This paper represents an investigation of one aspect of the phenomenon of recoverability: i.e. the ability of a hearer to recover the underlying representation of a sentence which may have undergone various processes of ellipsis or rearrangement in the course of its derivation. We all know that ambiguity arises as a result of certain syntactic processes; it is the thesis of this paper, however, that certain kinds of ambiguity do not arise, in fact are simply not tolerated in natural language. It will be argued that structural ambiguity which might be expected to arise from deletion is in fact always avoided, and that deletion rules involving variables are subject to a structural recoverability condition which assures the recoverability of the structure undergoing deletion; it will also be argued that chopping rules are subject to a similar condition.

1. Gapping

1.1. Sentences (1) and (2) are related by a rule of Gapping, which was first proposed in Ross (1967a):

(1) Max wrote a novel, and Alex wrote a play.
(2) Max wrote a novel, and Alex a play.

This rule deletes nonleftmost occurrences of identical verbs in conjoined sentences. As Ross showed, it may also delete more than just the verb:

(3) Max wants to try to begin to write a novel, and Alex (((to try) to begin) to write) a play.
(4) Max seemed to be trying to persuade Ted to get lost, and Walt, Ira.

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Examples like (3) show that an indefinitely long string of infinitives may be gapped along with the verb; and examples like (4), which were pointed out by Jackendoff (1971), show that the deleted material does not have to be contiguous, but may flank the nondeleted NP on both sides.

One constraint on Gapping appears to be that one constituent of the VP in which deletion occurs must be nonidentical to the corresponding constituent of the leftmost conjunct.\footnote{With certain systematic exceptions, exactly one. Thus Gapping cannot apply to delete \textit{give} in (i) to yield (ii):}

\begin{itemize}
  \item[(1)] Jack gave Sally a nickel, and Harry gave Sue a quarter.
  \item[(ii)] *Jack gave Sally a nickel, and Harry Sue a quarter.
\end{itemize}

This nonidentical constituent, which of course does not get deleted, may be some constituent other than NP:

\begin{itemize}
  \item[(5)] Max spoke fluently, and Albert haltingly.
  \item[(6)] Max is careless, and Albert irresponsible.
  \item[(7)] Max eats with chopsticks, and Albert with a fork.
\end{itemize}

The deleted segment may also contain indefinitely complex derived structures:

\begin{itemize}
  \item[(8)] Max was kissed by Heloise, and Susan by some stranger.
  \item[(9)] Max seems to have tried kissing gorillas, and Harvey, buggering polar bears.
  \item[(10)] Max is believed to have tried to seem helpless, and Harvey, irresponsible.
\end{itemize}

These facts show that, as Ross suggested, the rule of Gapping must be formulated in terms of deletion of a variable:

\begin{itemize}
  \item\textit{Gapping}
  \item NP $X$ $A$ $Z$ and NP $X$ $B$ $Z \rightarrow$ NP $X$ $A$ $Z$ and NP $B$
  \item where $A$ and $B$ are nonidentical major constituents.\footnote{A "major constituent" of a given sentence $S_0$ is a constituent either immediately dominated by $S_0$ or immediately dominated by VP, which is immediately dominated by VP.}
\end{itemize}

The variables in this rule are subject to numerous constraints, the nature of which I cannot go into here.\footnote{For a discussion of these constraints, and a detailed account of the formulation of Gapping, see Hankamer (1971), chapters 1 and 3.} For the purposes of the present argument, however, it suffices to establish that the rule does in fact delete a variable, which examples like (3)--(4) and (8)--(10) demonstrate conclusively.

\subsection*{1.1.1. Variable-Deletion Rules}

It has been suggested, as a metaconstraint on grammars, that no rule may be formulated so as to apply to a nonconstituent. (This suggestion has not, to my knowledge, appeared in print, but it has been "in the air"; for example, Bever and Langendoen (1971) cite as a "formal advantage" of their theory of relative clause formation the fact that it avoids the use of a rule deleting nonconstituents.)

While it may be possible to maintain this restriction for certain classes of rules
(it seems to hold, for example, for the class of movement rules) it is quite clear that there is a class of deletion rules which delete nonconstituents. It consists of precisely those rules which involve deletion of a variable. 4

In addition to Gapping, there are several other variable-deletion rules. One such rule operates in comparative clauses:

(11) Joe likes Sue more than [Joe likes] Martha.
    \[ \downarrow \]
    \[ \phi \]

(12) Joe was admired by Sue more than [Joe was admired] by Martha.
    \[ \downarrow \]
    \[ \phi \]

(13) Joe seems more likely to get along with Sue than [Joe seems likely to get along] with Martha.
    \[ \downarrow \]
    \[ \phi \]

Another applies in more general situations allowing ellipsis:

    \[ \downarrow \]
    \[ \phi \]

(15) Who incriminated Harry?—Max [incriminated Harry].
    \[ \downarrow \]
    \[ \phi \]

(16) What has Harry done?—[Harry has] incriminated himself.
    \[ \downarrow \]
    \[ \phi \]

The rule of Sluicing, which derives (18) from (17):

(17) Sally’s coming to the party, but I don’t know who Sally’s coming to the party with.

4 There may, in fact, be other types of deletion rules which delete nonconstituents. One such rule would be the rule of Whiz Deletion, which is supposed to relate (i) and (ii):

(i) the idiot who is behind the spectacles
(ii) the idiot behind the spectacles

The status of this rule is somewhat obscure, however. This is the rule which Bever and Langendoen (1971) eliminate by adopting an alternative solution (due originally to Sandra Annear Thompson) involving insertion of WH rather than deletion; whereupon they claim as a “formal advantage” of their analysis that it doesn’t involve deletion of a nonconstituent. This, it seems to me, is putting the cart before the horse. A general formal restriction like the one in question embodies an empirical claim which must be tested against empirical facts; for example, against the well-motivatedness of the rule of Whiz Deletion. It cannot be used to support an argument for an alternative solution.

Edwin Williams (1971) does present arguments against the rule of Whiz Deletion, however, which are strong enough to leave the existence of such a rule in doubt.
(18) Sally’s coming to the party, but I don’t know who with.

requires a formulation involving deletion of a variable, as Ross (1969) demonstrated.

1.1.2. Variable-Deletion Rules Cannot Be Replaced by Interpretive Rules. It might be suggested for each of these cases that an interpretive solution of some sort could eliminate the necessity for positing a variable-deletion rule. For example, sentence (2) might be generated as a basic sentence, with an interpretive rule assigning to the elliptical right conjunct a reading consistent with that of the left conjunct.

Ross (1969) has demonstrated conclusively, however, that such a solution is impossible for the rule of Sluicing; and essentially the same arguments are available in the case of every variable-deletion rule. For example, in any language in which some verbs idiosyncratically govern cases other than the accusative, facts such as the following (from German) will be found:

(19) a. Das Kind folgte mir, und der Hund meinen Vater.
   ‘The child followed me (dative), and the dog my (dative) father.’
   b. *Das Kind folgte mir (dat), und der Hund meinen (accusative) Vater.

(20) a. Das Kind hat mich gebissen, und der Hund meinen Vater.
   ‘The child has bitten me (acc), and the dog my (acc) father.’
   b. *Das Kind hat mich (acc) gebissen, und der Hund meinen (dat) Vater.

(21) a. Das Buch gehört mir, und die Stiefel meinen Vater.
   ‘The book belongs (to) me (dat), and the boots (to) my (dat) father.’
   b. *Das Buch gehört mir (dat), und die Stiefel meinen (acc) Vater.

(22) a. Das Buch erstaunte mich, und die Stiefel meinen Vater.
   ‘The book astonished me (acc), and the boots my (acc) father.’
   b. *Das Buch erstaunte mich (acc), und die Stiefel meinen (dat) Vater.

If the elliptical right conjunct is to be generated directly by the base rules, what mechanism is to insure that the object is in the case required by the governing verb, which is in the other conjunct? If these cases are assigned by a transformational rule, it must be made sensitive, for just these cases, to the verb in the left conjunct; if they are generated directly in the base by a context sensitive base rule, that base rule must be made sensitive, for just these cases, to the verb in the left conjunct. Alternatively, the interpretive rule itself might incorporate some filtering device allowing it to reject as ungrammatical any gapped sentence which has the wrong case on the object in the right conjunct. This could be done, of course, only at the cost of giving up any claim that interpretive rules are strictly “semantic”, in any accepted sense, since case government is a purely idiosyncratic syntactic characteristic of verbs.

Any of these alternatives requires a device in addition to the interpretive rule which, just for these gapped sentences, sees to it that the object is in the proper case. The syntactic deletion theory, on the other hand, requires no extra mechanism to account for government in gapped sentences: since the verb is there in the right
conjunct all along, whatever mechanism accounts for government in simple sentences will automatically account for government in gapped sentences as well.\(^5\)

To appreciate the force of this argument, notice that the syntactic deletion theory predicts that things could not be other than as they are. If Gapping is a rule of syntactic deletion, objects in gapped sentences must be governed exactly like objects in simple sentences. Under an interpretive theory, there is no reason to expect that the case of the object in the right conjunct would be governed by the verb in the left: it could just as well be that the right-conjunct object was always in the accusative case, or the nominative, or the genitive, or even in some special case which only isolated objects could be in. Deriving gapped sentences by a syntactic deletion rule, on the other hand, predicts that the isolated object must be in just the case that would be assigned to an object of the verb in the left conjunct by the ordinary case marking mechanism.

It predicts, for example, that in Turkish, where the verb *kork*-'fear' takes an object in the ablative case, the isolated object in the right conjunct of a gapped sentence having *kork* in the left conjunct will also be in the ablative case:

(23) Rahmi şeytanlardan korkuyor, Alev keçilerden.
    'Rahmi fears devils (abl), Alev goats (abl).'

In every language which has anything like case government, the application of a variable-deletion rule to delete a verb, leaving behind the object of that verb, leaves the object in the case governed by the verb. The syntactic deletion theory predicts this generalization; an interpretive theory requires ad hoc devices just to state the facts correctly.\(^6\)

A similar argument can be constructed on the basis of verbs which require a particular prepositional complement. For example, the German verb *fürchten* 'fear' takes not only an accusative reflexive object but also a prepositional phrase (PP) complement with *vor*, and the following facts are found:

(24) Das Kind fürchtet sich vor dem Hund, und die Frau
    \[
    \{ \begin{array}{c}
    \text{vor der Maus} \\
    \text{*mit der Maus} \\
    \text{*aus der Maus} \\
    \text{*der Maus}
    \end{array} \}
    \]
    'The child fears the dog, and the woman the mouse.'

\(^5\) Note that I am assuming an ordering relation, namely that Gapping follows Government. I assume, in fact, that this relation is universal; the justification for this assumption is the fact, cited directly below, that all languages which have government exhibit government in gapped sentences. As two of my readers pointed out, this ordering relation need not be extrinsic. If Government is cyclic, as seems likely, then Gapping, whether cyclic or post/last-cyclic, would have to follow it.

\(^6\) Note that this prediction is possible only under the assumption that Gapping is universally a deletion rule. It cannot be the case, for example, that a particular language could idiosyncratically have an interpretive rule in the place of the deletion rule which German has; otherwise no general prediction of this sort could be made. And since the government phenomenon is not restricted to Gapping, but is observed in the case of other
An interpretive theory which generates (24) as a basic sentence must be careful not to supply the right conjunct with a PP complement which would not be appropriate with the verb in the left, or with an NP complement when the verb requires a PP complement. Again the interpretive theory requires an ad hoc device, necessary only for gapped sentences, to keep things straight. And it cannot predict, as the deletion theory does, that similar facts will be found in any language which, like German, has verbs which require particular prepositional complements. English, for example, is such a language:

\[
(25) \quad \text{Bill depends on Alex, and Alex} \begin{cases} \text{on Bill} \\ \ast \text{of Bill} \\ \ast \text{to bill} \\ \ast \text{Bill} \end{cases}.
\]

\[
(26) \quad \text{Jerry disagreed with Margaret, and Sid} \begin{cases} \text{with Maxine} \\ \ast \text{from Maxine} \\ \ast \text{to Maxine} \\ \ast \text{Maxine} \end{cases}.
\]

The preposition that such a verb will require is not predictable on the basis of any semantic considerations (ask someone who does not know German to predict the preposition required by fürchten, for example); it is an idiosyncratic lexical fact about these verbs. The interpretive theory, then, while claiming to generate gapped sentences like (26) as basic, must in addition employ some device (either a context sensitive base rule or a filtering device) which, just in the case of gapped sentences, makes reference to the verb in the left conjunct.

Similarly, the statement of selectional restrictions poses a problem for an interpretive theory of ellipsis, for sentences like (27) must be eliminated:

\[
(27) \quad \ast \text{Jack admires chastity, and sincerity the bedpost.}
\]

Under a syntactic deletion theory of Gapping, the ungrammaticality of (27) follows from the ungrammaticality of (28), which any theory must account for:

\[
(28) \quad \ast \text{Sincerity admires the bedpost.}
\]

This sentence is eliminated in every current theory at the level of lexical insertion; the statement of selectional restrictions must certainly be accomplished before the application of cyclic transformations like Passive and Raising, which may remove the terms involved in the selectional restriction indefinitely far from each other:

\[
(29) \quad \ast \text{The bedpost is believed to be admired by sincerity.}
\]

\footnotesize{variable-deletion rules as well, a more general claim is implicit in the discussion:}

\footnotesize{All cases of “ellipsis” (i.e. truncated sentences) are due to variable-deletion rules.}

\footnotesize{The term “ellipsis” is not intended to refer to deletions of specific constituents at specific locations, as in cases of Equi, or of single constituents deleted under identity with specific controllers, as in Comparative Deletion or Relative Deletion.}
But in an interpretive theory of Gapping, (27) cannot be eliminated by the selectional restriction that eliminates (28), for that restriction involves the verb *admire*, which cannot take objects like *sincerity*; and there is no verb in the right conjunct of (27) in that theory, at any stage of derivation.

