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Comparative Deletion and Constraints on Transformations

Joan W. Bresnan

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O. Introduction

Much work in syntactic theory has been devoted to discovering general laws or conditions limiting the applicability of transformations to syntactic structures. In this line of research, initiated by Chomsky (1964), I include the theory of islands (Ross 1967), the cross-over condition (Postal 1971, 1972), the incomplete constituent constraints of Kuno (1973b), and the conditions on transformations of Chomsky (1973). These conditions or constraints differ in the generalizations they express, and in some cases they conflict with one another by assimilating the same phenomenon to incompatible generalizations. But their common feature of interest here is that each has either been formulated or interpreted as a possible diagnostic for movement rules.

To take a recent example, Ross's theory of islands has been applied by Postal to argue against an interpretive account of the scope of comparatives. After observing that comparative scope ambiguities are restricted in islands (such as complex noun phrases and sentential subjects), Postal hypothesizes that "...scope rules correlate with extraction rules [with respect to island constraints] because both are movement rules" (Postal 1974:422). In this way, Ross's island constraints are used as syntactic evidence for quantifier-lowering rules. Yet the crucial premise in Postal's argument--that the island constraints are diagnostics for movements--has already been cast in doubt. Most recently, Fauconnier (1974) has shown that although certain scope ambiguities of superlatives appear to be restricted by the island constraints, the same effects can be obtained in the pragmatic interpretation of expressions which cannot involve movements. Other evidence against the crucial premise is mentioned in sections 1.2 and 2.3 below. It turns out that there are reasons for questioning whether any of these constraints and conditions are diagnostics for movements.

The purpose of this study is to show that although Comparative Deletion behaves like a movement rule with respect to various applicability constraints on transformations, it is best analyzed as a rule deleting a constituent "across a variable", that is, under identity to a constituent which may be arbitrarily far from the deletion site. In Section 1 I show how Comparative Deletion can be made to simulate movement rules in obeying Postal's cross-over-like conditions, Ross's constraints on variables, Kuno's incomplete constituent constraints, and certain of Chomsky's conditions on transformations. Section 2 extends these results to Subdeletion, a variation of Comparative Deletion. In Section 3 I argue that Subdeletion cannot be analyzed as a movement rule without loss of linguistically significant generalizations, and I indicate how these can be naturally explained by analyzing Subdeletion and Comparative Deletion as a single rule which deletes across a variable. In consequence, the constraints discussed here cannot be diagnostics for movements. An application of this result to analyses of the English relative clause construction is mentioned in conclusion.

I should add that in sections 1 and 2 of this paper I make no attempt to confirm or disconfirm the conditions and constraints under discussion, or to reconcile conflicting hypotheses. In each case I simply assume the validity of the generalization expressed by the constraint and then show that it extends to Comparative Deletion (or Subdeletion) as well as movement rules. Where possible I give independent evidence against regarding the constraints as diagnostics for movements. Finally, section 3 of this paper contains what is essentially a preview of work in progress on the form and applicability conditions on Comparative Deletion and related rules. A detailed justification of the explanation outlined in section 3.3. will appear in subsequent work.

1.0 Comparative Deletion (CD)

CD is the rule which has removed from each of the following examples a constituent marked by '___'.

- 1) He uttered more homilies than I'd ever listened to ___ in one sitting.
- 2) Try to be as dispassionate in writing your stories as you've become ___ in conducting your affairs.
- 3) But they didn't word their proposal as skilfully as we worded ours ___.

It is clear that something is missing in (1)-(3), because the comparative clauses each lack a constituent whose presence would be required in similar independent clauses:

- 4) *I had listened to ___ in one sitting.
- 5) *You've become ___ in conducting your affairs.
- 6) *We worded ours ___.

That CD seems to operate over a variable was observed by Ross (1967: 6.1.3.1) and can be seen in examples (7)-(9):

- 7) He's not as successful as people think he is ___.
- 8) He's not as successful as he believes that people think he is ___.
- 9) He's not as successful as his wife hopes he believes that people think he is ___.

Other properties of this rule are discussed as needed.

1.1 CD and Cross-Over-Like Conditions


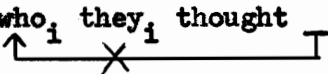
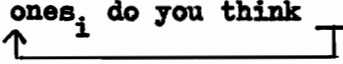
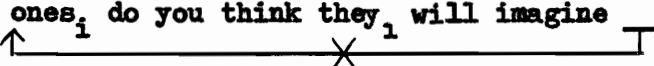
The Cross-Over Condition, proposed by Postal (1971) to account for a congeries of unexplained phenomena, had successively more elaborated and refined versions. The fundamental insight it embodied, however, was simply this: that it is impermissible for a transformation to make a constituent "cross over" a coreferential constituent, in certain cases. Postal later formulated a global derivational constraint as an alternative and superior way of accounting for some of the same phenomena (Postal 1972). Recognizing the theoretical differences between these constraints (the

earlier one being a universal meta-condition on transformations, and the later one a dialect-variable, tri-level filter on derivations), I will nevertheless refer to them both as cross-over-like conditions. I will consider the earlier condition first, for although Postal now seems to have abandoned it, it has in fact been used as a diagnostic for movement rules.

The original Cross-Over Condition was intended to explain the following kinds of facts, among many others (see Postal 1971: Ch. 13; p. 181 "Cross-Over VI"; Ch. 20):

- 10a) The students who thought they would flunk didn't flunk.
 b) The students who they thought would flunk didn't flunk.
- 11a) Which ones do you think will imagine they have flunked?
 b) Which ones do you think they will imagine have flunked?

In the (a) cases of (10) and (11), the pronoun they may have who or which ones as its antecedent; but in the (b) cases, it may not. How this difference would follow from the Cross-Over Condition is indicated in (12) and (13).

- 12a) The students who_i thought they_i would flunk didn't flunk.

- b) *The students who_i they_i thought _____ would flunk didn't flunk.

- 13a) Which ones_i do you think _____ will imagine they_i have flunked?

- b) *Which ones_i do you think they_i will imagine _____ have flunked?


No Cross-Over violations occur in (12a) and (13a), but violations do occur in (12b) and (13b) when they is taken to be coreferential with the crossed constituents.

It might be objected that (12b) and (13b) are excluded not by the Cross-Over Condition, but rather by the same condition that prohibits the indicated coreference in (14) -- namely, the condition that a pronoun may not both precede and command its antecedent (cf. Langacker 1969):

- 14a) *They_i thought the students_i would flunk.
 b) *They_i will imagine certain students_i have flunked.

Before the application of the movement rules, the structures for (12b) and (13b) are parallel to (14a,b) and hence would be ill-formed prior to and independently of any crossing-over. This objection was answered by Postal (1971: p. 247 n.3), who observed the contrast between cases like (15a) and (15b) (which was also noted in Postal (1970)):

- 15a) *You said that she_i hated one of the men that Sally_i dated.
 b) Which of the men that Sally_i dated did you say that she_i hated?

The condition that would apply before movement to rule out (14) would wrongly do the same in (15). But the Cross-Over Condition would not rule out (15b), because Sally is not "mentioned" by the movement rule: see Postal (1971: Ch. 11). Thus it appears that only the Cross-Over Condition as formulated by Postal (1971) can explain (12b), (13b), and (15b).²

It is therefore interesting to observe that the Cross-Over Condition appears to apply to Comparative Deletion:

- 16a) More students flunked than thought they would (flunk).
 b) More students flunked than they thought would (flunk).
- 17a) Not as many students as you think will imagine they have flunked, actually will (flunk).
 b) Not as many students as you think they will imagine have flunked, actually will (flunk).

(16) and (17) are exactly parallel to (10) and (11) in the significant respects. In the (a) cases, the pronoun they may refer to the removed constituent (x many students), but in the (b) cases it may not. The apparent violation can be diagrammed as in (18) and (19).

- 18a) More students flunked than _i thought they_i would (flunk).
 ↑—————↑
 b) More students flunked than they_i thought _i would (flunk).
 ↑—————X—————↑
- 19a) Not as many students as you think _i will imagine they_i have flunked, actually will (flunk).
 ↑—————↑
 b) Not as many students as you think they_i will imagine _i have flunked, actually will (flunk).
 ↑—————X—————↑

The double-headed arrow connects the comparative head with the site of the removed compared constituent; when the arrow "crosses over" a pronoun coreferential with the removed constituent, a violation occurs parallel to those in (12b) and (13b). (Notice that there is no necessary "coreference" between the head of the comparative clause and the removed compared constituent: in (16a), for example, the students who flunked need not be the same students as those who thought they would flunk; indeed, the set of flunked students need not even intersect the set of students fearful of flunking.)

