the faults of linguistic theory is that the theory allows incorrect solutions in particular cases. (The other fault, with which I am not concerned here, is that it does not allow correct solutions.)
in many cases.) A theory that allows incorrect solutions is too weak, and can be strengthened only by the formulation of constraints on particular solutions which prohibit in principle some of the solutions which are incorrect.

It has been shown that the principal fault with the formulations of Gapping and CR was that rules which are actually distinct were conflated as mirror image rules.

I will propose here a general principle, as a tentative universal constraint on the formulation of rules in particular grammars, which would prevent the formulation of such incorrect solutions in principle:

(38) There are no mirror image rules in syntax.

An equivalent formulation of this principle can be stated in terms of a negative constraint on notation:

(39) No such conflating notation as that proposed by Langacker, which would allow the formulation of a syntactic mirror image rule, may be employed in the formulation of any rule in any language.

These proposals are tentative, and like all empirical hypotheses, subject to disproof. What I suggest in proposing them is that any formulation of a syntactic mirror image rule should be viewed as an empirical challenge to these claims, and rigorously tested for validity. Since there remains at present no serious counterevidence, some version of (39) should be added to linguistic theory. This principle, unless overthrown by a clear counterexample, constitutes a significant constraint on the notion "rule of grammar".

The reduction of forward Gapping and LCR to one rule of Deletion, which deletes from left to right in conjoined structures, and the identification of Delay as a copying-and-erasure transformation, suggest another universal generalization:

(40) There is no rule which deletes under identity from right to left in conjoined structures.

Note that whereas Ross's Gapping rule was so formulated that it effected deletion from right to left if the identical constituents were on right branches, the LN rule which I have shown to be responsible for all cases of backward Gapping is formally different: it first Chomsky-joins a copy of the identical constituents (or of the rightmost one), to a higher node, and then deletes all of the originals. The formal differences between directional deletion rules like Deletion and copying-and-erasure rules like LN will be investigated in detail in Chapter 6. There it will be shown that in fact no identity deletion rule deletes from right to left, except for rules of a certain well-defined class which delete into subordinate clauses.

The weaker generalization (40), however, is sufficient to exclude the formulation of a Gapping rule which deletes from right to left.

With this principle in the theory of universal grammar, it is unnecessary to seek further for an explanation of the universal absence of the gapping pattern (b): (*SO SVO). Such a deletion is excluded in principle.
I know of no counterexample to (40); and since Ross's hypotheses to account for the non-existence of *D have been shown to be untenable, I see no way without (40) to account for it. I therefore propose that (40) be added to linguistic theory as a constraint on the formulation of deletion rules in particular grammars.

Footnotes to Chapter 1

1. It is argued in Tai (1969) that all cases of conjoined constituents can be derived transformationally by CR; this leads, however, to a very counterintuitive treatment of sentences like (16). See Lakoff and Peters (1969).

2. For a discussion of this notion see (Ross 1957b).

3. For a discussion of command see (Ross 1957b) and Langacker (1969).

4. This restriction can be reformulated in terms of subcategorization features on the deleted verb, so that verbs are considered identical for the purposes of CD if and only if they have the same subcategorization features. This comes to exactly the same thing.

5. He presents at this point no direct evidence for this universal; the only other SOV languages he discusses are Turkish and Hindi, which are in fact counterexamples which he has to explain as having SVO order in deep structure; he cites Siouxan as a "strict" SOV language, i.e., a language which, like Japanese, has only backward Gapping, but he does not discuss it.

6. In an unpublished paper which I have not seen, Joan Haling proposes a similar alternative not essentially distinct from this one.

7. Actually, the Scrambling which Ross considers directly is a very limited type; he considers only permutation of object and verb and only in SOV and SVO languages; if a larger range of possibilities were being considered, the above statement would not hold. However for the class of phenomena with which Ross is directly concerned,
the points of application of the two types of Gapping are clearly distinct.

8. It might be argued that the deletion of NP’s in Turkish and Japanese is a more general process, not restricted to coordinate structures; but this observation, while correct, leaves unexplained the fact that object-Gapping patterns in coordinate structures exhibit the same paradigm as verb-Gapping patterns.

9. The possible existence of "anywhere" rules is discussed in Lakoff (1967).

10. Jackendoff (p.21) asserts, as Ross assumes, that Gapping is not an extension of CR, but (as will be shown below) the example which he gives to demonstrate this assertion is irrelevant; he later (p.28) remarks again that Gapping differs from CR, but this time it is RCR.

11. This rule is discussed in various places in Ross (1967b), particularly § 4.2.4.; Ross there refers to Ross and Lakoff (forthcoming), where the CR rule is to be discussed in greater detail.