Thus again the interpretive theory requires an ad hoc device to characterize sentences like (27) as ungrammatical. Note, however, that this device cannot be a simple extension of the selectional restriction to hold between the “subject” in the right conjunct and the verb in the left conjunct, at the level of lexical insertion:

(30) *Chastity is believed to have been admired by the Romans, and the bedpost by sincerity.*

If the right conjunct is generated directly by the base rules, there is no way, at the level of lexical insertion, to associate the *by*-phrase in the right conjunct with the subject relation.

The only way to eliminate (30), in an interpretive theory, is somehow to employ the interpretive rule as a filter; but this can be done only at the cost of repeating the entire mechanism of selectional restrictions at the level of application of the interpretive rule, presumably at surface structure. (It must in any case follow the application of cyclic rules like Passive and Raising, which the statement of selectional restrictions must precede.) It might be supposed, for example, that the interpretive rule attempts to supply an interpretation for the right conjunct of (30) parallel to the interpretation of the left conjunct; finding the result semantically anomalous, the rule cannot assign an interpretation and the sentence is rejected.

This seems initially plausible; but note that it is precisely this sort of semantic anomaly that selectional restrictions are supposed to account for. Thus the anomaly of (29) is accounted for by a selectional restriction operating at the level of lexical insertion; and the same anomaly, when it occurs in a gapped sentence such as (30), is accounted for by the filtering function of an interpretive rule.

One might object (as one of my anonymous readers did) that any interpretive theory which could determine for a case like (27) that the missing structure is to be interpreted as “admires”, and for (30) that it is to be interpreted as “is believed to have been admired” accounts for the anomaly of those sentences, since the restrictions are purely semantic ones. The implied assumption is that selectional restrictions, being purely semantic restrictions, can be defined as well-formedness conditions on semantic structures; and since the output of an interpretive rule is presumably a semantic structure, there is no problem.

If we take the trouble to scrutinize carefully the mechanism which would be required by an interpretive rule in order to perform this filtering function, however, we see that the matter is not at all so straightforward. Remember that the reason that selectional restrictions must in general be stated on deep or semantic structures is that they must apply before such cyclic rules as Passive, Raising, and There Insertion
distort the structures in which the selectionally restricted items occur. Otherwise the
ingrammaticality of (29) cannot be made to follow from the ungrammaticality of (28),
and either a complex set of additional restrictions must be devised to account for the
grammaticality of (29), or the transformations producing (29) must in effect be
undone in the statement of the selectional restriction.

Consider now what would be required in order for an interpretive Gapping rule,
applying to surface structures such as (27) and (30), to characterize them as un-
grammatical on the same basis as their ungapped counterparts. How can the selec-
tional restrictions which are posited to account for sentences like (28) be employed to
account for the anomaly of (30), in which, it is presumed, not only was the derived
structure "is believed to have been admired" not there to be deleted, but neither was
the underlying structure, which would have violated the selectional restriction, ever
there at any point in the derivation?

Clearly, the only assumption under which the interpretive rule can be presumed
to be able to produce an output (whether it is called "semantic" or not) which can be
subjected to the same selectional restriction that accounts for the anomaly of (28) and
(29) is that it is able to reconstruct not only what structure is missing from the "gap",
but also what its underlying representation would have been before the application
of any structure distorting cyclic transformations, if it had been there to undergo any.
It is difficult to see how this could be accomplished, except by assuming that the
"interpretive" rule incorporates the inverse of the transformational component, cycle
and all.

A third general difficulty which faces any interpretive theory of ellipsis is that of
accounting for the structure of elliptical sentences. The basic fact to be accounted
for is that every elliptical sentence is a truncated version of some well-formed non-
eliptical sentence: that is to say, every elliptical sentence consists of constituents
which can occur as parts of some ordinary sentence, in the order in which they would
occur in an ordinary sentence. If the elliptical clauses in sentences such as (1)–(30)
are generated directly by the base rules, this generalization is lost.

It is perfectly possible, for example, to write a base rule which generates all the
surface structures resulting from Gapping; but such a rule would merely state what a
syntactic deletion rule explains, namely that the elliptical clauses must be fragments
of full clauses. In any interpretive theory not incorporating the equivalent of syntactic
deletion, the fact that the base generates as elliptical clauses only fragments of full
clauses is pure accident.7

I consider it established, then, that there is a class of rules which delete variables,
and that Gapping is such a rule.

7 Yet another alternative might be contemplated: suppose the interpretive rule is employed as a filter, so
that any sequence of constituents which does not "match up" with some portion of the left conjunct is considered
uninterpretable and rejected, so that in effect the left conjunct is used as a template to check the structure on the
right. This would correctly predict that only well-formed fragments of full clauses would be accepted as elliptical
clauses. There still remains, however, the problem of how the base is to generate the elliptical structures in the
1.2. This paper is concerned with a class of restrictions that must be placed on Gapping if it is formulated as a variable-deletion rule. Jackendoff (1971) pointed out that sentences like (31) are unambiguous:

(31) Jack wants Mike to wash himself, and Arnie to shave himself.

This sentence has the same meaning as (32):

(32) — and [Jack wants] Arnie to shave himself.  

This indicates, as Jackendoff observes, that the rule of Gapping must be blocked from applying in (33), since such gapping would yield (31), but then (31) should be ambiguous between the readings of (32) and (33), which it is not.

(33) — and Arnie *[wants Mike] to shave himself.

To account for the unambiguity of (31), Jackendoff proposed that a condition be placed on Gapping:

(34) When the sequence NP VP appears in the VP of the right conjunct, Gapping cannot delete NP, leaving VP behind (though it may delete VP, leaving NP behind).

This condition also correctly prevents Gapping from applying in (35c–37c) to yield (35a–37a), which have the readings of (35b–37b) and not the readings of (35c–37c).

(35) a. Max seemed to want Alice to get lost, and Susan to stay.
    b. — and *[Max seemed to want] Susan to stay.
    c. — and Susan *[seemed to want Alice] to stay.

first place. Under such a theory, the base would bear no responsibility at all for the well-formedness of the elliptical structures it generates. It could just as well generate all conceivable outputs, since the interpretive rule will be able to throw out all the bad ones. Thus the base would have a rule like this:

S → S and GARBAGE
GARBAGE → (anything you like)

There is no reason even to restrict GARBAGE to the class of Phrase-Markers; if, for example, GARBAGE were rewritten as a carrot, the interpretive rule would find it uninterpretable and reject it.

The prospect of such an excrescence in the machinery of syntax is abhorrent; fortunately, there is a straightforward and conclusive argument against it. Garbage must be generated only in the environment where the interpretive rule is available to filter it, i.e. as a nonleftmost member of an S-coordination. But ordinary sentences also appear in that environment, and the interpretive rule must be “intelligent” enough not to expel them for failing to match up with portions of the left conjunct. Thus (i) must be rejected (its right conjunct presumably arising as an expansion of GARBAGE), while (ii) must be accepted:

(i) *Jack likes Susan, and unfortunately never of the older marines mothering rapture derelict.
(ii) Jack likes Susan, and unfortunately never have I seen a young marine so in need of mothering.

But the “interpretive” filter, in order to be able to distinguish between (i) and (ii), must somehow determine that the right conjunct of (ii), taken by itself, is grammatical. This can be done, obviously, only if the rule incorporates the inverse of the entire grammar. It is clear that to incorporate into the interpretive rule the entire syntactic mechanism is equivalent to admitting that the interpretive rule by itself cannot be used as a filter.

Henceforth, I will indicate a permissible deletion by square brackets preceded by a check, as here, and a forbidden deletion by square brackets preceded by a star. I will also omit the left conjunct in repeated citations of gapped sentences.
(36) a. Bill expects Harry to find the way to the party, and Sue to find the way home.
   b. ____ and [Bill expects] Sue to find the way home.
   c. ____ and Sue *[expects Harry] to find the way home.

(37) a. Max persuaded Jim to come to the party, and Alex to bring Susan.
   b. ____ and [Max persuaded] Alex to bring Susan.
   c. ____ and Alex *[persuaded Jim] to bring Susan.

But now consider the following sentences:

(38) a. Max gave Sally a nickel, and Harvey a dime.
   b. ____ and *[Max gave] Harvey a dime.
   c. ____ and Harvey *[gave Sally] a dime.

Just as in the cases previously considered, it is clear that Gapping must be prevented from applying in (38c) to yield (38a), which has only the reading of (38b). The condition which Jackendoff proposed to account for sentences like (31)–(37) cannot account for this case, since that condition specifically refers to the presence of a VP in the VP of the right conjunct, and there is no VP in the VP of the right conjunct of (38). In order to block Gapping in (38c) we must apparently impose another condition on Gapping, something like the following:

(39) If the VP of the right conjunct contains the sequence V NP NP, Gapping cannot apply to delete the first NP along with the verb, leaving only the second NP:

NP *[V NP] NP

But now observe that the second NP can’t be gapped either:

(40) a. Max gave Sally a nickel, and Harvey gave Susan a nickel.
   b. *Max gave Sally a nickel, and Harvey Susan.

Sentence (40b) could only mean that Max gave Susan to Harvey. So the condition required is something like the following:

(41) If the VP of the right conjunct is V NP NP, neither NP can be deleted by Gapping.

There is another class of cases for which Jackendoff’s condition (34) is inadequate. Jackendoff failed to notice that if the lower VP in a [V NP VP]VP configuration itself contains an NP, Gapping cannot apply to delete VP, leaving NP behind:

(42) a. Max wanted Ted to persuade Alex to get lost, and Walt, Ira.
   b. ____ and Walt *[wanted] Ira [to persuade Alex to get lost].

Sentence (42a) does not have the reading of (42b); yet Gapping in (42b) would not be prevented by condition (34). It also does not have the reading of (42c), in which Gapping would again be allowed by condition (34):
UNACCEPTABLE AMBIGUITY

(42) c. ___ and Walt *[wanted Ted to persuade] Ira [to get lost].

The only reading available for (42a) is that of (42d):

(42) d. ___ and [Max wanted] Walt [to persuade] Ira [to get lost].

These sentences seem to show that some totally new condition is needed in order to block Gapping in (42b–c).

1.3. The No-Ambiguity Condition

1.3.1. If we proceed in this fashion to add a new condition on Gapping for every new restriction we find, we end up only with a mysterious collection of conditions. It should be noted, in particular, that each condition, by itself, accounts for nothing: it merely states some of the facts. And to represent the restrictions on Gapping in terms of a set of independent conditions on the rule is to claim that there is no connection between the fact that Gapping is blocked in sentences like (35c–37c) and the fact that it is blocked in sentences like (38c) and (40); and that these facts are unrelated to the fact that Gapping is blocked in (42b–c).

I suggest that any solution which forces the imposition of numerous ad hoc conditions on the application of a rule must have something wrong with it. Is there not some unifying generalization about these restrictions that is escaping us?

Note that all the proposed conditions have a common effect, which is to prevent Gapping from applying in such a way as to produce ambiguity. In each class of cases, there is exactly one reduction of the right conjunct which is allowed, namely the one in which the deleted segment includes the leftmost constituent of the right conjunct.

Ross (1967a) and Jackendoff (1971) assume that the rule of Gapping is not involved in the reductions indicated in (32) and the (b) sentences of (35)–(38), and similar sentences cited here, where the left extreme of the right conjunct is reduced. They assume that these reductions are due to a different rule of Conjunction Reduction, which is supposed to apply only to identical constituents on the right or left extremes of each conjunct, and which, when identical subjects are reduced, results in conjoined VPs. The derivation of sentence (42d) would then involve both Conjunction Reduction and Gapping.

This assumption has been challenged in Tai (1969) and Hankamer (1971), where it is argued that the rules of Gapping and Conjunction Reduction are one and the same. I will not attempt to justify this identification here. It is clear, however, that subjects do get deleted in coordinate structures, and there seems to be no reason to assume that a rule different from Gapping is responsible:

(43) The question is an important one, and will continue to be asked until an answer is found.

The prominent comma intonation which is possible in such a sentence indicates that it consists of conjoined Ss rather than a single S with conjoined VPs. Also, it is
impossible to question or relativize the subject of such a sentence without removing the comma, which makes it sound queer:

(44) ?Which questions are important ones, and will continue to be asked until an answer is found?
(45) ?You have raised a question which is an important one, and will continue to be asked until an answer is found.

Notice the marked improvement in (45) if relativization is done “across the board”:

(46) You have raised a question which is an important one, and which will continue to be asked until an answer is found.

These facts indicate that sentences like (43), pronounced with comma intonation as indicated, consist of two S-conjuncts with the subject of the right conjunct deleted. The remaining subject cannot be questioned or relativized because it is in a coordinate structure, and to chop it out would violate the Coordinate Structure Constraint.

There is also evidence in German that subjects are deleted in nonleftmost conjuncts by a rule like Gapping. In the following sentence, there are two verbs and only one subject:

(47) Ein kräftiger, untersetzter Mann stand auf dem Podium, und redete.
‘A powerful, squatty man stood on the podium and spoke.’

If one maintains that only Conjunction Reduction can reduce subjects, then this sentence must have conjoined VPs, and it should be impossible to move any constituent out of either of them. However, the following sentence is also good:

(48) Auf dem Podium stand ein kräftiger, untersetzter Mann, und redete.

Here the locative phrase auf dem Podium has been fronted, and Subject-Verb Inversion has taken place in the left conjunct. The subject has inverted only with the leftmost verb. There is no mystery in this, if the structure of (47) is a conjunction of S-conjuncts; then the fronting of the locative phrase and the automatic inversion of subject and verb simply take place in the left conjunct, and nothing happens in the right. But if we have assumed that the structure is that produced by Conjunction Reduction, i.e. one S with conjoined VPs, we have to explain not only how it is possible to extract a constituent out of one of these VPs, but also how the subject can then invert with the nearest verb, which would seem to require either extracting yet another constituent from the coordinate structure, or stuffing the subject into it.

Sentences like these, which clearly show that subjects can be deleted by a rule exactly like Gapping, are easy to find:

(49) ... und so bedrucken sie Papier, und halten Versammlungen ab, und reden und schwatzen.
‘... and so they print paper and hold meetings and talk and chatter.’
Hätte die Explosion in dem üblichen Betonbunker stattgefunden, so hätte der Luftdruck keinen Ausweg finden können, und hätte alle Anwesenden getötet.

‘If the explosion had occurred in the usual concrete bunker, the air pressure would have been able to find no way out, and would have killed all those present.’