If the Cross-Over Condition is assumed to be the correct explanation for (10) and (11), then the existence of parallel facts with Comparative Deletion poses a problem: assuming that this parallelism reflects a true generalization, either the Cross-Over Condition must be revised so as to apply to certain deletions as well as movements, or CD must be analyzed as involving movements which sometimes produce cross-over violations. I will argue in Section 3 that CD is a deletion rule which involves no movements; from this it follows that the Cross-Over Condition--assuming it to capture a true generalization--must be

revised. However, at this point it is worth asking what independent evidence there may be for such a revision.

Ross (1967: 4.1.4) observes that relativization in Japanese is subject to the Cross-Over Condition, despite the fact that Japanese gives no direct evidence of relative movement and lacks relative pronouns. From the crossover phenomena and the fact that Japanese relativization in certain cases seems to be subject to the Complex NP Constraint, Ross concludes that Japanese relativization involves a reordering, or movement. However, Ross also observes (1967: 6.1.3.0),

This is only one of the possible conclusions: the other is that $i[t]$ is not the case that the crossover condition and the constraints of Chapter 4 only affect "reordering transformations"; rather, there are some transformations whose only effect is to delete constituents under identity, but which are nonetheless still subject to these constraints.

In a more extensive study of Japanese relativization, Kuno (1973a: Chs. 20, 21) shows that in a great number of cases, relativization ignores Ross's "island boundaries". Kuno also proposes that relativization in Japanese is a deletion rule. If Kuno's analysis and Ross's cross-over observations are correct, then the Cross-Over Condition cannot be taken as a diagnostic for movement rules.

I conclude that the Cross-Over Condition itself does not force one to analyze CD as involving movements. If anything, the Cross-Over Condition must be extended to certain deletions over a variable-- or else simply abandoned as an explanation of the facts I have presented. This last is just what Postal (1972) does, for other reasons.

Postal (1972: 57-8, n. 24) states that examples like (12b) and (13b) reflect a universal condition that a pronoun cannot both precede and command its antecedent, a condition which applies to structures prior to the application of certain movement rules like Question Movement and relative pronoun movement. (He does not, however, explain how he would answer his own earlier objections to this alternative based on examples like (15a,b).) This alternative would also immediately explain (16) and (17):

20a) x many students _{i} thought they _{i} would flunk

b) *they _{i} thought x many students _{i} would flunk

21a) you think x many students _{i} will imagine they _{i} have flunked

b) *you think they _{i} will imagine x many students _{i} have flunked

(20) and (21) are the underlying contents of the than and as clauses in (18) and (19). In the ungrammatical cases, the pronoun they precedes and commands its antecedent x many students, which is later removed by CD, as shown in Bresnan (1973).

In his later paper (1972), Postal explicitly excludes examples like (10) and (11) from consideration and draws on a different kind of example, such as (22) [Postal's (29a,b)] :

22a) The newsman who criticized him_i later belted which official_i? (Legalistic Question)

b) *Which official_i did the newsman who criticized him_i later belt?

To account for the difference between (22a) and (22b), Postal proposes a global constraint on pronominalization, which "appears to block co-reference between a wh form [footnote omitted--JWB] and a pronoun which is to the left of it in the input to the Wh Movement rules just in case this constituent order is reversed in the output of these rules." (Postal 1972: 48; the omitted footnote refers to his n. 10 for certain qualifications which will not be relevant here.) Postal observes (1972:55) that this constraint "is not even operative in the dialects of all English speakers", a fact which distinguishes this cross-over-like constraint from the preceding phenomena.

I will assume in accordance with Postal that the difference in grammaticality or acceptability that I find between (23a) and (23b) is attributable to this global derivational constraint:

23a) Which students_i were given C's by their_i teachers?

b) *Which students_i did their_i teachers give C's to?

The point I now wish to make is that I find (24) and (25) exactly parallel to (23):

24a) Exactly as many students_j re-registered as ____i were given C's by their_i teachers

b) *Exactly as many students_j re-registered as their_i teachers gave C's to ____i.

25a) More students_j re-registered than ____i were given C's by their_i teachers.

b) *More students_j re-registered than their_i teachers gave C's to ____i.

(Note that in (24) and (25), $j \neq i$; the students who re-registered need not include any of the students who got C's.)

This parallelism between cases of Wh Movement and CD seems to be systematic:

Question Movement

26a) How many children_i have been found by $\left\{ \begin{array}{l} \text{my} \\ \text{their}_i \end{array} \right\}$ parents?

b) How many children_i have $\left\{ \begin{array}{l} \text{my} \\ * \text{their}_i \end{array} \right\}$ parents found?

Relativization

- 27a) Where are the children who_i have been found by $\left\{ \begin{array}{c} my \\ their_i \end{array} \right\}$ parents?
- b) Where are the children $who(m)_i$ $\left\{ \begin{array}{c} my \\ *their_i \end{array} \right\}$ parents have found?

Comparative Deletion

- 28a) As many children_j have been found by the police as $_i$ have been found by $\left\{ \begin{array}{c} my \\ their_i \end{array} \right\}$ parents.
- b) The police have found as many children_j as $\left\{ \begin{array}{c} my \\ *their_i \end{array} \right\}$ parents have found $_i$.

(Again, $j \neq i$.)

Once again, CD can be made to simulate violations of a constraint defined on movements rather than deletions. Again this poses the problem of either revising the constraint or analyzing CD as involving movements. And again there is some independent evidence for revising the constraint.

Consider the English as-relative:

- 29) Such women as Tom was able to speak to $_$ were very unfriendly.

As-relatives do not occur with relative pronouns who, which, etc. Thus they do not display the direct evidence of movement that ordinary relative clause constructions do. Furthermore, although overt wh relative pronouns resist there-insertion, the as-relativized constituent allows it; compare (30) and (31):

- 30a) Such women as $_$ were on the playing-field were unfriendly to Tom.
- b) Such women as there were $_$ on the playing-field were unfriendly to Tom.
- 31a) Some women who were on the playing-field were unfriendly to Tom.
- b) *Some women who there were on the playing-field were unfriendly to Tom.

If it is only wh-words which undergo relative movement, then as-relatives may involve not movement, but deletion over a variable. In any case, if as-relatives lack wh-words, then Postal's global constraint (defined on wh-words) must be revised, for these constructions display the dialect-variable cross-over phenomena:

- 32a) Such students as $_i$ were given C's by $their_i$ teachers....
- b) *Such students as $their_i$ teachers gave C's to $_i$

I find (32) similar to (23)-(28).³

Examples like (32) thus provide some independent evidence for revising Postal's global cross-over-like condition. Indeed, analyses of ordinary relative clause constructions which include deletion over a variable have been proposed for English by Emonds (1970) and Morgan (1972), among others; these analyses would also entail revisions in Postal's constraint to take account of deletions as well as movements.

In summary, I have shown that CD seems to be subject to two cross-over-like conditions defined on movement rules; but in neither case is one forced to analyze CD as involving movements. Independent evidence suggests that the conditions themselves may have to be revised to take account of certain deletion rules, or else abandoned for some other explanation of the phenomena.

1.2 CD and Ross's Constraints on Variables

Ross's Constraints on Variables (Ross 1967) can be briefly illustrated with the following cases of Question Movement.

The Complex NP Constraint

- 33a) *How hard have you solved problems which are?
 b) How hard did you believe (*the claim) that these problems would be?

The Coordinate Structure Constraint

- 34a) How onerous and hard do you consider these problems?
 b) *How hard do you consider these problems onerous and?

The Sentential Subject Constraint

- 35a) How hard is it likely that they will be?
 b) *How hard is that they will be likely?

Ross observes (1967: 6.1.3.1) that the deletion operation in comparative clause constructions is subject to these constraints, and gives examples like the following, which are slightly modified versions of Ross's (6.92)-(6.94):

- 36a) *Wilt is taller than he knows a boy who is ____.
 b) Wilt is taller than he believes (*the claim) that he is ____.
- 37a) *Wilt is taller than Bill is strong and ____.
 b) *Dean drank more booze than Frank ate Wheaties and Sammy drank ____.
- 38a) *Wilt is taller than that he is ____ is generally believed.
 b) Wilt is taller than it is generally believed that he is ____.

Very similar observations are made by Hale (1970).

To account for these facts, one might at first think of generalizing Ross's constraints to apply to all rules which delete over a variable as part of their operation. Thus a "chopping" rule

$X A Y \rightarrow A X Y$ could be regarded as the product of a copying operation and a deletion operation $X A Y \rightarrow A X A Y \rightarrow A X \emptyset Y$, rather than as simply the permutation of the variable term, X , and the constant term, A . The former interpretation is implicit in the notation of (39):

39) $X - A - Y$
 1 2 3 \rightarrow
 2 1 \emptyset 3

But this alternative seems to be inadequate, because there appear to be deletion rules not subject to the constraints (as Ross observes; see also Neubauer 1970). For example, one rule supposed to delete over a variable is "Super Equi-NP Deletion" or "Dative Deletion" (see Grinder 1970; Kimball 1971; Grinder 1971; Neubauer 1972). This rule is not subject to Ross's constraints, as is seen in (40), where a pronoun may be deleted from within a complex NP (namely, the relative clause with the head people):

40) Janet couldn't help wanting to avoid the very people that it was going to be necessary \emptyset to introduce herself to.