12. The S-Pruning convention is discussed in detail in Ross (1967b), Chapter 3; further discussion of this convention may be found in Perlmuter (1968). In Chapter 4, I will discuss the node-pruning conventions and propose a modification of the pruning convention proposed by Ross. The node-relabelling convention, under which an S-node is relabelled as an A-node if, as a result of the application of some rule, it comes to dominate only a conjunction of A’s, is also briefly alluded to in Ross (1967b), but nowhere fully discussed.

Such conventions of derived constituent structure are clearly necessary, and one of the most pressing tasks of current theory is to develop a consistent theory of restructuring conventions.

13. The precise formal statement of this convention requires a kind of adjunction unneeded elsewhere in linguistic theory - the phrase conjoined with cannot be taken to mean sister-adjointed, because a new node has to be created to dominate the new conjunction:

\[ \text{(i)} \]
\[ S \quad S \quad \text{NP} \quad \Rightarrow \quad \text{NP} \quad S \quad \text{VP} \]

For the case where there are only two conjuncts, Chomsky-adjunction would do the job. But if there are more than two, the derived structure is that shown in (ii):

\[ \text{(ii)} \]
\[ S \quad S \quad S \quad \Rightarrow \quad \text{NP} \quad S \quad \text{VP} \]

And there is no way to get such a structure by repeated application of Chomsky-adjunction; and Chomsky-adjunction as presently conceived cannot adjoin more than one constituent at a time:
is derived from (ii) as follows:

(ii)

\[
\begin{array}{cc}
\text{NP} & \text{NP} \\
\text{S} & \text{VP} \\
\text{NP} & \text{NP} \\
\text{S} & \text{VP} \\
\text{S} & \text{NP} \\
\end{array}
\]

Gapping applies to delete one of the two occurrences of John. Since they are on left branches, it is the right-hand occurrence that is deleted. Then Gapping applies again, to delete writes, which is also on a left branch, so again the right-hand occurrence is deleted.

The result is (iii):

(iii)

\[
\begin{array}{cc}
\text{NP} & \text{NP} \\
\text{S} & \text{VP} \\
\text{NP} & \text{NP} \\
\end{array}
\]

Since no reduction convention is proposed, the structure stays this way. It is clear to me that any proposal that predicts derived constituent structures like this can be rejected.
Bad as (iii) is, it is pretty compared with the result when the unlike constituents are internal to the sentence (Koutsoudas doesn't illustrate any examples of this kind, but this is what his proposal leads to):

(iv) John wrote and mailed the letter.

is derived from (v):

(v)

First John is deleted from the right conjunct, as before; then Gapping applies to delete one of the occurrences of letter; but there are on right branches, so the left-hand one is deleted. The resulting structure is (vi):

(vi)
15. There have been other proposals: Dougherty (1968) argues that all conjunction should be generated by a rule of the base. Koutsoudas (1970) (see footnote 14) and Tai (1969) argue that all conjunction should be generated by the transformational rule of CR.


17. This result raises serious difficulties for the characterization of the notions "subject" and "object" as NP's dominated directly by S and VP respectively. This characterization is proposed in Chomsky (1965) and constitutes an important primitive in any theory of semantic interpretation. If languages exist for which there is no syntactic evidence for VP nodes, as I assert to be the case, there will have to be a significant revision in the version of semantic theory which takes deep syntactic structures as input to interpretive rules of the semantic component.

18. This constraint, which requires that every constituent dominated by an S-node in surface or "shallow" structure have a subject, is proposed by Perlmutter (1968) and shown to be necessary in the grammar of English. cf. also Chapter 4 of this thesis.

21. It is possible to determine the position of phonological juncture in Biblical Hebrew from the "pointing", or indication of vocalic syllables, which appears in the texts. This pointing contains information from which the type of juncture immediately following a given syllable can be deduced. I am indebted to Jared Klein for the facts

on which this conclusion is based.

22. For the data from Korean, I am indebted to Bob Ramsey and his wife Yung Hi.

23. As with adverbs, it is possible in Turkish, Japanese and Korean to get an indirect object in the right conjunct, and none in the left, cf. this example from Korean:

(i) nayka ka papul, Chelsow ka=e pesul, Swanh= e ewussta.
   I potatoes Chelsow rice to Swanh gave
   "I gave the potatoes to Swanh, and Chelsow gave him the rice."