The comma intonation characteristic of such subject-gapping is also typical of the sentences under discussion (sentence (32) and the (b) sentences of (35)–(38)); I will henceforth assume that it is the rule of Gapping that effects deletion in these sentences.

This assumption, it should be noted, requires a reformulation of the Gapping rule, and this reformulation raises important theoretical questions about the devices required for the formulation of rules of ellipsis. Some of these questions are discussed in Hankamer (1971); they will not be considered here.

Returning to the main point, it appears that the only gapping which is allowed to derive a given surface structure is that which places the “gap” in the structure as far to the left as possible. All other potential gappings are blocked. I therefore propose the following condition, which renders conditions (34), (41), and the condition which would be required to account for sentences (42) unnecessary:

(51) The No-Ambiguity Condition (NAC):

Any application of Gapping which would yield an output structure identical to a structure derivable by Gapping from another source, but with the “gap” at the left extremity, is disallowed.

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9 A similar idea is proposed in Tai (1969) in a slightly different context. Tai proposes a Conjunction Reduction rule which operates by deletion according to Ross’s (1967a) directionality constraint (to the right for elements on left branches, to the left for elements on right branches), followed by a restructuring:

(i) Jack ate and Jack drank.
(ii) Jack ate and $\varnothing$ drank.
(iii) Jack ate and drank.

But Tai says he needs some condition to prevent a derivation like the following:

(iv) Old men plant flowers and old women like sunshine.
(v) *Old men plant flowers and women like sunshine.

Sentence (v) is ungrammatical, at least on the reading of (iv). Tai proposes an “Anti-Ambiguity Condition” to the effect that if the deletion results in an output derivable by another derivation, the derivation involving Conjunction Reduction is blocked. The idea is essentially the same as that of the NAC proposed here for Gapping.

I think, however, that it cannot be defended in this case. Rules such as Gapping and Conjunction Reduction, which are defined specifically on conjoined structures, can in general only apply to structures which are directly conjoined. Gapping, for example, cannot delete the second occurrence of *ate in (vi):

(vi) Jack claims that Max ate the potatoes, and George claims that Harry ate the fruitcake.
(vii) *Jack claims that Max ate the potatoes, and George claims that Harry the fruitcake.

Likewise, the version of Gapping which occurs in NPs applies only if the NPs are directly conjoined:

(viii) I like Albert’s picture of Bob and Max’s of Kathy.
(ix) *I like Albert’s picture of Bob, and Susan likes Max’s of Kathy.
In other words, if there is a left-peripheral gapping that yields a given surface structure, there can be no interpretation of that structure as resulting from an internal gapping.

Note that it is identity of structure that is specified as crucial in this condition, and thus it is structural ambiguity that is disallowed. Gapping is blocked in (52c), even though there is no grammatical sentence with a left-peripheral gap having the same sequence of morphemes:

(52) a. *Jack asked Mike to wash himself, and Sue to shave himself.
   b. *____ and *[Jack asked] Sue to shave himself.
   c. ____ and Sue *[asked Mike] to shave himself.

This condition thus blocks Gapping in cases where there could be structural ambiguity as to the location of the "gap". Other potentially disambiguating factors, such as the reflexive pronoun in (52) or the selectional anomaly in (53), are irrelevant:

(53) a. *Max wanted the matrix inverted, and Harvey diagonalized.
   b. *____ and *[Max wanted] Harvey diagonalized.
   c. ____ and Harvey *[wanted the matrix] diagonalized.

(54) a. *The Senate wanted the bill passed and the House tabled.
   b. *____ and *[the Senate wanted] the House tabled.
   c. ____ and the House *[wanted the bill] tabled.

In short, the condition insures that if the output of Gapping is structurally interpretable with a left-peripheral gap, it will be so interpreted, even if this interpretation forces a reading on which the sentence is ungrammatical because of a selectional or agreement violation, as in (52) and (53). In (52) and (53), the only permissible interpretation of the gap is at the left extremity, because that interpretation is structurally possible. Since, however, the only source for each of those sentences, with the gap so interpreted, is ungrammatical, (52a) and (53a) are doomed to be ungrammatical.

The sentence corresponding to (52a) is grammatical in Swedish:

(55) Jack bad Mike att vaska sig, och Sue att raka sig.
   'Jack asked Mike to wash himself, and Sue to shave himself.'

The sentence is good, but only on the reading where *sig in both conjuncts is coreferent with *Jack; i.e. it derives from (56) by the deletion indicated:

(56) Jack, bad Mike att vaska sig, och *[Jack, bad] Sue att raka sig.

Clearly no Anti-Ambiguity condition can be appealed to in these cases. But if constituents such as NPs must be directly conjoined in order for Gapping and Conjunction Reduction (which Tai assumes to be the same rule) to apply, the Anti-Ambiguity condition is superfluous.

Finally, if the Anti-Ambiguity condition is what blocks (v), what is to prevent (x)?

(x) *Old plant flowers and young women like sunshine.

Since *women in (x) is on a right branch, backward Gapping should apply to it just as forward Gapping should apply in (v) according to Tai’s analysis. The Anti-Ambiguity condition can block (v) but not (x). Both, however, are eliminated by the otherwise necessary condition that coordinate reduction rules apply only to directly conjoined constituents.
Reflexivization in Swedish differs from reflexivization in English in that reflexivization into an embedded clause can be controlled by the subject of a higher clause, as here. The constraint on Gapping allows only the interpretation with a left-peripheral gap if it is structurally possible, regardless of whether there exists an actual grammatical sentence with that interpretation; in Swedish there happens to be one, in English there does not.

The fact that it is structural ambiguity which is prohibited, and that semantic or morphological disambiguation cannot force the suppressed structural interpretation, will be of significance later in distinguishing the kind of ambiguity avoidance observed here from other phenomena of a quite different nature. It is the thesis of this article that the kind of structural ambiguity considered here, where it would result from the operation of a deletion rule to neutralize the distinction between two different sources, is not tolerated in natural language.

1.3.2. The NAC captures the generalization relating the apparently independent conditions discussed in the preceding section. Moreover, it makes predictions that go beyond the facts accounted for by those separate conditions.

It predicts not only that Gapping will be blocked in the situations specified by those conditions, but also that any application of Gapping which results in the configuration NP NP, or, more generally, NP X on the right will be blocked when there is a like configuration in the VP of the left conjunct. Thus the following facts are accounted for:

(57) a. Jack calls Joe Mike and Sam Harry.
    b. _____ and ∨[Jack calls] Sam Harry.
    c. _____ and Sam *[calls Joe] Harry.

(58) a. Jack told Harry that Nixon was a fairy, and Alex that Agnew had warts.
    b. _____ and ∨[Jack told] Alex that Agnew had warts.
    c. _____ and Alex *[told Harry] that Agnew had warts.

(59) a. Max wanted to put the eggplant on the table, and Harvey in the sink.
    b. _____ and ∨[Max wanted to put] Harvey in the sink.
    c. _____ and Harvey *[wanted to put the eggplant] in the sink.

(60) a. The press characterized Agnew as colorless, and Nixon as low-keyed.
    b. _____ and ∨[the press characterized] Nixon as low-keyed.
    c. _____ and Nixon *[characterized Agnew] as low-keyed.

(61) a. The court declared Edward insane, and his mother morally bankrupt.
    b. _____ and ∨[the court declared] his mother morally bankrupt.
    c. _____ and his mother *[declared Edward] morally bankrupt.

The (a) sentences are unambiguous, and have the readings of the (b) sentences. They do not have the readings of the (c) sentences, as predicted by the NAC. Note
that each of these sentences, in the absence of the NAC, would require an additional condition on Gapping.

Recall that in considering sentences with both dative and accusative objects, it was found that neither NP could be deleted by Gapping along with the verb, and a condition (41) was formulated to state that fact. What happens if there is a fourth constituent in the VP? Suppose we try to gap in sentences like (62) and (63):

(62) Max gave Sally a nickel yesterday, and Max gave Susan a nickel last week.
(63) Max gave Sally a nickel yesterday, and Max gave Sally a dime last week.

Condition (41) would claim that Gapping is impossible in both of these sentences, although it is perhaps unfair to ask (41) to make a prediction, since it does not pretend to have any explanatory value. In any case it is wrong:

(64) *Max gave Sally a nickel yesterday, and Susan last week.
(65) Max gave Sally a nickel yesterday, and a dime last week.

Gapping is possible in (63), but not in (62). To see why this is so, note that the addition of a fourth constituent indirectly makes a peripheral gap possible which includes the subject, the verb, and the indirect object, but does not include the direct object:

(66) Max gave Sally a nickel yesterday, and *[Max gave] Susan [a nickel] last week.
(67) — and *[Max gave Sally] a dime last week.

The NAC predicts that in this situation the gapping indicated in (67) will be possible, since it is left-peripheral, and that the internal gapping indicated in (66) will be prohibited, because its output would have the same structure as the output of the peripheral gapping.

In the absence of the NAC, condition (41) would have to be modified in some ad hoc fashion to accommodate this case. I think it is clear by now that the attempt to account for the avoidance of structural ambiguity manifested by the rule of Gapping in terms of conditions like (41) must be abandoned. It is possible, of course, that a condition or set of conditions could be formulated which would succeed in characterizing all of the structures in which the application of Gapping might produce structural ambiguity, and thus list or characterize the environments in which Gapping must be blocked; the NAC, however, makes a claim that it is no accident that it is just those applications of Gapping that would produce structural ambiguity if allowed which are prevented from occurring. To the extent that this claim is substantiated, the NAC must be preferred over such a condition or set of conditions, which explain nothing and themselves cry for an explanation.

1.4. Apparent Exceptions to the NAC

1.4.1. Jackendoff (1971) cites the following sentence:

(68) Massachusetts elected McCormack Congressman, and Pennsylvania, Schweiker.
This is a counterexample to the NAC if the presumed structure of *elect McCormack Congressman* is V NP NP. However, there is little reason to suppose that *Congressman* is syntactically an NP in such a sentence. Note that these titular NPs are very limited in internal structure. They never have determiners, for example:

\[(69) \, *\text{Massachusetts elected McCormack} \{\text{the governor} \, a \text{congressman}\}.\]

They also can never be modified by a restrictive relative clause, nor by a nonrestrictive clause with *who*:

\[(70) \, *\text{France elected DeGaulle} \{\text{*the} \, \text{president that ruled the country like a dictator who was the most powerful man in Europe for a while}\}.\]

\[(71) \, *\text{France elected DeGaulle president, whose ability to stay in office cannot be gainsaid.}\]

They can be modified by nonrestrictive relative clauses with *which*:

\[(72) \, \text{France elected DeGaulle president, which is no sinecure.}\]

But this does not indicate that *president* in (72) is an NP, for nonrestrictive relatives with *which* can modify stative adjectives and verbs:

\[(73) \, \text{Harvey is arrogant, which is not a particularly endearing trait for an interpretivist to have.}\]

\[(74) \, \text{Harvey smells bad, which is a condition not uncommon among Texans.}\]

There is no transformational evidence that I know of that titular NPs are NPs. They don't passivize:

\[(75) \, *\text{President was elected DeGaulle by France.}\]

They don't topicalize, cleft, relativize, or pronominalize:

\[(76) \, *\text{President, we elected Nixon.}\]

\[(77) \, *\text{President is what we elected Nixon.}\]

\[(78) \, *\text{What we elected Nixon was president.}\]

\[(79) \, *\text{President, which we elected Nixon, is no sinecure.}\]

\[(80) \, *\text{Max wants to be president, which we elected Nixon.}\]

\[(81) \, *\text{We elected Tom president, and the chess club elected him} \{\text{it one theirs}\} \text{too.}\]

The transformational evidence, then, indicates that titular NPs in general do not behave syntactically as NPs.
There is further evidence of another kind that titular NPs are not NPs. Ross (1967b) notes that there is a general constraint on the rule of Complex NP Shift which prevents a complex NP from being shifted over another NP, as in (82b):

(82) a. I loaned a man who was watching the race my binoculars.
   b. *I loaned my binoculars a man who was watching the race.

But he also notes that titular NPs do not count as NPs, as far as this constraint is concerned:

(83) We elected president my father, who had just turned sixty.

In the face of this evidence, I don’t see how the claim can be maintained that Congressman in (68) is an NP. I don’t know what it is, but its exceptionality with respect to the NAC is in line with its general lack of NP-like behavior.

Note, however, that no matter what the status of titular NPs is, the NAC correctly predicts that the genuine NP in such constructions can’t be gapped:

(84) *The chess club elected Tony treasurer, and the outing club president.

This is so because the output structure of this gapping is the same as that of a sentence such as (85), with a left-peripheral gap:

(85) The chess club elected Tony treasurer, and [the chess club elected] Alex president.

Note that in the absence of the NAC, yet another condition would have to be placed on Gapping to block sentences like (84).

1.4.2. Another class of exceptions to the NAC consists of sentences like (86):

(86) ??Max writes plays in the bedroom, and Harvey in the basement.

There seems in general to be a difference between cases like (59), where the verb is strictly subcategorized for a PP, and cases like (86), where the PP is optional. In the latter case, Gapping can occur with much greater felicity. But it seems that the grammaticality (or near grammaticality) of (86) depends also on the fact that plays in writes plays is generic, for (87) is somewhat worse:

(87) ??Max is writing a play in the bedroom, and Harvey in the basement.

And when the direct object is definite, it is still worse:

(88) ??Max is memorizing the play in the bedroom, and Harvey in the basement.

Still, (88) is not as impossible as (59) on the internally gapped reading. I can offer no well-motiTed explanation for this difference; in the absence of some general explanation, it will be necessary to modify the NAC in some way to allow the derivation of
sentences like (86). This modification will apparently have to make use of a distinction between constituents required by the verb and constituents which are optional adjuncts to the verb phrase.

1.4.3. A third class of exceptions to the NAC consists of sentences like (89), in which a pronoun contiguous to the verb does not seem to count as an NP as far as the NAC is concerned:

(89) Paul Schachter 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)

This type of exception to the NAC would disappear if there were a cliticization rule in English, whereby pronouns in immediate postverbal position become cliticized to the verb. There is a small amount of syntactic evidence for such a rule. It would explain why Dative Movement cannot apply if the direct object is a pronoun: 10

(90) a. They gave it to us.
   b. *They gave us it.