Ross himself suggests that his constraints affect both "chopping" rules and "unidirectional" deletion rules, but not bidirectional deletion rules (1967: 6.5). And indeed, Super-Equi, unlike CD, is bidirectional; that is, it can operate backwards as well as forwards:

41) That it was going to be necessary \emptyset to introduce herself to those people worried Janet terribly.

(Note that in (41) Super-Equi crosses a sentential subject boundary.) Rules like Super-Equi, if they involve deletion over a variable, are therefore obstacles to a straight-forward generalization of Ross's constraints to deletions over a variable.⁴

Alternatively, one could attempt to reserve Ross's constraints for chopping rules and to analyze CD as involving chopping. However, as in the case of the cross-over-like conditions, there is independent evidence for allowing these constraints to apply to (certain kinds of) deletion rules. Perlmutter (1972) shows that interesting generalizations can be captured, and apparent counter-examples explained, by defining Ross's constraints on certain deletion rules which operate over a variable. He argues that Turkish relativization, a rule which seems to delete over a variable, is subject to Ross's constraints, but Japanese relativization is not, because in the latter case, deletion is accomplished by Pronoun Drop (which generally ignores Ross's constraints). deRijk has given evidence that the Basque relativization rule deletes over a variable and obeys the Complex NP Constraint and the Coordinate Structure Constraint, but not the Sentential Subject Constraint. deRijk also remarks that Basque, an SOV language with clause-final complementizers, does not have a question-word movement transformation (deRijk 1972a,b).

The English as-relatives, which may involve deletion over a variable (cf. Section 1.1), are also subject to Ross's constraints:

- 42a) Such problems as we believe (*the claim) that there may be ___ will not be insuperable.
 b) *Such problems as there are solutions and ___ cannot be insuperable.
 c) *Such problems as that there will be ___ is likely will not be insuperable.
 (Cf. Such problems as it is likely that there will be ___ will not be insuperable.)

Grosu (1973) gives other examples of non-chopping rules constrained by one or another part of the Coordinate Structure Constraint; Ross himself argues that "feature-changing" rules are subject to his constraints (Ross 1967: Chs. 5,6); and it is clear from (43) and (44) that these constraints apply in some cases where there is no movement:

- 43a) Who played what?
 b) * Who played checkers and what?
- 44a) Who was planning to buy what?
 b) *Who was arguing about a plan to buy what?

(It is well known that echo questions can be formed quite freely without violating constraints, e.g. You were playing checkers and WHAT?? This example repeats or "echoes" a declarative and it questions a conjunct without violating the Coordinate Structure Constraint. It is also possible for (43) and (44) to be interpreted as echo questions which repeat questions. For example, (44b) can be read as a repeated question in the following context: "Who was arguing about a plan to buy plinths?" --"Who was arguing about a plan to buy WHAT??" The "echo" interpretations of (43) and (44) must be excluded.) (43b) is a violation of the Coordinate Structure Constraint; (44b) violates the Complex Noun Phrase Constraint. Compare (44) to (45):

- 45a) What were they planning to buy?
 b) *What were they arguing about a plan to buy?

(Again, (45b) must be read as a non-echo question.)

From all of these considerations it appears that Ross's constraints are a poor diagnostic for movement rules. The conclusion must be that we cannot infer from examples (36)-(38) that CD involves movements.

1.3 CD and Incomplete Constituent Constraints

The Incomplete Subject Constraint is one of a very interesting series of constraints recently developed by Kuno (1973b) as generalizations and refinements of some of Ross's constraints. It is stated as follows (Kuno 1973b: 380):

- 46) The Incomplete Subject Constraint
 It is not possible to move any element of a subject noun phrase/clause if what is left over constitutes an incomplete noun phrase/clause.

(46) would account for the difference between (47) and (48):

- 47a) That criminal, pictures of whom the police claimed someone had doctored __, had actually undergone plastic surgery.
 b) That criminal, who(m) the police claimed someone had doctored pictures of __, had actually undergone plastic surgery.
- 48a) That criminal, pictures of whom the police claimed __ had been doctored, had actually undergone plastic surgery.
 b) *That criminal, who(m) the police claimed pictures of __ had been doctored, had actually undergone plastic surgery.

(48b) is worse than (47b), according to (46), because in (48b) an incomplete NP (pictures of) has been left behind in subject position; in (47b) the incomplete phrase is in final position. (46) is also intended to account for cases of the Sentential Subject Constraint; however, since Ross already observed that CD obeys this constraint, I will restrict my attention here to non-clausal incomplete phrases.

Ross (1967: p. 265, n.31) had originally proposed that facts like these were to be accounted for by a special condition "making pied piping in the environment [P]_{NP} also obligatory where the prepositional phrase is dominated by an NP which is immediately dominated by S." (Ross regards prepositional phrases as NP's--hence the notation '[P]_{NP}'.) In this way Ross explained the difference between (49a) and (49b) (see Ross 1967: p.242 and p.265, n.31):

- 49a) Of which cars were the hoods damaged by the explosion?
 b) *Which cars were the hoods of damaged by the explosion?

By Kuno's constraint (46) the difference is attributed to "incompleteness": in some sense, the hoods of would be an incomplete subject NP, although the hoods would not.

I now observe that CD cannot apply so as to leave an incomplete NP in subject position:

- 50a) He couldn't have met as many actresses as he has pictures of ____.
 b) *He couldn't have met as many actresses as pictures of ____ are in his office.

The contrast between (50a) and (50b) is like that between (47b) and (48b), except that Pied Piping seems to be irrelevant, never occurring in comparative clauses:

- 51a) He couldn't have met as many actresses as he says he has pictures of.
 b) *He couldn't have met as many actresses as pictures of he says he has.
- 52a) *He couldn't have met as many actresses as he says pictures of are in his office.
 b) *He couldn't have met as many actresses as pictures of he says are in his office.

Thus constraint (46) seems to affect CD as well as recognized movement rules. (53) and (54) illustrate the same point.

- 53a) I'd like to know how many different songs you have records of ____.
- b) *I'd like to know how many different songs records of ____ are available.
- 54a) (?) I have tape recordings of as many different songs as you have records of ____.
- b) *Tape recordings of as many different songs are available as records of ____ are.

Although some speakers find (54a) awkward and some find it unexceptionable, they agree that it is distinctly better than (54b).

In consequence, either constraint (46) must be generalized to deletions as well as movements, or else CD must involve movements and not just deletions. The same conclusion can be shown to hold for another constraint proposed by Kuno as a generalized version of (46):

55) The Clause Nonfinal Incomplete Constituent Constraint

It is not possible to move any element of phrase/clause A in the clause nonfinal position out of A if what is left over in A constitutes an incomplete phrase/clause. (Kuno 1973b: 381)

As Kuno notes (Kuno 1973b: 380-381), (55) is dialect-variable, that is, not all speakers generalize (46) from subject to clause-nonfinal position.

Note that (55) represents a generalization of (46) in two respects: it applies to phrases other than NP's and to positions other than subject position. Note also this important qualification of what is meant by "nonfinal": phrases are nonfinal unless they "appear either clause finally or, if not, are followed only by optional elements in the sentences" (Kuno 1973b: 381).

The following facts illustrate how (55) applies to phrases other than NP; although these facts are not discussed by Kuno, I believe that they support his hypothesis. Observe first that a certain inversion of subject and locative prepositional phrases (PP's) can take place in some complements.

- 56a) Mary says that an old ruin is situated near that town.
- b) Mary says that near that town is situated an old ruin.

Next, observe that the PP can be relativized from either the preverbal position or the postverbal position, in the following appositive relatives:

- 57a) That town, near which Mary says an old ruin is situated ____, is virtually uninhabited.
- b) That town, near which Mary says ____, is situated an old ruin, is virtually uninhabited.

Finally, note that the preposition may not be left behind where it would constitute an incomplete phrase in preverbal position:

- 58a) That town, which Mary says an old ruin is situated near __, is virtually uninhabited.
 b) *That town, which Mary says near __ is situated an old ruin, is virtually uninhabited.

In (58b) there is a fragmented PP in clause nonfinal position; the dangling preposition in (58a) is in clause-final position (within the appositive clause), and is therefore permitted by (55).⁵

The facts to be given next show how the constraint applies to incomplete constituents in non-subject position.

- 59) I'd like to know which presidential conversations there are records of __ .
 60) *I'd like to know which presidential conversations there were records of __ made.
 61) I'd like to know which presidential conversations there are records of __ in the White House.