The commas indicate major phonological junctures, suggesting a structure like (ii):

(ii)

![Diagram](image)

I potatoes Chelsow rice

The normal position in surface order of an indirect object, however, is not immediately before the verb, but before the direct object:

(iii) Chelsow swanh= e pesul ewussta.
    Chelsow to Swanh rice gave
    "Chelsow gave Swanh the rice."
These facts are duplicated in Turkish and Japanese, suggesting that in those languages some optional rule must be operating to attach an indirect object to the verb. If my contention that RNR is restricted to final major constituents is correct, the node marked ? in (ii) must be such a major constituent. There is reason to believe that this node-label should be V, since there is evidence in other languages of such rules attaching clitics to verbs, although generally the attached constituent is a pronoun.

24. Elsewhere I will argue that this restriction need not be stated at all. For I can argue that the generic objects are incorporated into the verb, hence that the final major constituent (which is exactly what is affected by RNR) is not the verb alone, but the verb with an incorporated object, dominated by the node V; and RNR will thus be unable to apply if the incorporated objects are not identical, as well as the verb.

Letter Footnotes - Chapter One

a. (p.17) This was an error. (15) is almost certainly an instance of Right Node Raising applying to conjoined NP's, and (as I argue below) RNR is a process to be distinguished from Conjunction Reduction. Note that the segments joined by and (one large, one small) are, according to any analysis known to me, nonconstituents in the source. Conjunction Reduction does not generally result in the coordination of nonconstituents, while RNR does.

b. (p.25) Another example would have been

(i) John sings, and Peter sings in the shower.
(ii) *John sings, and Peter in the shower.

In general, Gapping must end up contrasting the two constituents remaining in the right conjunct with the corresponding constituents in the left conjunct. The definition of the notion "corresponding constituent" depends on structural parallelism.

c. (p.31) The class of rules referred to here is the class of "structure-identity" rules, or "ellipsis" rules, discussed in chapter four. This class comprises all rules which delete arbitrary constituents from a target structure under the condition that they be identical to corresponding constituents of an antecedent structure. The requirement of structural "identity" (I should have said correspondence or parallelism) is apparently crucial to the identification of corresponding constituents which is required for determining the applicability of these rules.

Such rules are not, as I say here, restricted to coordinate structures. Some apply in adjacent sentences, one at least into adverbial clauses of a certain type, and one (now generally called Comparative Ellipsis) applies in comparative clauses.

d. (p.51) I should not have called this (ex.75) a case of "conjunction reduction", since I am going to argue that it is Right Node
Raising (RNR). Let the reader bear in mind that where I distinguish "Right Conjunction Reduction" (RCR), the process involved is Right Node Raising. "Left Conjunction Reduction" (LCR), or simply "Conjunction Reduction" (CR) is argued below to involve Coordinate Deletion.

e. (p.32) I adopted Ross's terminology here, which is slightly unfortunate, since the rightward movements involved are mostly of quite a different type than the English rule which most commonly goes by the name of "Extraposition".

f. (p.38) Ross called it Conjunction Reduction, but it is clearly Right Node Raising. Ross assumed a formulation of Conjunction Reduction that involves Right and Left Node Raising as elementary operations. I argue against such an analysis below.

g. (p.44) I made a rather stupid error here. There is no need to specify the ordering Scrambling - RCR (i.e. RNR) in order to avoid forbidden patterns like *SO SVO and *SV SOV. A more reasonable assumption would be that the permutations of elements blanketed under the term "scrambling" are generally restricted to permutations of elements of the same minimal clause, or at any rate cannot insert a constituent into the midst of a sister constituent. The structural result of RNR is assumed to be something like

```
   S  S  V
   /\  /\  /
  S? \ S? \\
 NP  NP  NP
```

To get the nonoccurring pattern *SO SVO "scrambling" would have to insert V back into the middle of S?2, which there is good reason to believe is an operation not generally possible for such rules.

Maling (1972) did not make this error.

h. (p.44) This is probably wrong; the constraint in English seems to be that Ellipsis (SI) processes cannot strip direct objects (or other strictly subcategorized complements) away from verbs. This constraint is investigated more thoroughly in chapter three. Note that there are many cases of CD deleting final constituents:

(i) John put the carrots in the soup, and Mary, the potatoes.
(ii) John wanted Paul to come, and Walt, Ira.

i. (p.46) But see footnote g.

j. (p.48) Nonsense. Turkish of course does have "scrambling"; the absence of the expected SVO SO pattern in Turkish is accounted for in chapter two.

k. (p.48) The correctness of Ross's observations has been challenged by several subsequent writers. See Rosenbaum (1977) and references cited there. If there are in fact B and AB languages, one would want to check to see if those languages have a general RNR rule. If they don't, then assumption (32) may be dropped from my list of assumptions, without affecting the rest of the analysis. If there are AC languages, then the universal ordering hypothesis might be wrong (which is quite likely) or the assumption that "scrambling" works in the same simple-minded fashion in all languages (which is certainly wrong) may have been a misguided idealization.