Because if it in (90a) is cliticized, there is no NP for the dative phrase to move over, and the structural description of Dative Movement is not met. It would also explain why pronouns can’t be Node-Raised: 11

(91) *Jack cooked, and I ate, them.

In any case, any account of Gapping has to distinguish between (89) and (92):

(92) Paul Schachter has informed Haj Ross 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.

For the only interpretation for this sentence is that Haj Ross, Ives Goddard, and Guy Carden are all recipients of information from Paul Schachter; i.e. the gap is interpreted as left-peripheral, as required by the NAC.

None of these exceptions to the NAC seem to warrant scrapping it, since we would then be back in the position of having to state numerous unrelated conditions on the Gapping rule; and whereas each of these exceptions seems to have a chance of being eliminated by independent considerations, the multi-condition approach is in principle incapable of capturing any generalization whatever.

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10 This was pointed out to me by David Perlmutter.
11 This fact was pointed out by Barbara England.
2. Transderivational Constraints and Recoverability

I consider it established, then, that the NAC is empirically supported, and must be included in an adequate account of natural language. This conclusion raises certain interesting theoretical questions.\(^\text{12}\)

2.1. One important consequence of the establishment of the NAC arises from the fact that it can be formulated only in a weakened version of linguistic theory, namely one which allows the formulation of conditions having transderivational reference. We have seen that the empirically correct formulation of the condition necessarily refers to information present in two different derivations. A certain strong version of linguistic theory forbids the formulation of such a condition; the empirical verification of the necessity for such a formulation shows that the theory which does not allow it is too strong.

There has been considerable expression of dismay at the suggestion that linguistic theory should allow the formulation of constraints which require transderivational power; therefore the theoretical implications of the establishment of such a constraint merit some discussion.

The most common a priori objection to transderivational constraints is that in the most general case such a constraint would appear to require a search through the infinite class of derivations to decide whether it applied or not. If such a search, which in the most general case would apparently be infinite, were actually required, it would seem that the notion of finiteness of grammatical devices had been discarded.

However, in the case of the NAC proposed here, no such endless search is called for. The constraint refers necessarily to other derivations, but only to other derivations involving the application of the same deletion rule to produce the same output. This class of derivations is in every case finite. This is so because every output sentence will consist of a left conjunct of finite length and a right conjunct (or conjuncts) containing a gap. Since the gap must have arisen by deletion of a segment under identity with a corresponding segment of the left conjunct, the question is how many different seg-

\(^\text{12}\) The No-Ambiguity Condition, it should be noted, represents an explicit formulation of what has been called a “perceptual strategy”. There has been some speculation about perceptual strategies and the role such devices might play in determining interpretations of ambiguous sentences and levels of acceptability; but there has been very little in the way of substantive investigation of their actual formulation and their interaction with other syntactic rules. (But cf. Bever and Langendoen (1971) and references cited there.)

One reason for the general neglect of this phenomenon is no doubt the widespread assumption that perceptual strategies belong in some as yet unexplored “performance model” and have nothing to do with “competence”. Yet I know of no empirical test which could tell us whether a given sentence, say sentence (52a), is actually ungrammatical or only “unacceptable for performance reasons”.

Until such a test is suggested, it is vacuous to attribute some cases of ungrammaticality to violations of rules “in the grammar” and others to “performance constraints”. Consider the clearly structural nature of the judgments represented by the NAC, as demonstrated in sentence (52a): how is this judgment to be distinguished from that associated with any other structural violation, such as failure to undergo an obligator transformation?

Note that I am not denying that the NAC is a performance constraint. There is nothing to deny, because to assert that it is a performance constraint makes no empirical claim about it whatever.
ments of the left conjunct can conceivably have controlled the deletion. In a sentence of finite length, it is clear that there will only be a finite number of possibilities. Each member of the class of derivations which is referred to by the NAC corresponds to a possible controller of the deletion resulting in the gap, and hence this class of derivations is likewise finite.

This suggests, however, that there may be a general way to restrict the class of transderivational constraints so as to avoid this objection. It seems reasonable to propose, as a general restriction on transderivational constraints, that the statement of such a constraint must specify, implicitly or explicitly, a finite well-defined class of derivations to which it refers in any given case.

Once this objection has been set aside, it should be clear that there can be no a priori grounds for rejecting a transderivational constraint. It is a logical possibility, within the general framework of generative grammar, that constraints on derivations might sometimes be stated in terms of information present in other derivations. Whether or not such constraints are ever necessary is an empirical question.

A theory which explicitly claims that there are no transderivational constraints is to be sure stronger, in a very general sense, than one which does not: it claims that derivations are mutually independent. And since this theory makes an empirical claim, it can be tested. The empirically demonstrated existence of the NAC shows that derivations are sometimes not independent. Thus the theory which claims that they always are must be rejected as too strong.

Sometimes it is useful to talk in terms of “stronger” and “weaker” theories, as I have done here; however, except in the most uninteresting cases, to do so almost invariably involves an oversimplification, and this is the case here. If the NAC on Gapping is a universal constraint, as I assume, and if it is a reflection of a general restriction on deletions, as I will argue subsequently, then the admission of the transderivational constraint which makes the formulation of that condition possible pays for itself by effecting a reduction in the power of transformational rules. Note that the proposed condition has the effect of reducing the number of possible derivations; that is, it reduces the generative capacity of transformational grammars. Since we know that transformational rules have far too much power, such a well-motivated reduction should be welcome. The theory incorporating both transformational rules and the transderivational constraint, in short, claims that a certain class of derivations (which is not even characterizable in the other theory) will be ill-formed, and thus in a sense is more restrictive than the theory which does not allow transderivational constraints.

It is somewhat misleading, in fact, to claim that a theory allowing transformations (of the unrestricted sort we now have), and not allowing some other device, is more restrictive than one which allows both devices. Given the power of transformations to derive virtually any conceivable class of sentences (including, unfortunately, a lot of “sentences” which could never appear in any natural language), it is not at
all clear how the addition of a new device could make the theory "less restrictive". What a theory allowing transformations and barring transderivational conditions claims, in fact, is that transformations are not restricted in certain ways. It is not clear whether such a claim can be evaluated as more or less "restrictive" than the negation of it.

It should be noted that the evidence presented in support of the NAC does not indicate that devices of transderivational power are required for the formulation of rules in the grammars of particular languages. Although I have largely restricted myself to examples from English in demonstrating the operation of the NAC, exactly the same condition restricts Gapping in other languages, and there is every reason to believe that it is universal. There may well be such language particular transderivational rules, or there may not be; the evidence presented in this paper has no bearing on the question.

This does not mean that the device required for the formulation of the NAC is of no theoretical interest. It is just as important to place empirically motivated constraints on the formulation of universal conditions as on the formulation of language particular ones.

A final point of theoretical interest is that the NAC is a post hoc condition: it cannot be stated as a condition on input structures to the rule of Gapping, but rather it must be stated in terms of features of output structures of that rule. It was in part the attempt to characterize the class of input structures in which Gapping is blocked that led to the bewildering mess of conditions which had to be rejected in favor of the NAC. It thus deviates in another way from what is thought to be the normal case of conditions on transformations, which are generally presumed to be stateable as conditions on input structures. This is an a priori assumption, and I know of no argument which has ever been given why it should be so. Still, the proposal of a condition defined on output structures raises the question to an empirical level, and if the NAC is accepted, a theory which claims that all conditions on transformations are stateable in terms of input structures is too strong and must be modified in some way to allow at least some kinds of conditions on transformations to be defined on output structures.

2.2. Recoverability

The effect of the NAC is to prevent ambiguous derivations by Gapping; that is, to assure recoverability of the input to the Gapping rule. This suggests that there may be a deeper generalization underlying the avoidance of ambiguity observed here; it may be that the NAC, which so far has appeared to be an ad hoc appendix to the Gapping rule, is actually the reflex in this particular case of a general condition on recoverability of deletion.

Chomsky (1965, 144–145) proposed the following condition on recoverability of deletions:
We are proposing the following convention to guarantee recoverability of a 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, 1964, §2.2), or an element that is otherwise represented in the sentence in a fixed position.

This condition allows two kinds of recoverable deletion: absolute deletion, in which case the deletion rule itself specifies, in various ways, the formatives to be deleted; and controlled deletion, in which case the rule deletes a constituent “that is otherwise represented in the sentence in a fixed position”.

If this is taken to be an empirical claim about possible deletion rules in natural language, the arguments of Section 1.1 of this paper, which demonstrates the existence of variable-deletion rules, show that it must be rejected. For it has been shown that there is a class of rules which delete variables, and hence delete elements that are neither specified in the structure index of the rule nor represented elsewhere in the sentence in a “fixed position”. The existence of such rules shows that Chomsky’s formulation of the recoverability condition, taken as a restriction on the class of possible deletion rules, is empirically inadequate; for if it were correct, there could be no such rules.

The facts discussed in Section 1 show, however, that recoverability is nevertheless assured for the rule of Gapping, though not by virtue of any restriction on its formulation. If this is found to be the case in general for variable-deletion rules, the notion of recoverability must be preserved in some more adequate formulation.

Consider what it means, in general, for a deletion to be recoverable: a deletion is recoverable if, given only the statement of the rule effecting the deletion and the output of a particular application of the rule, the input to the rule can be uniquely determined. In order to meet this condition, a deletion rule would have to be so formulated or so constrained that it could never map two distinct inputs into the same output. Any rule which so neutralized the distinction between two different underlying structures would introduce ambiguity, and a deletion which introduces ambiguity is not recoverable.

There are two questions: whether it is true that all deletions are recoverable, and if so, or when they are, how is recoverability assured? Chomsky’s condition claims that all deletions are recoverable because a set of restrictions on the formulation of deletion rules prevents the formulation of a rule which could have any chance of introducing ambiguity. This attempt to account for recoverability by stating a set of restrictions on the formulation of deletion rules must be abandoned. It is inherent in the nature of variable-deletion rules that the risk of neutralizing distinct inputs must be incurred. There are also numerous rules which must be formulated to delete a constituent under identity with another constituent over a variable. These rules too clearly have the potential, given their formulation, to introduce ambiguity.
If deletions are still recoverable in spite of the fact that the class of deletion rules cannot be so restricted, it must be because there are independent constraints which block these rules when there is a possibility of nonrecoverable application. The remainder of this article will be devoted to the investigation of some aspects of the phenomenon of recoverability: I will attempt to characterize a class of cases in which recoverability is universally assured, and to determine the nature of the constraints which operate to assure recoverability.

This investigation cannot hope to be exhaustive; in spite of a general explosion in the study of syntax, there has been virtually no empirical investigation of the phenomenon of recoverability, nor has anything much been said about it since 1965. The present investigation, I suspect, merely scratches the surface of a topic the complexities of which have escaped notice for so long only because nobody was looking. I will restrict myself essentially to the consideration of one hypothesis, which is based on a generalization from the NAC developed in Section 1:

(93) The Structural Recoverability Hypothesis
Deletion rules involving variables are universally subject to a transderivational condition which prevents them from applying in such a way as to introduce structural ambiguity.

3. Deletion over Variables

3.1. In the last section I suggested that there was a general condition on structural recoverability of deletion and observed that that condition, if correct, would predict that rules which delete under identity over variables do not produce structural ambiguity.

One such rule is the rule of Comparative Deletion, which derives (95) from (94):

(94) Jack has more money than Harvey has [money].
(95) Jack has more money than Harvey has.

This rule obligatorily deletes a constituent from a comparative clause under identity with a constituent marked by the comparative morpheme more or -er in the matrix clause.

If we consider a comparative clause containing a V NP NP sequence, we find that neither NP can be deleted by this rule:

(96) Jack persuaded more millionaires to go on diets than Harry sold [millionaires] Cadillacs.
(97) *Jack persuaded more millionaires to go on diets than Harry sold Cadillacs.
(98) Jack stole more Cadillacs than Harry sold millionaires [Cadillacs].
(99) *Jack stole more Cadillacs than Harry sold millionaires.

If (97) means anything, it is that the number of millionaires that Jack persuaded to go on diets was greater than the number of Cadillacs that Harry sold. It thus cannot derive from (96).
UNACCEPTABLE AMBIGUITY

Note that if Dative Movement has not applied in the underlying sentence, the result of Comparative Deletion is perfectly good:

(100) Jack persuaded more millionaires to go on diets than Harry sold Cadillacs to.

(101) Jack stole more Cadillacs than Harry sold to millionaires.

In these cases, of course, the input to the rule is recoverable, and deletion does not produce an ambiguous output structure. It thus appears that Comparative Deletion is subject to some condition which has the effect of preventing it from producing structural ambiguity as to the location of the deletion. Let us tentatively hypothesize, then, that this rule is subject to a Structural Recoverability Condition (SRC): if a deletion rule operating over a variable would introduce structural ambiguity by yielding the same output upon application to two different sources, both applications of the rule are blocked.

Other examples where application of Comparative Deletion could potentially result in structural ambiguity are difficult to construct; in general a rule which deletes over a variable can produce an unrecoverable deletion site only when it deletes a constituent of type X from the sequence XX, which is rare.

To be sure, ungrammatical sentences like (97) and (99) could be blocked by an ad hoc condition on Comparative Deletion referring specifically to V NP NP sequences, but such a condition would merely describe the facts. Only a general condition such as the proposed SRC can account for why Comparative Deletion is blocked in just these cases.

Another rule which deletes over a variable is the rule which operates (obligatorily) to derive (103) from (102):

(102) These socks are ready for you to put [these socks] on.

(103) These socks are ready for you to put on.

For lack of a better name, I will call this rule Ready Socks. It also obeys the SRC (I use \( \phi \) to indicate the location of a deletion site):

(104) *These socks are ready for you to take Harry \( \phi \).

(105) *Harry is ready for you to take \( \phi \) these socks.

Again, an ad hoc condition on the rule could block the ungrammatical sentences (ungrammatical, that is, on the intended reading); but only a general condition such as the proposed SRC can account for why the rule is blocked in these cases and not in others.