Both constraints, (46) and (55), permit (59), for there the fragmented phrase is in clause-final position. Only (55) rules out (60), for there the fragmented phrase is not in subject position and not clause-final. (61) illustrates Kuno's proviso exempting not only clause-final fragments, but also fragments followed only by optional elements in the clause: the PP in the White House is an optional element of the VP. (By contrast, the passive verb made in (60) is an obligatory element; compare There were no records of them made.) Kuno's notion of "incompleteness" ⁶ correctly predicts that (62) should be grammatical, compared with (60):

- 62) Of which presidential conversations were there records made?

Having illustrated the main features of constraint (55), I now observe that it applies to CD as well as the movement rules on which it is defined. Compare (59)-(61) with (63)-(65):

- 63) The President had more conversations than there are records of __ .
 64) *The President had more conversations than there were records of __ made.
 65) The President had more conversations than there are records of __ in the White House.

In summary, when an incomplete constituent is left in clause nonfinal position--whether by a movement rule such as Question Movement or by CD--ungrammaticality results. Again we see that the same effects can be produced by CD as by movement rules. If Kuno's constraint explains (66),

it must also, I presume, explain (67):

- 66a) How many people did you talk to ___?
 b) *How many people did you say to ___ that I was opposed to abortion?
- 67a) I talked to as many people as you talked to ___.
 b) *Exactly as many people voted against me as you had said to ___ that I was opposed to abortion.

If constraints (46) or (55) are truly diagnostics for movements of constituents, then CD must incorporate a movement in its formulation. But in this, as in the previous cases, there is some independent evidence that it is the constraint which must be revised: this will be given in Section 2.2.

1.4 CD and Chomsky's Conditions on Transformations

In Chomsky (1973) a set of very strong conditions on transformations is proposed from which certain of the previously considered constraints follow as special cases. Chomsky's conditions can only be understood within his framework of hypotheses and analyses, the justifications for which I cannot reproduce here. Rather, I will simply presuppose these hypotheses and draw their consequences for CD, as I have done in the previous cases.

One of the important consequences of these hypotheses is succinctly stated by Chomsky as follows (1973: p.243): "an item can 'escape' from a tensed sentence [only--JWB; cf. p. 244] if it has been moved into the COMP position on an earlier cycle and is moving into the COMP position on the present cycle." This effect can be seen in the difference between (68) and (69):

- 68a) *Many students are believed ___ will flunk by the teachers.
 b) The teachers believe many students will flunk.
- 69a) How many students do the teachers believe will flunk?
 b) COMP₁ the teachers believe [S COMP₂ how many students will flunk]

The passive transformation is prevented from extracting many students from the tensed complement in (68), but Question Movement is not prevented from extracting how many students from the tensed complement in (69). Chomsky attributes this difference to the nature of the two rules: Passive places a postverbal NP into the subject position, but Question Movement places a constituent into COMP position--and COMP position is the "escape hatch" from tensed clauses. Thus, on Chomsky's analysis, how many students moves into COMP₂ in (69b) on the first cycle, and thence into COMP₁ on the second cycle.

It happens that in every example of CD I have given thus far, an element has been removed from a tensed clause. Thus CD behaves like Chomsky's COMP-substitution rules with respect to his constraints. As a result, if Chomsky's conditions on transformations are correct, CD

must be a movement rule, and one of a particular type, moving material into complementizer position. Compare (70) with (68) and (69):

- 70) As many students will actually flunk as the teachers believe
 ___ will flunk--such is the power of positive thinking.

There is a superficial dissimilarity between this and the preceding cases which must not confuse the issue. In the previous cases (Sections 1.1-1.3), certain conditions which prohibited the application of movement rules were seen also to affect CD--a result which raised the question whether CD should involve movement. In this case, Chomsky's conditions permit material to be removed from the tensed clause by the application of certain kinds of movement rules only, and the similar exemption of CD raises the question of whether it should be (that kind of) a movement rule.

In the course of his exposition, Chomsky develops further conditions from which the Complex NP Constraint and the Sentential Subject Constraint follow, along with some cases of Kuno's constraints, and a multiplicity of other facts. How these conditions entail that CD must involve a COMP-substitution transformation can be illustrated by a sketch of Chomsky's explanation for the difference between (71) and (72); see Chomsky (1973: p. 247).

- 71a) Who does Mary believe John saw?

b) COMP₁ Mary believes [S COMP₂ John saw who]

- 72a) *Who does Mary believe the claim that John saw?

b) [S₁ COMP₁ Mary believes [NP the claim [S₂ COMP₂ John saw who]]]

(71a) derives from (71b) by iterated (cyclic) application of Question Movement. But (72a) cannot be derived, because of Chomsky's "subjacency condition" (1973: (80)), which allows (extraction) rules to apply only within adjacent cyclic categories or within the same cyclic category. Thus, in (72b), who can move to COMP₂ on the first S cycle, but it cannot move up on the NP cycle, because NP's lack COMP's and Question Movement is a COMP-substitution transformation. On the next S cycle, who cannot move into COMP₁, because S₂ and S₁ are not adjacent cycles: the cyclic category NP₁ intervenes. On the other hand, (73a) can be derived without violation of the subjacency condition, because NP is subjacent to S:

- 73a) Who did Mary see pictures of?

b) [S COMP Mary saw [NP pictures of who]]

In (74), NP₁ is not subjacent to S because of the intervention of NP₂:

- 74a) *Who did Mary hear claims about pictures of?

b) [S COMP Mary heard [NP₂ claims about [NP₁ pictures of who]]]

It is clear from this sketch that these results depend crucially upon Chomsky's conception of COMP-substitution transformations. Now it has already been shown (see Section 1.2) that CD is subject to the Complex NP Constraint, and examples of CD parallel to (73a) and (74a) are not difficult to construct:

- 75a) I've met more actresses than you have pictures of ____.
 b) *I've met more actresses than you've heard claims about pictures of ____.
- 76a) The official didn't confess to as many crimes as we had evidence of ____.
 b) *The official didn't confess to as many crimes as we had information about evidence of ____.

It follows, then, that if Chomsky's conditions are correct, CD must involve a movement. This in fact is Chomsky's conclusion (1973: n.32, pp. 253-4):

Observe that to accommodate comparative deletion (which, as D. Vetter noted, obeys the Complex NP Constraint), one might assume that it involves a movement rule with deletion in the position of the COMP than. Thus John is taller than Mary claims that he is (cf. *John is taller than Mary believes the claim that he is) would derive, by successive movement of tall through the indexed COMPS, from John is taller than₂ Mary claims that₁ he is tall, with [than, tall] becoming than. That than is a COMP follows from the parallelism between adjectival and nominal phrases discussed (within the framework of the lexicalist hypothesis) in Bowers (1969) and Selkirk (1970).

But here again, some independent evidence can be adduced that these conditions are not diagnostics for movements. Compare the following multiple wh questions to (73) and (74), excluding the echo-question interpretation:

- 77a) Who saw pictures of whom?
 b) *Who heard claims about pictures of whom?
- 78a) Who has evidence of which crimes?
 b) *Who has information about evidence of which crimes?

The same is shown by examples (44) and (45) previously discussed.

Nor does Chomsky's proposal for analyzing CD as a movement rule take into account the phenomena I will next consider in Sections 2 and 3, which provide strong evidence that CD deletes over a variable. If my arguments are correct, then Chomsky's conditions on transformations, like the other constraints I have discussed, must be revised. The weight of evidence thus favors Chomsky's earlier analysis of CD as an erasure transformation requiring no movement of the deleted elements (Chomsky 1965: 168-9). At the same time, there is evidence that than, as are complementizers (Bresnan 1972, 1974).

2.0 Subdeletion

I will now extend the results of Section 1 to a variation of CD which I call "Subdeletion". Subdeletion will be crucial to my arguments in Section 3 that CD is a rule deleting over a variable.

In all the examples of CD I have given so far, the entire compared constituent has been removed from the comparative clause. The compared constituent is a noun phrase in (79), an adjective phrase in (80), and an adverb phrase in (81):

- 79) They have many more enemies than we have ____.
- 80) She seems as happy now as she seemed ____ before.
- 81) My sister drives as carelessly as I drive ____.

However, there are certain conditions under which only a subpart of the compared constituent is removed--a phenomenon I refer to as Subdeletion. In the following examples, an underlying measure-phrase modifier is removed where indicated:

- 82) They have many more enemies than we have ____ friends.
- 83) She seems as happy now as she seemed ____ sad before.
- 84) My sister drives as carelessly as I drive ____ carefully.

It has sometimes been thought that no deletion or removal occurs in examples like (82)-(84) (see Ross (1967: 6.1.3.1), Grosu (1972: n.1)); but I have argued elsewhere that, minimally, a quantifier-like element is removed (Bresnan 1973), although larger phrases can be removed. Because this point is very important in what follows, I will review here some of the evidence for it.