l. (p.49) Wrong. Neither of these objections counts as an argument against Ross's theory (though they may constitute reasonable cause for doubt).

m. (p.50) I should, of course, have been somewhat more tentative here.
a. (p.54) Sections 1.3 and 1.4 present a proposal for the analysis of Conjunction Reduction as Coordinate Deletion followed by an automatic restructuring to produce conjoined constituents. This analysis is contrasted with what I took to be the "standard" analysis, a proposal due to Ross and Lakoff that Conjunction Reduction be regarded as the result of right and left Node Raising. This is something of a digression, and the issue probably does not deserve the space that I gave it. Since these sections contain the investigation of the properties of Right Node Raising, however, and since the status of Conjunction Reduction seemed to be integral to the development of my theory of coordinate deletions at the time, I have let these sections stand.

b. (p.84) Not clear at all. Here I took a rather strict empiricist position on the nature of linguistic knowledge, assuming that a category for which no evidence is visible in the forms of a language can play no part in a representation of the knowledge of the speakers of the language. If, contrarily, one assumes that there is a universal innate machinery of linguistic competence, independent of experience, as Chomsky has claimed, the conclusion in the text does not follow.

c. (p.92) It is now clear to me that I was worrying about a pseudoproblem here. In a recent paper (Hankamer (1977)) I argue that rule overlap is the most natural thing in the world, and that the compulsion frequently exhibited by linguists, such as me here, to eliminate it may be of psychological interest but has nothing to do with the nature of language.

d. (p.107) Subsequent more thorough investigation reveals that this is not, as I thought, a universal constraint against Gapping verbs in sentences with unlike indirect objects. There are Turkish speakers who accept (15) as there are English speakers who accept (12)). In both cases it is just those speakers who accept Gapping in general with more than two constituents remained in the right conjunct. The contrast with RNR remains, however, for all speakers where the indirect objects are identical; and no speakers appear to have a two-constituent remainder restriction in the case of RNR.

e. (p.120) Langacker has accepted Ross's (1967) argument that Relativization in SOV languages like Japanese, where relative clauses precede their heads, involves a movement to the right. That was probably a mistake, and there probably are no rightward-movement relativizations. There are, of course, both rightward and leftward deletion relativizations, but the statement of the required universal schema requires simply a "neighborhood" notation, not a structurally-determined mirror image notation.

f. (p.122) This would be a special case of the (presumably universal) "backward anaphora constraint", given a sufficiently general characterization of anaphora. See Hankamer (1976).

g. (p.124) It does not, as a matter of fact. For it to come to the same thing would require that (a) a verb like like have two subcategorizations, one for an ordinary object NP like flying reptiles and another for ex-sentential objects like stealing jewels; and (b) that like with one subcategorization be considered a distinct verb from like with the other subcategorization. Otherwise (i.e. if there is just one verb like, with a disjunctive subcategorization feature) the subcategorization itself cannot be counted on to tell which choice was taken.

h. (p.124) My misunderstanding of Ross's (unclear) reference: Siouan is a family of languages, not a language.

2. (p.131) The reference is to an attempt to devise and motivate a node-pruning principle which would remove some of the many counterexamples to Perlmuter’s Surface Subject Constraint. The attempt (which was in the suppressed portion of chapter 4) was not an unqualified success, and it is probably not possible to assume that English has any such general constraint as the Surface Subject Constraint.

CHAPTER TWO

The Universal Ordering Hypothesis

2.0 In this chapter, I will re-examine the universal ordering hypothesis proposed in § 1.2, and show that a more thorough investigation of Scrambling and its interaction with Gapping forces a reformulation of this hypothesis. It will be argued that the rule of Extraposition which places constituents in post-verbal position in Turkish is distinct from other rules which permute constituents in preverbal position. It will be shown that this Extraposition rule must precede the rule of Deletion in Turkish, and further evidence will be considered to show that this ordering is universal. A formal distinction will be drawn between this Extraposition rule and the extraposition rules found in SVO languages like English and Russian, and it will be argued that the Turkish Extraposition rule is formally related to a rule of Focus-Assignment in English. It will then be argued that Scrambling rules (as distinct from such Extraposition rules) must universally follow not only the rule of Extraposition but also (in SVO languages) the rule of Focus-Assignment.

Thus the universal ordering hypothesis will be altered in detail, but its universality will be maintained. It will be seen that the reformulation of the ordering hypothesis affects only one of the arguments presented to account for the distribution of Gapping patterns, namely that concerning the non-existence of any AC languages; a more general