To say that the ungrammatical sentences (97), (99), (104), and (105) are blocked by independent conditions placed on the rules involved is to claim that it is an accident that the conditions on the two rules are identical, for there is nothing in such a theory which predicts that they must be the same; and that it is an accident that these
rules have such conditions at all, for there is nothing in such a theory which predicts that another rule could not exist which effected deletion over a variable but lacked such a condition. A theory containing the SRC is, in short, a stronger theory; and since, on the basis of the evidence considered so far, it appears to be correct, it must be accepted.

There remains the possibility, of course, that a general condition other than the SRC proposed here blocks deletion in these cases. There might be, for example, some kind of global condition prohibiting deletion of an NP which has undergone Dative Movement: this would account for (97) and (105), explain why the two rules involved both have the same condition, and predict that all deletion rules must have the condition. But to account for (99) and (104) it would be necessary also to say that an NP over which another NP has been passed by Dative Movement cannot be deleted. This kiss-of-death condition bears no necessary relation to the other condition, and thus nothing in such a theory explains why they go together.

A theory containing the proposed SRC, on the other hand, explains not only why the deletion rules concerned have both prohibitions, but also why the prohibitions exist at all. It relates the prohibition against deletion of one of two adjacent NPs by a rule operating over a variable to the same prohibition in the case of a rule which deletes a variable, claiming that they are both aspects of a more general restriction on recoverability.

3.2. Pronominalization Rules

In the last subsection I showed that at least two rules which delete over variables obey a condition on structural recoverability of deletion. There is a class of deletion rules, however, which generally can produce ambiguity of a different sort. This class includes Identity of Sense Pronominalization, VP Deletion, and Sluicing:

(106) When Charley learned that Jack had a girlfriend who owned a Greek island, he decided he had to have one too.

(107) I'd like to teach my monkey to tat, but I don't know how.

(108) Max doesn't expect Alex to like kissing gorillas, because Harvey doesn't.

Each of these sentences is ambiguous, and the ambiguity is introduced by the deletion. Note, however, that the ambiguity produced by these rules is different from that which is blocked in the cases of Gapping and the deletion rules discussed in the last subsection: in those cases the output of the deletion rule was structurally ambiguous as to the location of the deletion; in these cases the "hole" where the deletion has occurred is recoverable. The ambiguity which arises as a result of these deletions is an ambiguity as to the identity of the deleted constituent, or, equivalently, as to the controller of the deletion; the structure remaining after deletion is nevertheless unambiguous.
Thus each of (106)–(108) has two possible antecedents, labelled $A_1$ and $A_2$ in the examples below; but in each case there is exactly one possible deletion site, indicated by $\phi$:

(106') When Charley learned that Jack had [a girlfriend who owned [a Greek island]$]_{A_1}A_2$, he decided he had to have one $\phi$ too.

(107') I'd like [to teach my monkey [to tat]$]_{A_1}A_2$ but I don't know how $\phi$.

(108') Max doesn't [expect Alex to [like kissing gorillas]$]_{A_1}A_2$ because Harvey doesn't $\phi$.

There can also be ambiguity between two possible controllers where neither is contained within the other:

(109) Max doesn't [expect trouble]$]_{A_1}$, because he doesn't think anybody [objects to his bringing that gorilla]$]_{A_2}$, but I do $\phi$.

Compare this to the situations where deletion is blocked by the SRC:

(97') *Jack persuaded more millionaires$_A$ to go on diets than

\[
\begin{aligned}
&\{\text{Harry sold cadillacs }\phi\}, \\
&\{\text{Harry sold }\phi \text{ cadillacs}\}.
\end{aligned}
\]

(99') *Jack stole more cadillacs$_A$ than \[
\begin{aligned}
&\{\text{Harry sold millionaires }\phi\}, \\
&\{\text{Harry sold }\phi \text{ millionaires}\}.
\end{aligned}
\]

(104') *These socks$_A$ are ready \[
\begin{aligned}
&\{\text{for you to take }\text{Harry }\phi\}, \\
&\{\text{for you to take }\phi \text{ Harry}\}.
\end{aligned}
\]

(105') *Harry$_A$ is ready \[
\begin{aligned}
&\{\text{for you to take these socks }\phi\}, \\
&\{\text{for you to take }\phi \text{ these socks}\}.
\end{aligned}
\]

In these cases there is potential ambiguity as to the location of the deletion site. (Remember that here, just as in the case of Gapping, it is structural ambiguity that is disallowed; the fact that one of the potential deletions in each case can be eliminated on semantic grounds is irrelevant.)

We have, then, a rather surprising fact about recoverability: the controller of a deletion (and thus the identity of the deleted constituent) does not have to be recoverable, but the deletion site does. Thus we must interpret the SRC as specifying only that the structure resulting from a deletion must be structurally unambiguous as to the position from which a constituent has been deleted, not necessarily as to its identity.

The rules just considered, which produce the ambiguities in (106)–(109), are in fact incapable of producing an ambiguity of the forbidden kind. This is so because each of these rules leaves a "trace" which unambiguously marks the deletion site: Identity of Sense Pronominalization leaves a "pronoun" or stranded determiner; Sluicing leaves the fronted WH of the sluiced sentence; and VP Deletion leaves an "auxiliary". I suggest that in general rules which delete over variables are subject
to a recoverability condition on the location of the deletion, so that these rules are exceptional only in that they are so formulated as to meet the condition vacuously.\footnote{There is one serious problem with the proposed explanation of the exceptionality of pronominalization rules. There are languages in which pronominalization does not in general leave a trace of the pronominalized constituent, as in Japanese:}

3.3. Relative Deletion

In some languages, the rule of Relative Clause Formation is a deletion rule rather than a chopping rule as it is in English. This is typically the case in SOV languages such as Japanese:

\[(110)\]
\[\begin{array}{ll}
(110) & a. \ [\text{Taroow} \ wa \ \text{kodomo} \ o \ \text{but-ta}]_S \ \text{kodomo} \\
 & \text{Taroow (SP) boy (OP) hit boy} \\
 & b. \ \text{Taroow ga } \phi \ \text{but-ta kodomo} \\
 & \text{‘The boy who Taroow hit’}
\end{array}\]

The structure of an NP before the application of Relative Deletion is represented in (110a); (110b) is the result of Relative Deletion, yielding a relative clause missing one NP which is interpreted as identical to the head.

\footnote{In these languages, it is generally said that pronominalization is accomplished simply by deleting the pronominalized NP. Yet pronominalization in these languages is no more subject to a recoverability condition than it is in English, witness the following ambiguous relative clause (the Japanese version of Relative Clause Formation is discussed in Section 3.3):}

\[(111)\]
\[\begin{array}{ll}
(111) & a. \ \text{Taroow} \ wa \ \text{Ziroow o but-ta.} \\
 & \text{‘Taroow hit Ziroow.’} \\
 & b. \ \text{But-ta.} \\
 & \text{‘He hit him.’}
\end{array}\]

Or Turkish:

\[(112)\]
\[\begin{array}{ll}
(112) & a. \ \text{Vur-du.} \\
 & \text{‘He hit him.’}
\end{array}\]

I have argued (in Hankamer (1971)) that pronominalization in languages like these proceeds in two stages. First a pronominalization rule applies, leaving behind a pronoun; thus in Turkish (iv) is converted to (v):

\[(113)\]
\[\begin{array}{ll}
(113) & a. \ \text{Mehmet Ahmedi vurdu.} \\
 & \text{‘He hit him.’}
\end{array}\]

Then a distinct and independently motivated rule of Pro Drop deletes personal pronouns under certain conditions (essentially, when they are not emphatic), yielding (ii).

If this is correct, we can say that the rule of pronominalization, which operates over a variable, is vacuously subject to the structural recoverability condition, as is the case in English; but the rule of Pro Drop, which does not operate over a variable (being an “absolute” or “uncontrolled” deletion rule) can produce ambiguity. I will argue in Section 4.4 that it is only rules with variables that are subject to the structural recoverability condition.

If this analysis of pronominalization in languages like Turkish and Japanese is rejected, we can only say without explanation that pronominalization rules are exempt from the structural recoverability condition.
UNACCEPTABLE AMBIGUITY

There are two “subject” particles in Japanese, *wa* and *ga*, the distribution of which is rather complex (cf. Kuno 1972). The *wa* particle does not normally occur in subordinate clauses, except where its function is to mark contrast; thus the subject particle in a relative clause is generally *ga*, as in (110b). Kuno (1972) proposes, for reasons which cannot be gone into here, that the underlying representation of relative clauses such as (110) has the subject particle *wa*, and that there is a rule converting underlying *wa* to *ga* in subordinate clauses.

In (110) the object NP has been relativized. The subject NP can also be relativized:

(111) a. [kodomo wa Taroo o but-ta]s kodomo
    boy (SP) Taroo (OP) hit  boy

b. φ Taroo o but-ta kodomo
   ‘The boy who hit Taroo’

The SRC predicts for any SOV language which has Relative Deletion that that rule cannot produce a deletion-site ambiguity. In examples like these, deletion-site ambiguity does not arise because of the subject and object particles (SP, OP) *wa/ga* and *o*, which unambiguously mark the remaining NP for its function in the relative clause, and thus for its original position.

There is, however, a class of adjective-like “verbs” in Japanese, a subclass of statives, that take *ga* as object particle:

(112) John wa Mary ga suki da.
    John (SP) Mary (OP) fond-of is
    ‘John is fond of Mary.’

And relative clauses involving these verbs are potentially ambiguous:

(113) a. Mary ga suki na kodomo
    Mary (SP/OP) fond-of is child
    ‘children who Mary likes’
    ‘children who like Mary’

b. sakana ga kirai na mono
   fish (SP/OP) hateful is thing
   ‘things that fish dislike’
   ‘things that dislike fish’

Relative clauses like those in (113) are completely ambiguous, and there are no preferred readings.

Whether these ambiguous relative clauses constitute a counter example to the SRC or not is not at all clear. If Kuno (forthcoming) is right in arguing that the underlying subject particle in relative clauses in which the subject has been relativized is *wa*, then at the point when Relative Deletion operates, its application to delete a subject is
always recoverable. It is the later \textit{wa} to \textit{ga} rule that creates the ambiguity, and this is a local deletion (thus not subject to the SRC). When an object is relativized, ambiguity would result directly from the application of Relative Deletion only if the subject at that point in the derivation could have \textit{ga} as subject particle, i.e. if superficial \textit{ga} as subject particle in relative clauses could come from underlying \textit{ga} as well as from \textit{wa} by the \textit{wa} to \textit{ga} rule. The underlying status of these particles is not at all well understood, and consequently no conclusion can be reached at this point as to the relevance of sentences like (113) to the empirical validity of the SRC.

It is interesting to note, however, that the SRC makes definite empirical predictions about nonsuperficial aspects of the grammars of particular languages, in this case about the underlying status of the particles \textit{wa} and \textit{ga}, and the existence of some such rule as the \textit{wa} to \textit{ga} rule, which Kuno has proposed on totally independent grounds. There are other languages with Relative Deletion rules in which subject and object are contiguous (Fijian is one) which, like Japanese, have ambiguous relative clauses. In every such case, the SRC predicts that some local operation must be responsible for the introduction of ambiguity, and unless such an operation can be motivated in each case, the SRC must be modified or abandoned.

The fact that these particles are sufficient to assure recoverability raises important questions about the nature of the SRC, for it must be sensitive in this case to information which is not strictly "structural". It appears that such purely functional particles as Japanese \textit{wa} and \textit{o} are counted as relevant to structural recoverability, while selectional restrictions and agreement features, as we saw above, are not. It is a general fact that function-marking particles, including prepositions (as we shall see is the case for French \textit{par} and \textit{à} in Section 4.2) and postpositions in some languages, are relevant to structural recoverability. I have not thoroughly investigated this aspect of the recoverability phenomenon, but it seems that the SRC must be sensitive to the information contained in morphological material which specifically denotes grammatical function. We would expect, then, that in a case language adjacent NPs in different cases would both be deletable, since the case marking of the remaining NP would contain sufficient information to mark its function, and hence its original position. I will assume that this is so; some evidence that it is will appear in the course of the following discussion.

The SRC predicts, then, that in an SOV language in which the subject and object are not distinguished by particles or case marking the rule of Relative Deletion will still be prevented from introducing deletion-site ambiguity. One such language is Turkish: subjects in Turkish are unmarked, and although there is a "specific" marker which only occurs with direct objects, nonspecific direct objects are unmarked.

\begin{verbatim}
(114) Çocuk su iç-ti.
    child water drink-past
    'The child drank (some) water.'
\end{verbatim}
UNACCEPTABLE AMBIGUITY

So, in the absence of the SRC, we would expect Relative Deletion in Turkish to be able to produce deletion-site ambiguity.

The syntax of relative clauses is rather complex in Turkish, however. There are two participial constructions which correspond to relative clauses in other languages, both of which involve a rule of Relative Deletion. (For an extensive discussion of these see Underhill (1972); also Lewis (1967).) In one type, the verb of the relative clause is participialized with the suffix -DLk (or -AcAk if it is future), the subject of the relative clause goes into the genitive case, and a possessive suffix agreeing in person with the subject is affixed to the participialized verb:\textsuperscript{14}

\[(115) \ \text{çocuğ-un} \ \phi \ \text{iç-} \ \text{tiği-} \ \text{i} \ \text{su} \\
\text{child-gen} \ \text{drink-DLk-pass} \ \text{water} \\
\text{‘water which the child drank’}\]

I will call this the Possessed Participle relative, because it is distinguished by being formed with a Possessed Participle. In Possessed Participle relatives, the relativized constituent is never the subject of the relative clause: only nonsubjects can be relativized in this construction, and the relativized constituent is deleted by Relative Deletion, as indicated.