Consider (85).

- 85) Next year, as many women will be admitted as ____ men will be (admitted).

I claim that a partitive "QP", which may be thought of as "x many" or "that many", has undergone Subdeletion in (85).

One kind of evidence for this claim is that no "QP" phrase can appear at the site of Subdeletion:

- 86) *Next year, as many women will be admitted as $\left. \begin{array}{l} \text{most} \\ \text{many} \\ \text{enough} \\ 16 \\ \text{a few} \end{array} \right\}$ men
will be (admitted).

Nothing, of course, prevents the occurrence of such measure phrases elsewhere in a comparative clause:

- 87) Next year, we will admit as many women as $\left\{ \begin{array}{l} \text{most} \\ \text{etc.} \end{array} \right\}$ universities
will admit ____ men.

(86) must not be confused with cases like (88):

88) Next year, as many women will be admitted as $\left\{ \begin{array}{l} \text{most} \\ \text{etc.} \end{array} \right\}$ men fear.

In (88), the CD site was in the underlying complement of fear, which was subsequently deleted by an ellipsis rule.

89) ... as $\left\{ \begin{array}{l} \text{most} \\ \text{etc.} \end{array} \right\}$ men fear x many women will
be admitted ---> (CD)

... as $\left\{ \begin{array}{l} \text{most} \\ \text{etc.} \end{array} \right\}$ men fear __ will be admitted ---> (ellipsis)

... as $\left\{ \begin{array}{l} \text{most} \\ \text{etc.} \end{array} \right\}$ men fear \emptyset

CD is distinct from the rules(s) of Comparative Ellipsis; for some discussion of the distinctive properties of the latter, see Hankamer (1971, 1973) and Bach, Bresnan, and Wasow (1974).

Another kind of syntactic evidence for Subdeletion appears in examples like (90)-(91):

90) North America has a larger share of the world's exportable supplies of food grains than the Middle East has __ of the world's exportable supplies of oil.

91) There isn't as large a number of women as there was __ of men.

Both "the Middle East has of the world's exportable supplies of oil" and "there was of men" are syntactically incomplete clauses. In (91), moreover, there-insertion and number agreement in the as clause indicate that a singular NP must have been present at an earlier stage; Subdeletion of x large a number would explain these facts. Similar syntactic evidence can be found for Subdeletion of a mere QP:

92) Why aren't there as many of those female athletes on t.v. as there are __ of these male ones?

As observed in Bresnan (1973), of appears between QP and NP when the latter has a determiner: cf. many male ones, many of these male ones. The of in the as clause of (92) thus signals the underlying presence of the subdeleted QP.

Further evidence for Subdeletion comes from semantic observations. Note that the understood content of the as-clause in (85) is not that "men will be admitted", but that "x many men will be admitted" (i.e. an unspecified number, possibly zero). This subtle semantic difference is brought out more vividly in (93):

93a) Next year for the first time, as many women will be admitted as men will be--but unfortunately, no men will be admitted next year.

b) Next year for the first time, many women will be admitted,

as men will be--but unfortunately, no men will be admitted next year.

Unlike (93a), (93b) is self-contradictory. The difference is attributable to the fact that an underlying QP was deleted in (93a) but never present in (93b). Compare: "this many men will be admitted: none" and "men will be admitted: none".

One might seek to attribute the semantic difference between (93a) and (93b) to some aspect of the comparative clause construction other than the hypothesized underlying QP, as Barbara Partee has pointed out to me in personal communication. She observes that some kinds of subordinate clauses would not yield a contradiction in the same context as (93b):

- 94) Next year for the first time, many women will be admitted, if men will be--but unfortunately, no men will be admitted next year.

The difference between (93a) and (93b) could then be merely that (93a), like (94), does not entail that men will be admitted. To this objection, which proposes that the contents of comparative clauses are not entailed, Barbara Partee has also provided me with an answer. Note that "I was driving that carefully" entails that "I was driving", even if the degree of carefulness alluded to is nil. (The latter interpretation is suggested in the sarcastic "Bill is riding his bicycle like a maniac, and he was driving that carefully, too".) Thus, I was driving that carefully--but I wasn't driving is self-contradictory. The same entailment appears when "I was driving x carefully" is embedded in a comparative clause:

- 95a) My sister was driving as carelessly as I was driving ___ carefully--but I wasn't driving.
 b) My sister was driving carelessly, if I was driving carefully--but I wasn't driving.

I believe that (95a) is self-contradictory, but that (95b) is not. If so, the semantic difference between (93a) and (93b) cannot be attributed to the supposed lack of entailments of comparative clauses.

In many cases the semantic effects of the Subdeleted element are much less subtle:

- 96) George is as phony as a hatcheck girl as Mildred is ___ a bouncer.

In addition to such syntactic and semantic indications, there are phonological traces of Subdeletion: tensed auxiliary contraction (known to block directly before a deletion site) is inhibited directly before a Subdeletion site. (See Bresnan 1973 for further discussion of this fact.) Examples are easy to find:

- 97a) *I'm as unlikely a hatcheck girl as you're ___ a bouncer.
 b) *I'm cleverer than I'm ___ prudent.
 c) *This is as much trouble as it's ___ fun.

(97a,b,c) are well-formed if contraction does not occur in their clauses.

Many other facts could be marshalled to prove that Subdeletion does remove material from compared constituents. For example, some verbs seem to require measure-phrase modifiers of their complements:

- 98a) This mouse weighs that many ounces.
 b) *This mouse weighs ounces.

Now the sentence (99)

- 99) John weighs more pounds than this mouse weighs ounces.

is no exception to this rule if one hypothesizes an underlying QP--x many --removed by Subdeletion. (This argument was pointed out to me in personal communication by Emmon Bach, who attributes the observation of (98)-(99) to Larry Martin.)

Granted the existence of Subdeletion, I will now investigate its relations to the constraints on transformations previously discussed; these will be taken in reverse order from that in Section 1. It will emerge that in every case but one, Subdeletion behaves in the same way as CD with respect to the constraints and conditions on transformations.

2.1 Subdeletion and Chomsky's Conditions on Transformations

That Subdeletion can remove elements from tensed clauses is already clear from the examples in Section 2.0. It follows that Subdeletion, like CD in general, must involve a (COMP-substitution) movement--if Chomsky's conditions are correct.

It is easy to see that Subdeletion obeys many of the particular constraints which are consequences of Chomsky's conditions on transformations. In (100)-(102), for example, the Complex NP Constraint affects Subdeletion:

- 100a) This policy has been as harmful to our interests as people believed it would be beneficial.
 b) *This policy has been as harmful to our interests as people believed the claim that it would be beneficial.
- 101a) I'll have to give as many F's as you've proposed to give A's.
 b) *I'll have to give as many F's as you've put forth a proposal to give A's.
- 102a) It has done no less harm than you say it has done good.
 b) *It has done no less harm than you have the opinion that it has done good.

Grosu also observes that the Complex NP Constraint affects cases of what I call Subdeletion (although he assumes with Ross (1967) that no deletion or removal takes place: Grosu (1972: n.1, p.108)).

It will be recalled from the discussion of examples (73) and (74) that Chomsky's conditions prohibit extraction from stacked picture noun phrases. In the following example, Subdeletion appears to be subject to

the same restriction:

- 103a) The official agreed to confess to as many petty crimes as we had evidence of grave ones.
 b) *The official agreed to confess to as many petty crimes as we had information about evidence of grave ones.

Compare (103) with (76), repeated here:

- 76a) The official didn't confess to as many crimes as we had evidence of .
 b) *The official ~~didn't~~ confess to as many crimes as we had information about evidence of .

These examples indicate that Subdeletion and CD are similarly restricted by Chomsky's conditions on transformations. The examples in the next two sections, to the extent that they fall under Chomsky's conditions, will show the same.

2.2 Subdeletion and Incomplete Constituent Constraints

Because Subdeletion removes a subpart of a compared constituent, it can very easily be shown to obey the Incomplete Subject Constraint (46); indeed, Subdeletion provides direct and novel evidence for the value of the concept of "incomplete constituent", (although the problem of finding a precise formulation for this very vague conception is far from trivial). But it also poses certain problems for the formulation of constraint (55).

Consider first (104) and (105):

- 104) More women were on t.v. than men were.
 105) *More of those women were on t.v. than of those men were.

In both examples, Subdeletion has removed a QP x many. But in (104) what is left of the subject phrase appears "complete", while in (105) it appears "incomplete". If it is the Incomplete Subject Constraint (46) which accounts for the difference between (104) and (105), then one would predict that the ungrammaticality of (105) would be neutralized when the incomplete constituent has been moved out of subject position. This prediction is borne out by (106) and (107):

- 106) There were more women on t.v. than there were men.
 107) There were more of those women on t.v. than there were of those men.