In the other type of construction, which I obviously have to call Free Participle relatives, the verb of the relative clause is participialized with the suffix -An (or -mI\textsubscript{3} if past, -AcAk if future) and no possessive suffix is attached. If a subject relativizes, it is with one of these:

\[(116) \ \phi \ \text{su} \ \text{iç-} \ \text{en} \ \text{çocuk} \\
\text{water drink-An} \ \text{child} \\
\text{‘the child who is drinking (some) water’}\]

Again the relativized constituent is deleted, as indicated. Constituents other than subjects can also relativize with a Free Participle; this typically happens to genitive NPs modifying the subject, for example:

\[(117) \ \phi \ \text{baba-} \ \text{si} \ \text{su-} \ \text{ya gir-} \ \text{en} \ \text{çocuk} \\
\text{father-pass} \ \text{water-dat} \ \text{enter-An} \ \text{child} \\
\text{‘the child whose father is entering the water’}\]

Typically, however, major constituents of the relative clause other than subjects are relativized with a Possessed Participle. Since subjects in these clauses appear in the genitive case, and are furthermore never relativized in this construction, but only in the Free Participle construction, it would appear that a “wrinkle” in the grammar of Turkish prevents the Structural Recoverability Hypothesis from being put to the test;

\textsuperscript{14} It is common practice, in the citation of Turkish forms, to use capitals to designate phonological segments which are subject to variation according to the rules of vowel and consonant harmony. I adopt this practice here.
for given this weird set of constraints on what can be relativized how, even the possibility of ambiguity is prevented from arising.

Under rather ill-understood conditions, however, major constituents which generally relativize with Possessed Participles do relativize with Free Participles: 15

(118) [uçak-ta] yangın çık- an bir uçak
       (loc) fire  emerge-An an airplane
       ‘an airplane on which fire broke out’

(119) [bez-den] göğüslük yap- il- an bez
       (abl) pinafore make-pass-An cloth
       ‘cloth from which pinafores are made’

(120) [köy-e] hiç öğretmen gir- me-miş bir köy
       (dat) no teacher  enter-neg-miş a village
       ‘a village which no teacher had entered’

I have indicated the relativized constituent in each case in square brackets, to show what its case would have been in the relative clause before relativization. The circumstances under which these constituents, which normally would take Possessed Participles, can be relativized in the Free Participle construction, are not entirely clear; the determining factor seems to be some sort of general indefiniteness of the subject. The interesting fact, however, is that there is one kind of constituent that can never be relativized in this construction; and that is direct objects.

(121) *[köy-ü] hiç öğretmen gör-me-miş bir köy
       (spec) no teacher  see-neg-miş a village
       (‘a village which no teacher had seen’) 

The difference between (121) and (120) is that the verb gir- ‘enter’ takes a complement in the dative case, while the verb gör- ‘see’ takes a direct object.

If (121) means anything, it is ‘a village which had never seen a teacher’; in other words, if we try to relativize a direct object with a Free Participle, we get only the interpretation where what has been relativized is the subject, and the remaining NP is interpreted as the direct object. Thus there must be some constraint which prevents direct objects, and only direct objects, from being relativized in this construction.

It would be easy enough, of course, to place an ad hoc condition on Relative Deletion to prevent it from deleting direct objects in Free Participle relatives; to do so, however, would be to claim that it is an accident that Relative Deletion is blocked just in the one case where it has a chance to introduce structural ambiguity.

It should be noted that I am equivocating slightly with the term ‘structural’: one of the mysteries of case languages is how universal processes which refer to

15 Relative clauses of this type are discussed in Lewis (1967, 262–263).
such overtly structural features as order and dominance in languages without highly developed case systems (like, for example, English) translate their effects into languages where much of the same "structural" information is encoded into case marking.

Underhill (1972) argues that any constituent which is in initial position in the relative clause at a certain point will be relativized with a Free Participle. This hypothesis is made to account for the otherwise mysterious distribution of types of constituents which are relativized with each type of participle; it depends on the assumption that certain movement rules can rearrange constituents of the relative clause prior to application of Relative Clause Formation. If this hypothesis is correct, it clearly makes no sense to talk about structural ambiguity in the usual sense, i.e. ambiguity in the order and dominance relations among constituents, being introduced by Relative Deletion. Let the reader be aware, then, that "structural ambiguity" means something slightly (perhaps superficially) different in reference to a case language. Perhaps a more adequate formulation of the constraints discussed here would eschew the use of the term "structural" altogether and refer to something like "underlying grammatical relations".

Underhill's theory, in any case, does not explain why direct objects cannot be relativized with Free Participles under the same circumstances as NPs in the dative, ablative, and locative cases. Any rule which could move those NPs to the front of the relative clause would also move direct objects under the same circumstances.

Note also that it is crucial that the "specific" suffix which appears with specific direct objects is not a case marker. It is intuitively clear that "specific" is not a case; but it is interesting to note what makes it different from a case in this instance. Although the "specific" suffix, when it occurs, distinguishes direct objects, since it only occurs with direct objects, its presence is not required to mark any grammatical relation. Thus when a direct object is deleted, it cannot be concluded from the absence of a "specific" marker on some NP which remains in the sentence that it is not a direct object. So in (121) "{o}gretmen is indistinguishable from a direct object.

I conclude that the constraint observed in (121) is a manifestation of a "structural" recoverability condition. Before drawing any further conclusions let us consider one more case.

Another SOV language in which subject and object are not distinguished by case marking is Navaho.16 In Navaho, relative clauses generally precede their heads, and the head, rather than the coreferent NP within the relative clause, is deleted:

(122) "ashkii yóó'eelwod-\text{-}èè \phi deezhtlízh.
\hspace{1cm} boy \hspace{1cm} ran \hspace{1cm} away- rel \hspace{1cm} fell \hspace{1cm} down
\hspace{1cm} 'The boy who ran away fell down.'

---

16 The data on which the following conclusions are based was provided by Paul Platero. Relative clauses of the head-deletion type are discussed in Brame (1968). In the examples, \( \phi \) indicates nasalized vowels.
When the verb in the relative clause is transitive, deletion of the head can be controlled by either the subject or the object, so that a sentence like (123) is ambiguous:\(^{17}\)

\[(123)\] 'ashkii 'at’éd yiyiiltsá'n-\(\mathcal{C}\)\(\_\mathcal{C}\) \(\phi\) yóó’eelwod.
boy girl saw- rel ran away
a. ‘The boy who saw the girl ran away.’
b. ‘The girl who the boy saw ran away.’

This ambiguity is to be expected, since the ambiguity engendered by the deletion is ambiguity as to the controller of the deletion. The location of the deletion site (the underlying grammatical function of the deletee) is recoverable, since it is in both cases the head of the relative clause that is deleted, and this head occupies a unique position immediately to the right of the relative clause.

There is another option in the formation of Navaho relative clauses. Instead of the head, the coreferent NP within the relative clause may be deleted:

\[(124)\] \(\phi\) yóó’eelwod-\(\mathcal{C}\) \(\mathcal{C}\) 'ashkii deezhtlizh.
run away- rel boy fell down
‘The boy who ran away fell down.’

If, however, the verb is transitive, so that the relative clause has two adjacent NPs, the rule is subject to a condition that prevents it from deleting the object:

\[(125)\] \(\phi\) 'at’éd yiyiiltsá'n-\(\mathcal{C}\) \(\mathcal{C}\) 'ashkii yóó’eelwod.
girl saw- rel boy ran away
‘The boy who saw the girl ran away.’

This sentence is unambiguous, with the deletion as indicated, and cannot have the reading corresponding to relativization of the object in a remote structure like (126):

\[(126)\] [‘at’éd 'ashkii yiyiiltsá'n-\(\mathcal{C}\)'] 'ashkii yóó’eelwod.
girl boy saw- rel boy ran away
(‘The boy who the girl saw ran away.’)

Again a constraint appears which prevents Relative Deletion from introducing deletion-site ambiguity, while ambiguity of the controller of a deletion is permitted. As in the case of Turkish, it would be possible to formulate Relative Deletion in an

\(^{17}\) There is a “preferred” reading, as is often the case with this kind of ambiguity: some speakers have difficulty getting the interpretation (123b) for this sentence. However, when the weaker interpretation is forced by a selectional restriction, it is perfectly acceptable (this was pointed out by Brame (1968), and the judgment is confirmed by Paul Platero):

\[(i)\] 'ashkii 'at’éd yiyiiltsá'n-\(\mathcal{C}\) \(\mathcal{C}\) 'ashchí.
boy girl saw- rel delivered (a baby)
‘The girl who the boy saw delivered.’

This is in marked contrast to the cases of unacceptable structural ambiguity which are the topic of this paper. As we have seen, when the structural recoverability condition is violated, the forbidden interpretation cannot be forced by selectional restrictions or other nonstructural factors.
ad hoc fashion to prevent it from deleting objects of transitive verbs within the relative clause. It is clear, however, that such a formulation would merely state the facts, and there would remain a question which too often goes unasked: why should the rule be formulated with this restriction? The Structural Recoverability Hypothesis is again confirmed, for it predicts that in precisely these cases such a restriction on Relative Deletion will appear.

These cases, however, are different in one respect from those considered in Section 3.1: the SRC which was proposed to account for the blocking of Comparative Deletion and Ready Socks in potentially ambiguous situations had to be formulated so as to reject both of the competing derivations. Here we find that one is allowed, but only one. An important question arises here, which I cannot answer: is there one universal condition surfacing in all these cases, the different behavior of which in each case might be accounted for by other facts, or are there several conditions at work, which cannot be generalized but must be stated independently for each case? I have no explanation for why some deletion rules, like Gapping and Relative Deletion, should allow one of the possible derivations in a potentially ambiguous situation, and others should block all of them; it appears that in all cases recoverability must be assured, but there is variation in the manner in which it is assured.

One observation can be made, on the basis of the facts considered so far: if one of the competing derivations is allowed, it is that one in which the "gap" made by the deletion is peripheral rather than internal. Thus in the case of Gapping, if two interpretations of the location of a gap in an output structure are possible, the interpretation under which the gap is internal is invariably rejected in favor of one in which the gap is left-peripheral. In the case of Navaho Relative Deletion, the deletion which is rejected is the internal one; the peripheral deletion of the subject is allowed. The facts are not so clear in Turkish, just as it is not clear in general how such gross structural concepts as "peripheral" translate into basic grammatical relations; but if there is a position difference between subjects and objects in relative clauses in Turkish, it is clear that subjects are "peripheral", and it is subjects that can be deleted.

I tentatively advance the following principle, as a first step toward a theory of structural recoverability conditions:

\[(127) \textit{The Peripheral Gap Principle} \]

If any interpretation is possible for an unacceptably ambiguous structure, it will be that interpretation under which the location of the deletion site is peripheral rather than internal.

4. Chopping Rules

4.1. It is known that chopping rules share many properties with deletion rules, such as sensitivity to island boundaries, for example. They also exhibit the structural recoverability phenomenon.
(128) *Sally is a girl I would give my last dime.
(129) *The bastard I lent my pipe tool never brought it back.

Compare the corresponding sentences derived from a source in which Dative Movement has not applied:

(130) Sally is a girl I would give my last dime to.
(131) Sally is a girl to whom I would give my last dime.
(132) The bastard I lent my pipe tool to never brought it back.

It has been suggested that sentences like (128) and (129) are to be accounted for by a general condition prohibiting any rule from moving again a constituent that has already been moved once. I am not sure what evidence there is for this condition apart from cases involving Datives; and many rules which would be counterexamples have been proposed and not been proved wrong: for example, a commonly accepted formulation of Passive involves moving an NP again after it has been moved by Dative Movement, multiple subject-raising cases occur, raised subjects can be passivized and then raised again, etc. In fairness, however, I have not investigated the status of this proposed condition and cannot evaluate it. I am going to suggest that the sentences in question are ungrammatical because of a violation of a structural recoverability condition, thus explaining their ungrammaticality in terms of the same restrictions that operate in the case of deletion rules. To the extent that this explanation succeeds, it weakens the motivation for positing a constraint against secondary movement on the basis of sentences like these. It of course has no bearing on other evidence for such a constraint, but if the evidence independent of these cases is weak, the Dative cases cannot be cited as supporting it.

If the condition blocking Relativization in (128) and (129) is the same as the SRC which blocks Comparative Deletion and Ready Socks in similar constructions, we would expect that it would be just as impossible to relativize the direct object as the indirect object. The judgments are delicate, but I find that in general this is the case:

(133) *The pipe tool I sold Jerome was rusty.
(134) *The book which I was reading Susan is on the table.

Other leftward chopping rules, such as Question Movement and Topicalization, yield similar results:

(135) *Who did you lend your pipe tool?
(136) *What did Harry sell Jerome?
(137) *Jerome, I sold my car.
(138) *My car, I sold Jerome.

These facts, which are predicted if these chopping rules are subject to the SRC, would not be accounted for by the condition on secondary movement. If that condition
were invoked to block chopping in (128), (129), (135), and (137), some additional condition would be needed to block chopping in (133), (134), (136), and (138). The evidence, then, seems to support the hypothesis that chopping rules are subject to the same kind of recoverability condition as the deletion rules, although the "strength" of the condition, and thus the badness resulting from its violation, seems to be somewhat weaker for movements. 18

The examples so far considered have been of leftward chopping rules. Rightward chopping rules exhibit similar behavior.

Ross (1967b) cites a constraint on Extrapolation from NP, to the effect that it must be blocked if the extrapolated constituent would pass over another NP in being shifted:

(139) *A man married my sister who had castrated himself.
(140) *I gave a kid a banana who was standing there looking hungry.

A similar condition holds in the case of Heavy NP Shift:

(141) *I loaned my binoculars a man who was watching the race.

Noting that (141) must be derived by Dative Movement from a source in which the heavy NP is already in final position, one of the anonymous readers of this paper suggested that what is involved is not the constraint mentioned, but a constraint against "undoing" the effect of a transformation, i.e. a constraint against deriving a given surface order of constituents by application of two rules, the movement components of which cancel each other, so that the resulting order is one derivable by a shorter derivation. The following sentences show that a condition such as Ross suggests is necessary anyway:

(142) a. I call anyone who risks losing what he has to gain what he doesn’t need a gambler.
   b. *I call a gambler anyone who risks losing what he has to gain what he doesn’t need.
(143) a. I call anyone who risks losing what he has to gain what he doesn’t need irresponsible.

18 There appears to be some dialect variation (or idiolect variation?) in judgments on these sentences. Ben Schapiro (personal communication) has found that some people, like me, reject any sentence involving chopping either the direct object or the indirect object; others accept some sentences in which the direct object has been chopped, but reject sentences in which the indirect object has been chopped. In such a dialect, the secondary-movement condition appears more plausible, and this weakens the argument presented above that there is a single prohibition involved in the dialect which does not allow either NP to be chopped.

Note, however, that the recoverability hypothesis still makes a prediction that the secondary-movement hypothesis cannot make: whatever conditions are involved in either dialect, they conspire to prevent ambiguity from arising as the result of a chopping rule. In the one case, neither chopping is allowed; in the other, some sort of preference is assigned to the chopping of direct objects, so that if any chopping occurs, its source is unambiguous. Note that in this dialect the Peripheral Gap principle suggested in Section 3.3 is obeyed.
b. I call irresponsible anyone who risks losing what he has to gain what he doesn’t need.

(144) a. We will designate the class consisting of the maxima of all the ordered sets the master.
   
b. *We will designate the master the class consisting of the maxima of all the ordered sets.

(145) a. We will consider any segment whose intersection with the master is nonnull masterful.
   
b. We will consider masterful any segment whose intersection with the master is nonnull.

It is possible to effect Heavy NP Shift in (143) and (145) because the constituent shifted over is not an NP; in (142) and (144) it is an NP, and Heavy NP Shift is impossible. Here no appeal can be made to any constraint on double movement or on undoing the effect of a movement rule, for no movement rule is involved in the derivation of (142a) or (144a).

Neither of the conditions noted has to be stated if chopping rules are subject to a structural recoverability condition; for in each case the effect of “passing over” another NP is to render the chopping site unrecoverable. That is, in each case the resulting structure is the same as if a different chopping or no chopping at all had taken place. Note that as a special case of the structural recoverability condition, whether or not a chopping rule has applied cannot be ambiguous either.

It has been pointed out, however, that Ross's statement of the condition on Heavy NP Shift is inaccurate: there are cases where a heavy NP can shift over another NP. It is possible, in particular, any time the NP shifted over is not a major constituent of the clause in which Heavy NP Shift is taking place:

(146) I discussed with your father everything that needs discussing.
(147) We can prove to have committed acts of perjury all of the men nominated for the appellate court.
(148) I think we should warn not to visit that café any of our friends who have sensitive stomachs.

But note that if the constraint involved is a structural recoverability condition, this is exactly what we would expect: the structure prior to application of the rule is unambiguously recoverable, for the NP over which the heavy NP has shifted cannot be interpreted as belonging to the clause in which Heavy NP Shift has taken place. Thus the fact that Heavy NP Shift has occurred, and the position from which the NP has been shifted, are recoverable.

The restriction observed here, like the structural recoverability condition obeyed by the deletion rules, is totally insensitive to selectional and other nonstructural disambiguation, as is clearly demonstrated in sentences (139)-(142); note also that the
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titular NPs, which were found not to block Gapping, also do not block Heavy NP Shift or Extraposition from NP:

(149) We elected president my father, who had just turned sixty.
(150) We elected a man president who had just turned sixty.

If, as was argued in Section 1.4.1, these titular NPs are syntactically not NPs, their exceptionality in this case is also accounted for by the structural recoverability hypothesis: for if they are not NPs, the structure after Heavy NP Shift is different from the structure before the shift; thus the fact that a shift has occurred or not occurred is recoverable.

There is another constraint on Heavy NP Shift which also seems to be related to recoverability. Consider the following sentences:19

(151) *I \{\text{want} \atop \text{expect}\} to be executed all the first-year students who failed their exams.
(152) *I \{\text{want} \atop \text{expect}\} to be destroyed the transcripts of all the students who were involved in the demonstration against me last week.
(153) The dean sent to be executed all the first-year students who failed their exams.
(154) The dean ordered to be destroyed the transcripts of all the students who were involved in the demonstration against him last week.
(155) I believe to be an idiot anybody who still defends an interpretive theory of ellipsis.

Note that the inability of the immediate postverbal NP to undergo Heavy NP Shift correlates with the ability of the verb involved to have the subject of a sentence embedded as its object deleted by Equi. All Equi verbs have the restriction on Heavy NP Shift, all non-Equi verbs lack it.

This is a correlation which can only be stated in transderivational terms. Heavy NP Shift is blocked just in case its output is a sentence which looks like a product of Equi, with an extra NP tacked on at the end.

This case is slightly different from those heretofore considered: the entire sentence which is blocked is not identical in structure to any sentence produced by a

19 These sentences were noticed by Howard Lasnik, who takes them to be evidence that verbs like believe have Raising, whereas verbs like want and expect do not. This difference is supposed to be marked idiosyncratically for each verb in the lexicon. Then the fact that Heavy NP Shift is impossible after want and expect is explained by the fact that the NPs immediately following those verbs are really subjects of the embedded verb, and subjects do not undergo Heavy NP Shift. Under this theory, of course, it is an accident that exactly those verbs which do not have Raising are the verbs which allow Equi.

The explanation of these facts as a type of ambiguity-avoidance was arrived at more or less independently by Roger Higgins, Paul Postal, and me.
different derivation, although the "core" of it is; the ambiguity is not produced by the operation of the NP Shift rule alone, deriving the same output from two different sources; and the lexical items involved play a role in determining grammaticality. For these reasons, it may be wrong to attribute the ungrammaticality of sentences like (151) and (152) to the same kind of structural recoverability condition as has been proposed for previous cases. It does, however, appear to be a manifestation of the recoverability phenomenon, and as such it raises numerous questions which cannot be ignored, even though at present they cannot be answered.

The conclusion seems in general to be warranted that chopping rules are subject to a structural recoverability condition like that of the deletion rules. There are things which require explanation, such as the relative delicacy of the judgments involved compared to the quite clear distinctions in the Gapping cases; the dialect variation mentioned in footnote 18; and the apparently different nature of the case involving Heavy NP Shift and Equi. I assume, however, that further investigation of these dark areas will lead to refinement, but not abandonment, of the theory of structural recoverability.

4.2. Ruwet (1971) discusses several constraints on movement transformations in French, all of which he attributes to the operation of perceptual strategies. He notes that a prepositional phrase of the form de NP can generally be relativized, questioned, or cliticized:

(156) a. Je parle de ce livre.
   'I speak of this book.'
 b. le livre dont je parle
   'the book of which I speak'
 c. De quel livre parles-tu?
   'Of which book do you speak?'
 d. J'en parle.
   'I speak of it.'

(157) a. J'ai lu la préface de ce livre.
   'I've read the preface of this book.'
 b. le livre dont j'ai lu la préface
   'the book of which I've read the preface'
 c. De quel livre as-tu lu la préface?
   'Of which book have you read the preface?'
 d. J'en ai lu la préface.
   'I've read the preface of it.'

They can, in particular, be moved from the immediate postnominal position in what I will call the double PP construction:
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(158) a. J'ai vu le portrait d'Aristote par Rembrandt.
   'I've seen the portrait of Aristotle by Rembrandt.'
 b. Aristote, dont j'ai vu le portrait par Rembrandt
   'Aristotle, of whom I've seen the portrait by Rembrandt'
 c. De qui as-tu vu le portrait par Rembrandt?
   'Of whom have you seen the portrait by Rembrandt?'
 d. J'en ai vu le portrait par Rembrandt.
   'I've seen the portrait of him by Rembrandt.'

If, however, the double PP construction contains two phrases of the form de NP, only the external or rightmost one can be moved:

(159) a. J'ai vu le portrait d'Aristote de Rembrandt.
 b. Aristote, dont j'ai vu le portrait de Rembrandt
 c. De qui as-tu vu le portrait de Rembrandt?
 d. J'en ai vu le portrait de Rembrandt.

Although (159a) is synonymous with (158a), (159b–d) are not synonymous with (158b–d). Rather, they can only be related to a source like (160):

(160) J'ai vu le portrait de Rembrandt d'Aristote.

That is, each of (159b–d) refers unequivocally to the portrait which Aristotle painted of Rembrandt. Since they cannot have the readings corresponding to (159a), some constraint must block the application of Relativization, Question Movement, and Cliticization in that sentence.

In the light of the results of the previous subsection, these facts can hardly be surprising. The rules involved all chop constituents over a variable, and chopping rules have been shown to be subject to a structural recoverability condition. In this case, if both of the de NP phrases in a double PP construction could be chopped, the chopping would be unrecoverable, since after chopping it would be impossible to tell which of the two de NP phrases had moved. The structural recoverability hypothesis predicts that movement rules must be restricted in such a case, and the peripheral gap principle suggested in Section 3.3 predicts that if one of the two NPs can be moved, it will be the outside one.

Ruwet's contention that the condition involved must be a perceptual strategy rather than a condition on transformations rests on the status of sentences like the following:

(161) ?le cataclysme dont j'ai lu la description de Pline
   'the cataclysm of which I've read the description of Pliny'
(162) ?J'en ai lu la description de Pline.
   'I've read the description of it of Pliny.'
In these sentences a selectional restriction renders the permitted interpretation of the chopping anomalous. Ruwet assigns them the judgment of ungrammatical and claims that they are better than (159b–d) on the barred interpretation because semantic information allows the recovery of the deep relations of subject and object. He states: “... it is difficult to see how it would be possible to account for these differences in terms of constraints on transformations, whereas they can be accounted for in terms of the combined effect of different strategies which would apply to different aspects of the surface structure (while taking into consideration the semantic information provided by the lexical items).” He does not, however, show how the differences can be accounted for by the interaction of perceptual strategies, nor does he say why perceptual strategies should be able to do things (for example, interact with one another) that “constraints on transformations” cannot do. He thus has failed to raise the question above the level of a terminological issue.

The status of sentences like (161)–(162) has a bearing on the theory being developed here, however. If the constraint blocking movement of de NP phrases in the double PP construction is a structural recoverability condition, we must expect that semantic and morphological information of a nonstructural nature will not suffice to force the suppressed interpretation, for it has not in any of the cases heretofore considered.

French speakers I have consulted do not all agree that these sentences are more nearly grammatical than the impossible interpretations of (159b–d); all do agree that they are definitely ungrammatical. We can conclude, then, that whether or not there is a difference in grammaticality between (159b–d) and (161)–(162), the presence of semantic information favoring the suppressed interpretation does not suffice to force it with full grammaticality. I assume that the status of these sentences is similar to that of “I asked Max to wash himself, and Sally to shave himself” (as compared to the impossible internally gapped interpretation of “I asked Max to wash himself, and Bill to shave himself”).

Another construction considered by Ruwet is the factitive construction. After the verb faire ‘cause’ an embedded verb occurs as an infinitive, and if the verb is transitive its subject occurs as à NP:

(163) Je ferai lire ce livre à Jean.
    ‘I will have Jean read this book.’

If the embedded verb has an indirect object of the form à NP, the factitive construction is ungrammatical:

(164) *Je ferai porter ce livre à Pierre à Jean.
    ‘I will have Jean take this book to Pierre.’

The ungrammaticality of (164), however, must be due to a surface constraint, for (164) is a necessary intermediate stage in the derivation of grammatical sentences in which the peripheral phrase à Jean has been moved:
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(165) a. C’est à Jean que je ferai porter ce livre à Pierre.
   ‘It’s Jean that I will have take this book to Pierre.’

b. À qui as-tu fait porter ce livre à Pierre?
   ‘Who have you had take this book to Pierre?’

c. Je lui ai fait porter ce livre à Pierre.
   ‘I’ve had him take this book to Pierre.’

Again, however, the movement of the internal à NP phrase is impossible:

(166) a. C’est à Pierre que je ferai porter ce livre à Jean.

b. À qui as-tu fait porter ce livre à Jean?

c. Je lui ai fait porter ce livre à Jean.

These sentences are all unambiguous, and must be derived not from a source like (164), but rather from one like (167):

(167) *Je ferai porter ce livre à Jean à Pierre.
   ‘I will have Pierre take this book to Jean.’

Since (166a–c) are unambiguous, the movement rules must be blocked in (164) from chopping the indirect object. There is no general constraint against chopping indirect objects; for example, in the equivalent factitive construction where the subject of the embedded verb occurs with the preposition par instead of à, they can move:

(168) a. C’est à Pierre que je ferai porter ce livre par Jean.
   ‘It’s to Pierre that I will have this book taken by Jean.’

b. À qui as-tu fait porter ce livre par Jean?
   ‘To whom have you had this book taken by Jean?’

c. Je lui ai fait porter ce livre par Jean.
   ‘I’ve had this book taken to him by Jean.’

The movement of indirect objects is prohibited exactly when such movement would result in an unrecoverable chopping site. The movement which is allowed, that of the à NP phrase corresponding to the underlying subject of the embedded sentence, is that predicted by the peripheral gap principle, under the reasonable assumption (which Ruwet does not make) that the order of constituents given in (164) is correct for the stage of derivation prior to the application of the chopping rules.

4.3. A final example of a chopping rule exhibiting the structural recoverability phenomenon is the Slovenian rule of Clitic Climbing.20 In Slovenian, clitics move up from embedded nontensed clauses to “second position” in the sentence:

20 This example was provided by David Perlmutter, who discovered the No-Ambiguity condition on this rule independently.
(169) Želeli smo mu pomagati.
    wanted we’ve him to help
    ‘We wanted to help him.’

(170) Želeli smo mu žačeti pomagati.
    wanted we’ve him to begin to help
    ‘We wanted to begin to help him.’

But with a verb like obljuditi ‘promise’, which takes an indirect object pronoun in the dative case which is identical to the clitic which would be climbing, Clitic Climbing is blocked:

(171) Obljubili smo mu pomagati.
    promised we’ve him to help
    ‘We promised him to help.’

Sentence (171) is unambiguous and cannot mean ‘We promised to help him’. So Clitic Climbing is blocked when the same output structure would result from a different derivation without Clitic Climbing. Furthermore, if a single output structure could have been produced by Clitic Climbing applying to two different sources, the sentence is ungrammatical on both readings:

(172) *Želeli smo mu obljuditi pomagati.
    wanted we’ve him to promise to help

The only way to say the sentences in which Clitic Climbing is blocked is to use a finite clause introduced by the complementizer da:

(173) Želeli smo mu obljuditi, da bomo pomagali.
    ‘We wanted to promise him that we would help.’