Because the distribution of asterisks in (104)-(107) is exactly what constraint (46) would predict if it applied to Subdeletion, I infer that Subdeletion, like CD, obeys the constraint.

In the same way one can show that Subdeletion seems to obey the generalized version of constraint (46), the Clause Nonfinal Incomplete Constituent Constraint (55). In (108) Subdeletion leaves "intact" or

"complete" appearing phrases in three types of positions, clause-final, clause-nonfinal before obligatory elements, and clause-nonfinal before optional elements:

- 108a) Nowadays, there aren't as many men as there are __ women.
- b) There were as many boys accepted as there were __ girls rejected.
- c) There weren't as many men on t.v. as there were __ women in the movies.

By contrast, in (109) Subdeletion leaves "incomplete" constituents in the same three types of positions:

- 109a) There aren't as many of them as there are __ of us.
- b) *There were as many of the boys accepted as there were __ of the girls rejected.
- c) There weren't as many of them on t.v. as there were __ of us in the movies.

Just as constraint (55) predicts, the fragmented phrase is grammatical in clause-final position (109a) and ungrammatical in non-final position (109b), except before optional elements (109c). Recall that as noted in section 1.3 above, (55) itself is dialect-variable, in the sense that not all speakers generalize the incomplete constituent constraint beyond subject position. Therefore, for some speakers (109b) and similar examples will be relatively acceptable.

Examples (108) and (109) rather strikingly illustrate Kuno's insight that the positioning of incomplete constituents affects grammaticality. But further evidence drawn from Subdeletion phenomena suggests that the formulation of the incomplete constituent constraints may have to be further revised. To see this, examine (110)-(113):

- 110) Not as many women are being admitted as __ men were.
- 111) *Not as many of the women are being admitted as __ of the men were.
- 112) They aren't admitting as many women as they were admitting __ men.
- 113) ??They aren't admitting as many of the women as they were admitting __ of the men.

These examples are similar to (104)-(107), but contain the main verb admit rather than be. According to constraint (55), (113) should be as well-formed as (107); yet it seems relatively unacceptable. I find the same unacceptability in ??They aren't admitting as many of the women as they were rejecting of the men, so it seems not to be caused by repetition of the verb, as (112) already suggests. Oddly enough, the unacceptability of (113) can be meliorated by subjecting it to Comparative Ellipsis, removing the verb:

- 114) They aren't admitting as many of the women as they were __ of the men.

What makes this fact odd is that Kuno's Incomplete Constituent Constraints are formulated to restrict the applicability of a transformation, and therefore cannot in principle explain such meliorations. Yet the difference between (113) and the fully acceptable (112) and (114) may lie in the possibility that the VP admitting of the men is somehow perceived as incomplete, compared with admitting men (112) or with the VP in (114), the traces of which seem to be effaced with ellipsis of the verb.

Another example of such "melioration" occurs in (115):

- 115a) *There were as many of the boys accepted as there were of the girls accepted.
 b) There were as many of the boys accepted as there were of the girls.

The ungrammaticality of (115a) stems from the incomplete NP of the girls in clause nonfinal position (cf. There were as many boys accepted as there were girls accepted). It is possible that (115b) is derived from (115a) by Comparative Ellipsis of the verb accepted, for one reading of (115b).

There also appear to be cases where Comparative Ellipsis removes an incomplete subject constituent and thereby restores grammaticality. (116) is an instance.

- 116) These constraints should be revised more radically than ___ has been suggested.

Simple CD is not sufficient to derive (116), because its source is not (117), but something like (118):

- 117) These constraints should be revised more radically than [x radically] has been suggested.
 118) These constraints should be revised more radically than [that they should be revised x radically] has been suggested.

The adverb phrase x radically cannot be the subject of has been suggested, but the clause in (118) can. As has been noted already in Section 1.2, CD into a sentential subject produces a violation:

- 119) *These constraints should be revised more radically than that they should be (revised) ___ has been suggested.

But subsequent application of Comparative Ellipsis to (119), yielding (116), appears to restore grammaticality. This fact is noted by Higgins (1973). Note also that for an object clause, both the pre-Comparative Ellipsis and the post-Comparative Ellipsis structures are grammatical:

- 120a) These constraints should be revised more radically than anyone has suggested that they should be (revised) ___.
 b) These constraints should be revised more radically than anyone has suggested ___.

Thus the surface positioning of incomplete constituents may affect grammaticality, quite apart from the rule applications in their derivational

history. If this conjecture can be supported, then constraints (46) and (55) will tell us little about the question of movements vs. deletions.

2.3. Subdeletion and Ross's Constraints on Variables

As noted in Section 2.1, Subdeletion obeys the Complex NP Constraint:

- 121a) We ended up buying as many oranges as we had planned to buy ___ apples.
 b) *We ended up buying as many oranges as we had discussed a plan to buy ___ apples.

Subdeletion also obeys the Sentential Subject Constraint:

- 122a) *You have as many reasons for leaving him as that he has ___ for leaving you is likely.
 b) ___ You have as many reasons for leaving him as it's likely that he has ___ for leaving you.

It also obeys the Coordinate Structure Constraint:

- 123a) *Dean drank more booze than Frank ate a lot of Wheaties and Sammy drank ___ milk.
 b) *Wilt is taller than Bill is so strong and ___ wide.

The same facts are observed in Grosu (1972).

The possibility of impunible "across the board" applications of rules, observed by Ross (1967), seems to exist for Subdeletion as well as CD and Question Movement:

- 124a) Dean drank as much booze as Frank drank ___ milk and Martha drank ___ Postum.
 b) Dean drank more booze than Frank drank ___ and Sammy drank ___ (together).
 c) How much booze did Frank drink ___ and Sammy drink ___ (together)?

Thus Subdeletion behaves like CD with respect to Ross's "island" constraints.

2.4 Subdeletion and Cross-Over-Like Conditions

One can construct cases of Subdeletion parallel to those of CD in Section (1.1) in which a seeming violation of the Cross-Over-Condition appears:

- 125a) As many new students flunked as ___ old students_i imagined they_i would (flunk).
 b) *As many new students flunked as they_i imagined ___ old students_i would (flunk).

This is not at all surprising, for the pronoun-antecedent relation

generally cannot hold in this configuration, as mentioned in Section 1.1.

However, the pattern of (125) appears to change if the pronoun they has the head new students as its antecedent; (126) then becomes more acceptable than (125b):

126) ?As many new students_i flunked as they_i imagined old students would (flunk).

But it is not clear that Subdeletion has taken place in (126) at all: it is possible that they in (126) is a "resumptive pronoun" like that in (127):

127) ?As many new students_i flunked as they_i imagined we old students would (flunk).

I believe that (126) and (127) have the same grammatical status; yet in (127) Subdeletion cannot have removed a measure phrase from we old students (cf. *that many we old students; *we that many old students). Nor indeed is there any overt deletion site in the comparative clause of (127). Rather, the pronoun they in (127) appears to occupy the site of CD: when they is omitted, the result is a fully grammatical, synonymous⁹ sentence, as the reader can verify. The same holds for (126). Consequently, it is extremely difficult to extract evidence from Subdeletion bearing on the Cross-Over Condition beyond the trivial fact recorded in (125).

In the case of Postal's Global Constraint on Pronominalization, one finds that although CD is subject to it, as I showed in Section (1.1), Subdeletion seems not to be. Compare (128) and (129), where $j \neq i$.

128a) As many boys_j were brought by Sam as ____i were brought by their_i mothers.

b) *Sam brought as many boys_j as their_i mothers brought ____i.

129a) As many boys_j were brought by Sam as ___ girls_i were brought by their_i mothers.

b) Sam brought as many boys_j as their_i mothers brought ___ girls_i.

(129b) seems to be no worse than (130); both are acceptable with appropriate intonation:

130) Their_i mothers brought (so) many girls_i.

Compared to (129b) and (130), (128b) sounds significantly worse, I believe.

Apparently, backwards pronominalization is harder to sustain (or interpret) where the antecedent has been removed (128b) than where only a proper subpart of it has been removed (129b).

In summary, Subdeletion is like CD with respect to the Cross-Over Condition, but unlike it with respect to Postal's Global Constraint on Pronominalization. This last is the only case where I have found a significant discrepancy in the behavior of Subdeletion and CD with respect to the constraints on transformations under discussion.¹⁰

3.0 Deletion Over a Variable

Despite the fact that Subdeletion, like CD, obeys constraints on movement transformations, it has properties utterly uncharacteristic of movement rules. It is my purpose here to describe these properties and then to outline how they may be explained by a rule of CD which deletes over a variable under identity.