(174) Želeli smo obljuditi, da mu bomo pomagali.
    ‘We wanted to promise that we would help him.’

This is because Clitic Climbing is obligatory from embedded infinitival clauses, and yet is blocked in these cases; clitics do not climb out of tensed clauses.

This behavior of Clitic Climbing, which is a kind of chopping rule, is exactly what would be expected if chopping rules were in general subject to a recoverability condition on the chopping site. In the absence of such a condition, it would require at least two separate conditions on the Clitic Climbing rule itself to account for the unambiguity of (171) and the ungrammaticality of (172). And as in all the other cases considered previously, such ad hoc conditions can in principle do no more than state the facts, and claim that it is an accident that the rule is restricted in just this way.

4.4. Permutation Rules

I have shown that rules which chop and delete over variables are in general subject to a structural recoverability condition. The question immediately arises whether
movement rules and deletion rules not involving variables are subject to the same condition.

In French, there is a rule of Subject-Verb Inversion (or Stylistic Inversion, as it is called in Kayne (1969)) which permutes subject and verb under certain conditions, typically when another constituent has been fronted:

(175) a. Où travaille Pierre?
    ‘Where does Pierre work?’
b. Qu’a mangé Pierre?
    ‘What did Pierre eat?’

Ruwet (1971) cites this rule as one which calls for a perceptual strategy, for he says it must be blocked when its application would lead to ambiguity:

    ‘Pierre met Paul.’
b. Qui a rencontré Paul?
    ‘Who met Paul?’
c. Qui a rencontré Pierre?
    ‘Who met Pierre?’

Sentence (176c), according to Ruwet, is unambiguous, and cannot be derived from (176a) by Question Movement and Subject-Verb Inversion. He notes, however, that many French speakers accept (176c) as ambiguous, with a strong preference for the interpretation of Pierre as object.

If there is semantic or morphological information to disambiguate in favor of the suppressed reading, Subject-Verb Inversion is possible (cf. also (175b–c)):

(177) a. Qui critiqueront ces imbéciles?
    ‘Who will these imbeciles criticize?’
b. Qui concerne cette décision?
    ‘Who does this decision concern?’
c. Quelle équipe a réuni l’entraîneur?
    ‘What team has the trainer got together?’

This is obviously not a case of unacceptable structural ambiguity, since the semantically and morphologically disambiguated sentences are perfectly good. In the framework of the theory of structural recoverability developed in this article, I think we must say that the rule of Subject-Verb Inversion is not subject to a structural recoverability condition. There does seem to be, as was the case in Navaho relative clauses, a “preferred” interpretation in semantically neutral cases. Ruwet’s perceptual strategy in this case is a codification of this preference.
Ruwet himself notes the difference between the Subject-Verb Inversion cases and the factitive and double PP cases discussed in Section 4.2, where semantic information could not be used to force the suppressed interpretation with full grammaticality. He could offer no explanation for this difference, since he was claiming that the same kind of strategy was at work in both cases. I suggest that two totally different constraints are at work: rules which chop over variables, as do those involved in the factitive and double PP cases, are subject to a structural recoverability condition; permutation rules like Subject-Verb Inversion are not subject to a structural recoverability condition, but are generally subject to a "strategy" or something which determines a preferred interpretation in the absence of semantic or morphological information forcing one or the other of the structurally possible interpretations.

A similar conclusion can be drawn from the behavior of Subject-Verb Inversion (or the Verb-Second rule) in German. The following sentence is judged ambiguous by many speakers, although there is a strong preference, in the absence of semantic or morphological clues, for the "straight-forward" interpretation in which Subject-Verb Inversion has not occurred:

(178) Welche Frau sieht das Kind?
   a. 'Which woman sees the child?'
   b. 'Which woman does the child see?'

Again, semantic or morphological information can force the weaker interpretation, with full grammaticality for all speakers:

(179) a. Welchen Mann sieht das Kind?
   'Which man does the child see?'
   b. Welche Frau sehen die Kinder?
   'Which woman do the children see?'
   c. Welches Antwort gibt die Frau?
   'What answer does the woman give?'

I think it can be concluded, then, that permutation rules, at least the Subject-Verb Inversion rule discussed here, are not subject to a structural recoverability condition, and that the preference for the straightforward or untransformed interpretation in cases of absolute ambiguity is due to a constraint or strategy of an altogether different nature from the structural recoverability condition.

As noted in Section 3.2, there are deletion rules involving variables which can introduce ambiguity as to the controller of deletion. In addition to the pronominalization rules discussed there, there is a rule which deletes subjects of gerunds:

(180) a. Joe talked to Bill about shaving himself.
   b. Joe talked to Sally about shaving himself.
   c. Sally talked to Joe about shaving himself.
Sentence (180a) is ambiguous, and the deleted NP can be interpreted as identical to either Joe or Bill. As in the nonvariable cases considered here, semantic disambiguation can force either reading, as in (180b) and (180c).

There may be some cases where a recoverability condition is manifested in the operation of a rule which moves or deletes a constituent over a nonvariable; but the cases considered here show that such a condition cannot be general.

The structural recoverability condition which has been established in this paper is, in effect, a constraint on the interpretation of variables. Thus its effects are found in the constraints on variable-deletion rules and rules which delete or chop over variables. If there are other rules which involve variables, such as the “feature changing” rules discussed in Ross (1967b), it might be expected that they would share the same constraints.

5. Counterexamples

5.1. In Section 1.1, the rule of Comparative Ellipsis was cited as a variable-deletion rule. We would therefore expect it to obey a structural recoverability condition; and in general, it seems that it does, as is evident from the following sentences:

(181) a. The twins know more girls than know Harry.
   b. The twins know more girls than Harry knows.
   c. The twins know more girls than Harry.

Sentences (181a–b) are the result of the application of the rule of Comparative Deletion to more remote structures. Comparative Ellipsis should be able to apply to either of these to yield (181c). But (181c) is unambiguous and has only the reading of (181b); so Comparative Ellipsis has been blocked from applying in (181a).

However, as one of my anonymous readers pointed out, it seems that these facts are due to another condition on Comparative Ellipsis. If it were the operation of a structural recoverability condition which prevents the application of Comparative Ellipsis in (181a), we would expect a similar ellipsis leaving a PP behind to be allowed:

(182) a. The twins shouted at more girls than shouted at Harry.
   b. *The twins shouted at more girls than at Harry.

That is, (182b) should be allowed by a structural recoverability condition, since there is no structural ambiguity as to the location of the deletion site. But (182b) is just as bad as (181c) would be on the reading of (181a), so apparently some other condition is required which would block application of Comparative Ellipsis in (182a); what appears to be required is some sort of parallelism condition to the effect that Comparative Ellipsis cannot apply unless the constituent deleted by Comparative Deletion is in a position in the comparative clause corresponding to the position of
its controller in the matrix clause. This condition would also prevent Comparative Ellipsis from deriving (181c) from (181a), so these sentences provide no evidence for the operation of a structural recoverability condition in cases of Comparative Ellipsis.  

If we choose a sentence which does not violate this parallelism condition, however, we find that some structural recoverability condition is still required:  

(183) a. Jack has sold more millionaires Cadillacs than Harry has.  
   b. *Jack has sold more millionaires Cadillacs than Harry.  
   c. *Jack has sold more millionaires Cadillacs than Porsches.  

(184) a. Jack has sold Cadillacs to more millionaires than Harry has.  
   b. *Jack has sold Cadillacs to more millionaires than Harry.  
   c. *Jack has sold Cadillacs to more millionaires than Porsches.

The reduction in the (a) sentences is allowed, because the deletion site is recoverable after has (this deletion may actually be attributable to the rule of VP Deletion rather than to Comparative Ellipsis). But the unrecoverable deletions that would result in the (b) and (c) sentences are blocked.

There are cases, however, where it looks like Comparative Ellipsis violates the recoverability condition. Consider the following sentences:

(185) a. Jack likes Sally more than Jack likes Susan.  
   b. Jack likes Sally more than Susan likes Sally.  
   c. Jack likes Sally more than Susan.

Sentence (185c) is ambiguous between the senses of (185a) and (185b). This is exactly the ambiguity which should be impossible if the rule involved obeys a structural recoverability condition.

This violation occurs in sentences in which the comparative clause is in adverbial relation to the matrix verb. In sentences like (183) and (184), where the comparative clause modifies some constituent other than the matrix verb, Comparative Ellipsis is restricted in exactly the expected fashion. Thus it appears that a structural recoverability condition is motivated for Comparative Ellipsis; and that we must seek some explanation for the exceptional behavior of the rule in the case of sentences like (185).

I present here, very tentatively, a line of thinking which might lead to such an explanation. The idea sketched here is more fully developed in Hankamer (forthcoming); but the argument is complex and to reproduce it here would be out of place.

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21 Parallelism conditions such as the one cited here are generally observed by ellipsis rules; cf. Hankamer (1971) for some discussion of such conditions. It is clear that parallelism conditions, though formally very different from the structural recoverability condition discussed in this paper, also have the effect of helping to assure recoverability.

22 The restriction in sentences like these has also been noticed by Arlene Berman.
Note that an NP in the position of *Harry* in (181c) cannot be questioned or relativized:

(186) a. *Who does Jack know more girls than?*
b. *I know a boy who Jack knows more girls than.*

Yet an NP in the position of *Susan* in (185c) can be questioned or relativized:

(187) a. Who do you like Sally more than?b. There is one girl I like Sally more than.

But whereas (185c) is ambiguous, (187a–b) are unambiguous: they have only the reading of (185a). This fact must be accounted for some way. Why should Question Movement and Relativization be blocked in (185b) but not in (185a)?

Note also that in the cases where questioning and relativization are possible, *than* can pied pipe:

(188) a. Than whom is Jack less industrious?b. God is that than which there is no greater.

The effect is, to be sure, somewhat stilted, but pied piping in these cases is in general felt to be “formal” or “literary”, even with ordinary prepositions.

It is in general possible to question and relativize NPs out of prepositional phrases, and it is in general possible to pied pipe prepositions. In questions, *only* prepositions can pied pipe. It is not in general possible to question or relativize constituents from embedded clauses introduced by conjunctions. The facts just presented seem to suggest that *than* behaves like a preposition in just those sentences where questioning and relativization are possible.

I propose the following hypothesis to account for these facts: a sentence like (185c) has two distinct structures, one in which *than Susan* is a prepositional phrase and which corresponds to the reading of (185a); and one in which *than Susan* is a reduced sentence introduced by a conjunction, with the reading of (185b). I will say nothing about how the prepositional phrase structure is introduced; it might be generated in the base or there might be a restructuring rule of some kind applying selectively to the reduced versions of sentences like (185a) to turn them into prepositional phrases. For the purposes of the present argument, it is only important that there must be a structural distinction underlying the two senses of (185c), in order to account for the differential applicability of Question Movement and Relativization.

With two different structures for the two senses of (185c), that sentence is no longer a counterexample to the generalization that variable-deletion rules do not produce ambiguous output structures. For each of the structures associated with (185c) is unambiguous, and corresponds to only one reading. The ambiguity of
(185c) is not a structural ambiguity, but rather results from the accidental homophony of the preposition than and the conjunction than. (This homophony is of course in a sense not accidental, but it is accidental from a purely structural point of view.)

In many languages there are two types of comparative construction, one involving a conjunction which introduces an embedded clause (which may, in general, be reduced by a rule like Comparative Ellipsis) and one involving a preposition, postposition, or case marking with a single NP. Latin and Greek are such languages: in Latin, for example, the comparative clause is introduced by the conjunction quam, but there is also a comparative construction consisting of an NP in the ablative case. I am suggesting, in effect, that the situation is the same in English, but the differences between the two types of construction are obscured by the fact that the preposition than happens to look just like the conjunction than, together with the fact that the clause introduced by than can be reduced by Comparative Ellipsis to a single NP.

If this argument is correct in principle, i.e. if the differential relativizability and questionability of NPs after than in the two senses of (185c) is due to a structural difference, then sentences involving Comparative Ellipsis confirm the recoverability hypothesis: it correctly predicts that Comparative Ellipsis will be unable to apply in cases like (183)–(184), and that (because of the structural difference) it will be allowed to apply in (185a–b).

5.2. There is one other class of systematic exceptions to the generalization that rules with variables do not produce structural ambiguity, exemplified by the following sentences:

(189) a. The chickens are ready to eat.
   b. Who do you want to eat?
   c. Who do you expect to pay for the drinks?
   d. It's Louise that I expect to marry before the year is out.
   e. Louise is too young to marry.
   f. The ones who are too young to eat will just have to starve.
   g. The ones who are too young to eat we'll fatten up a while.

In sentences like these, the deletion and chopping rules which were shown to obey a structural recoverability condition introduce ambiguity by deleting from either subject or object position. This ambiguity is possible, of course, only with "object-deletion" verbs like eat and marry. Apparently, the recoverability condition must be weakened to allow these cases, but exactly what reformulation should be attempted is not clear.

One possibility to consider would be that the recoverability condition applies only to ambiguity between VP-constituents, subject-object ambiguity being allowed. But it was found that the rule of Comparative Ellipsis obeys a condition which in the
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general case prohibits subject-object ambiguity (cf. sentences (183)–(184)); and in Section 3.3 it was found that Relative Deletion in SOV languages cannot produce subject-object ambiguity.

Another possibility is that the competing derivation in these cases is "too remote", i.e. that the information that a verb like eat is an "object-deletion" verb is not available to the transderivational condition which blocks ambiguity. It has been observed that a transderivational condition cannot be expected to examine all possible derivations which might lead to a given output. It remains an empirical question just what class of derivations a constraint like the structural recoverability condition compares; in the cases studied in this paper, the competing derivations have involved applications of the same rule or other rules with variables, except for the interaction of Heavy NP Shift with Equi discussed in Section 4.1. An obvious difference between this and the "object-deletion" cases is that the latter involve a lexical or quasi-lexical process rather than a syntactic one, in that the reasons for positing the rule have to do with matters of subcategorization and synonymy rather than with syntactic properties of the construction.

I cannot, however, suggest a precise characterization of the notion "too remote". The question of how to account for this class of exceptions is an important one, because the answer might yield an insight into the restrictions on the power of transderivational conditions in natural language.

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