3.1 Deletion of Immovable Constituents

The measure-phrase modifiers subject to Subdeletion cannot be moved away from the constituents they modify by movement rules. Contrast (131), a case of Subdeletion, with (132)-(135):

- 131) She has as many boyfriends as she has ___ books.
- 132a) *How many did she send ___ books to you?
b) How many (books) did she send ___ to you?
- 133a) *How many she sent ___ books to you!
b) How many (books) she sent ___ to you!
- 134a) *So many does she have ___ books that her garage is being converted into a library.
b) So many (books) does she have ___ that her garage is being converted into a library.
- 135a) *Many though she has ___ books, she wants more.
b) Many (books) though she has ___, she wants more.

In (131) a measure-phrase x many has been Subdeleted from the NP x many books. But in the (a) cases of (132)-(135), the same type of phrase cannot be moved away from the constituent it modifies: as the (b) cases show, movement is possible only if books accompanies the measure-phrase, or if there is no overt constituent modified by the measure-phrase.

The observation that certain kinds of left-branch modifiers cannot be moved away from the constituents they modify is well-known, although explanations for it vary: see Ross (1967); Grosu (1974); Chomsky (1973: n.10). It is discussed in Section 3.3 below.

The examples (131)-(135) all involve removal of QP in the context [QP NP]; left-branch adverbial and adjectival modifiers pattern the same way:

- 136) Your face is more nearly oval than it is ___ ogival.
- 137a) *How nearly would you say my face really is ___ ogival?
b) How nearly ogival would you say my face really is?

In (136), Subdeletion removes the Adverb Phrase in the context [AdvP AP]; in (137a) one sees that Question Movement cannot move this constituent away from the AP it modifies. To take another example, Subdeletion is occasionally possible in instances like the following:

- 138) Maggie is as fine a doctor as her sister is ___ a lawyer.

139) I'm as good a bridge-player as you are __ a poker-player.

Here there is deletion of the adjective phrases x fine and x good, which occur as the left-branch modifiers of the predicative nominals. (Observe that contraction of the is and are is not possible in (138) and (139) before the deletion sites.) Movement rules cannot move such AP's away from their nominals:

- 140a) *So fine her sister is __ a lawyer, that they call her Portia.
 b) So fine a lawyer is her sister, that they call her Portia.
- 141a) *How good are you __ a poker-player?
 b) How good a poker-player are you?

In conclusion, Subdeletion can remove a variety of modifying constituents which cannot be moved by movement rules. If there is a generalization over English movement rules, according to which certain left branch modifying constituents are "immoveable" from certain constructions, then Subdeletion cannot be such a rule.¹¹ I return to this generalization in Section 3.3.

3.2 Recoverability of Deletions

Consider the identity condition on CD: it is a fact that the elements removed by this rule are in some sense¹² identical to elements of the heads of the comparative clauses. In the first three examples given in this paper, the deleted elements are understood as being something like x many homilies, x dispassionate, x skilfully--phrases which are, except for their determiners, identical to the heads more [= -er many] homilies, as dispassionate, as skilfully. See Bresnan (1973) for an analysis of the internal structure of compared constituents.

In Bresnan (1973: 338) it is observed that only as much is deleted from the compared constituent by CD as is recoverable from the head of the clause. More explicitly, only the maximal subphrase of the compared constituent identical to a corresponding subphrase of the head undergoes CD.¹³ This generalization is illustrated in the following array of facts.

- 142) There isn't as large a number of women as there was.
- 143) *There isn't as large a number of women as there was of women.
- 144) *There isn't as large a number of women as there was a number of women.

In (142) the entire compared constituent x large a number of women is deleted. But in (143) the subphrase x large a number has been removed; and in (144) the subphrase x large has been removed. Neither of these subphrases is the maximal constituent recoverable from the head. But now compare (145) and (146):

- 145) There isn't as large a number of women as there was of men.
- 146) There isn't as large a number of women as there was a percentage of men.

In (145) and (146) the same phrases are deleted as in (143) and (144), respectively. The only difference is that in (145) and (146) the deleted constituents are the maximally recoverable ones, and the result is grammatical.

The generalization just illustrated has a natural explanation under the analysis by which CD deletes over a variable; see Section 3.3. But suppose CD is analyzed as requiring iterated movements to COMP followed eventually by deletion in the position after than or as (as discussed in Section 1.4). The movements are not and cannot be subject to the appropriate identity condition, because it must make reference to the head, which may be arbitrarily far from the moving item. Thus the movement operation cannot "know in advance" whether the phrase being moved up for eventual deletion will be the maximal phrase recoverable from the head. Therefore, (142)-(144) are equally derivable, and the generalization which distinguishes (143)-(144) from (145)-(146) is lost.

Similarly, the movement operation cannot know in advance whether the moved phrase contains nonrecoverable material. Therefore, there is no explanation for the nonoccurrence of sentences like (147) and (148).¹⁴

- 147) *There isn't as large a number of women as of men there was.
- 148) *There isn't as large a number of women as a percentage of men there was.

The same problems arise if the putative movement is accomplished by a single, unbounded application of a rule, followed by local deletion after than or as. To guarantee that only the maximally recoverable constituent is moved, one would have to place a special identity condition on the movement rule itself. But this nullifies the generalization that structural identity is universally part of the condition on recoverability of deletions: see Chomsky (1965: 225-6, n. 13). In other words, on this analysis it becomes accidental that the moved constituents undergo deletion and that the elements moved just happen to be those which would be maximally recoverable if deleted.

3.3 An Explanation

The preceding two sections have presented properties of Subdeletion which are utterly uncharacteristic of movement rules: its ability to remove immovable left branch modifiers and its inability to "move" phrases which are not maximally recoverable from the head. It turns out that these facts have a unified explanation, but this explanation requires a formulation of the rule of CD which draws upon a development of the formal and applicational properties of syntactic transformations under the Base Schema Hypothesis of Chomsky (1970)--and this is the subject of a separate study (Bresnan in preparation). There also I will justify several departures from the analysis of Bresnan (1973) which cannot be elaborated on here.

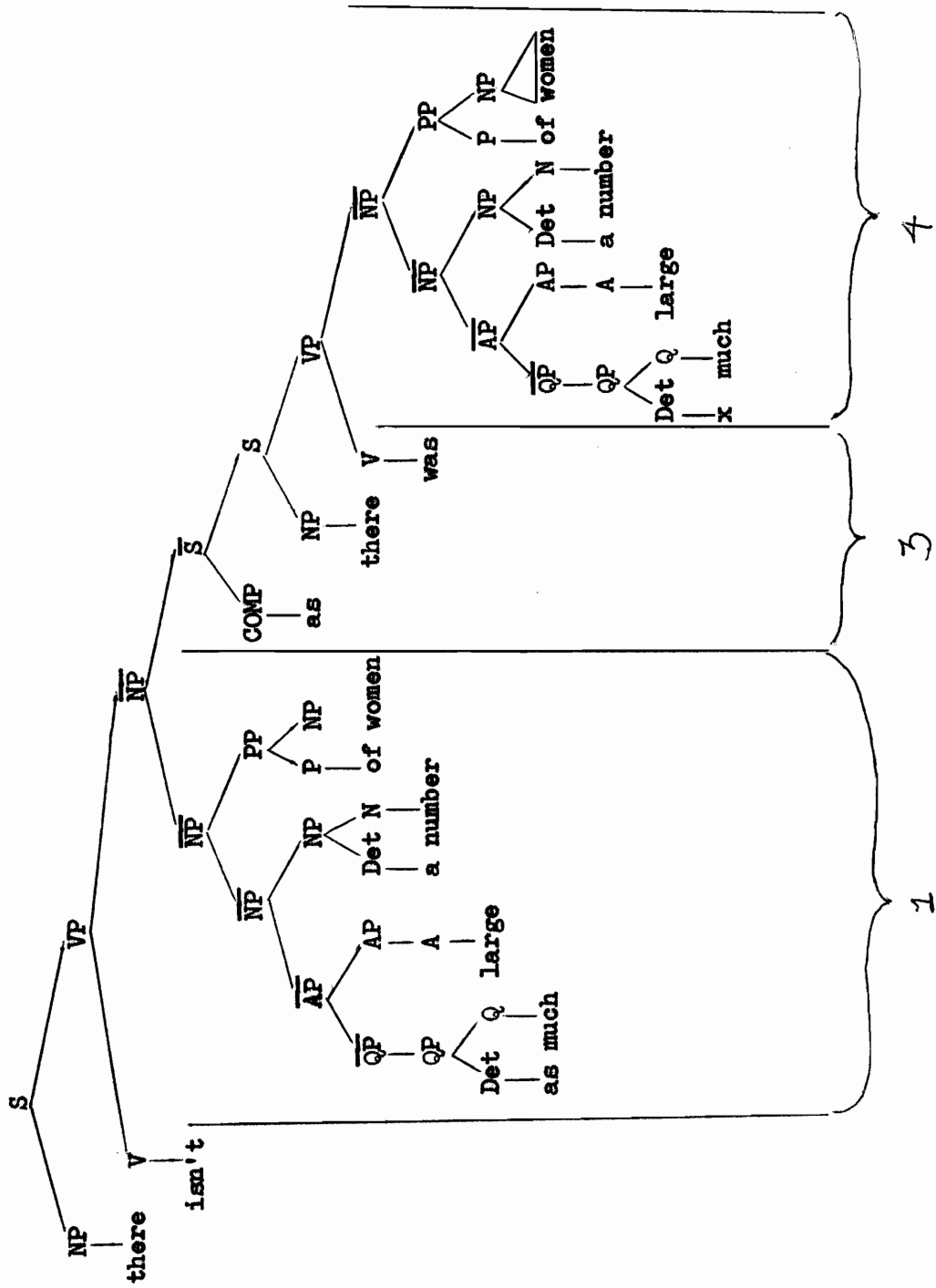
It is possible to represent Comparative Deletion and Subdeletion as the single transformation shown in (149).

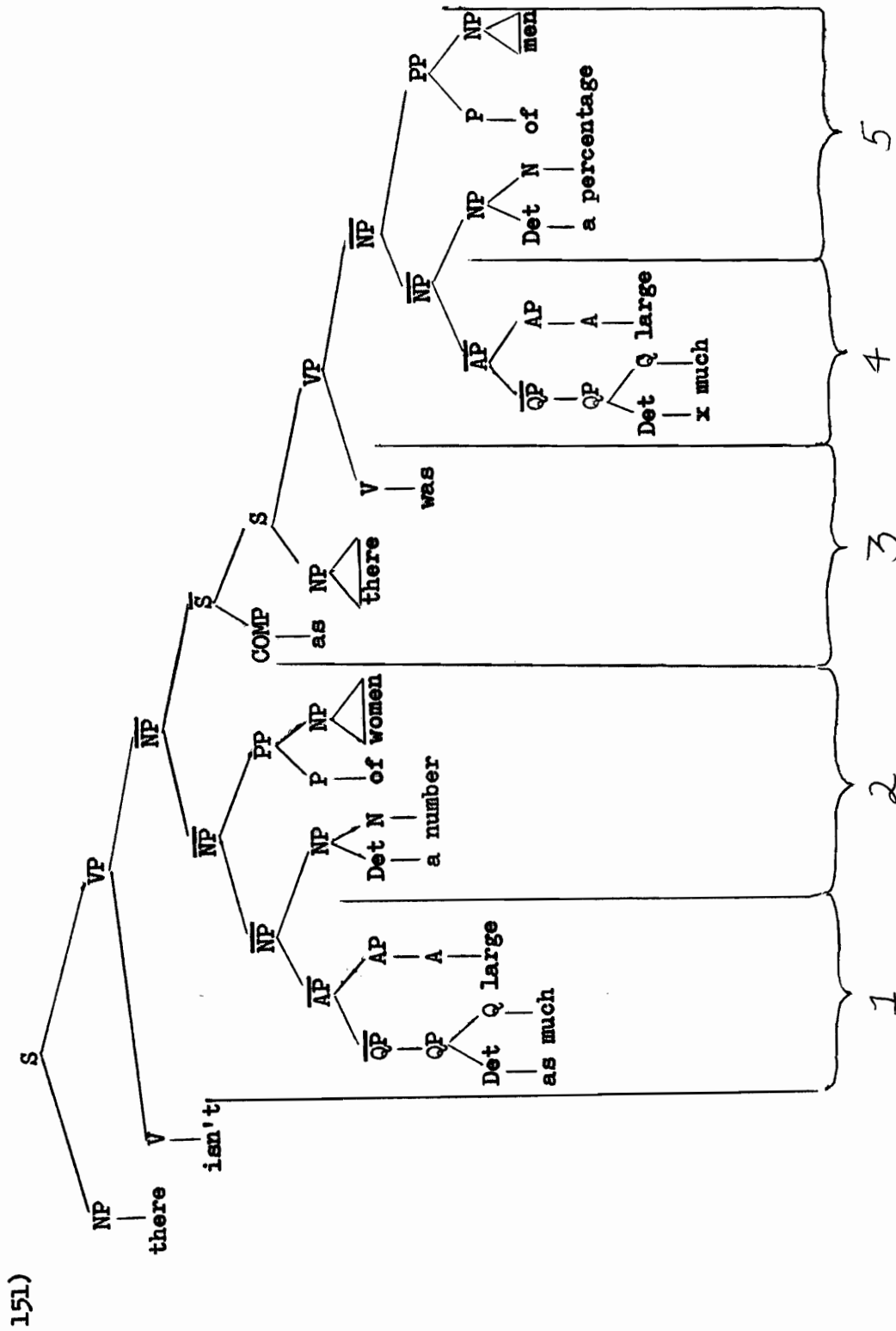
$$149) \left[\begin{array}{c} \bar{\bar{X}} \\ \bar{\bar{Y}} \end{array} W_1 \right] \left[\begin{array}{c} \bar{S} \\ \bar{S} \end{array} W_2 \right] \left[\begin{array}{c} \bar{\bar{X}} \\ \bar{\bar{Y}} \end{array} W_3 \right] W_4 \quad , \quad 4 \leq 1$$

$$\begin{array}{cccccc} 1 & 2 & & 3 & 4 & 5 & 6 & \rightarrow \\ 1 & 2 & & 3 & \emptyset & 5 & 6 & \end{array}$$

" \leq " stands for the nondistinctness relation.¹⁵ The W_i are variables over arbitrary labelled bracketings (i.e. variables in the sense of Ross (1967)). The X and Y "barred" variables are restricted to measure phrase constituents: $\bar{\bar{N}} = \bar{NP}$, $\bar{\bar{A}} = \bar{AP}$, $\bar{\bar{Q}} = \bar{QP}$ as in Bresnan (1973). These are variables in the sense of Chomsky (1970). When W_1 and W_3 are null, (149) is CD; when they are nonnull, (149) has the effect of Subdeletion. (150) and (151) illustrate these two situations.

150)





That (149) can apply in this way to both (150) and (151) follows from the definition of structural condition given in Peters and Ritchie (1973).

Now the generalization that CD deletes as much as is recoverable from the head can be restated as follows: where there are several pairs of constituents which can be taken as terms 1 and 4 in a proper analysis with respect to (149), the maximal, or dominating, constituents are chosen. (To illustrate, in (150), the NP's as much large a number and x much large a number are not the maximal constituents corresponding to terms 1 and 4 in (149).)

To capture this generalization, we cannot impose a "nonidentity" condition between terms 2 and 5 of (149), for then a sentence like There isn't as large a number of women as there was could no longer be derived by this rule. This type of sentence results when $W_1 = W_3 = \emptyset$, as in (150): it is a case of ordinary Comparative Deletion. The generalizations gained by analyzing CD and Subdeletion as the same rule ought to be clear from Sections 1 and 2. Further, it appears that "nonidentity" predicates are not needed elsewhere and can be eliminated; see Peters and Ritchie (1973: 62, n.6).

The desired generalization follows from a generalized A-over-A principle. The A-over-A principle has the effect that if a transformation applies to two constituents of the same type and gives no information about which is to be chosen, the maximal, or dominating, one is chosen (Chomsky 1973). If the principle is relativized to the structural conditions of transformations, we obtain the result that only the maximal constituent of the \bar{X} -type satisfying (149) can be deleted. For example, in (151) x much large is the maximal constituent of the \bar{X} -type identical to a corresponding constituent in the head; but the same phrase in (150) is not maximal, because it is dominated by other \bar{X} -type phrases satisfying (149). For a cross-categorical transformation like CD, which applies to \bar{X} constituents of all categories, the relativized A-over-A principle is more general in its effects than the simple A-over-A principle. But for transformations which apply to constant categories, such as passivization of NP's, the relativized principle will have the same effects as the simple principle had before.

Another cross-categorical transformation is Question Movement, which can affect nominal, adjectival, and adverbial phrases, such as which man, how tall a man, how tall, how skilfully. Each of these categories is analyzable as an \bar{X} ; therefore the structural condition of Question Movement can be stated as in (152)

$$152) \left[\begin{array}{c} \bar{S} \\ \bar{S} \end{array} Q W_1 \left[\begin{array}{c} \bar{X} \\ \bar{X} \end{array} \text{wh } W_2 \right] W_3 \right]$$

The structural change of (152) will specify that the \bar{X} is moved to supplant "Q". From this and the relativized A-over-A principle we obtain the result that only the maximal constituent of the

\bar{X} type satisfying (152) can undergo movement. In particular we have I wonder how tall he is, I wonder how tall a man he is, but not *I wonder how tall he is a man. The last example is formed by taking $\left[\begin{array}{c} \bar{AP} \\ \bar{AP} \end{array} \text{wh-so tall} \right]$ as the \bar{X} to be moved, rather than $\left[\begin{array}{c} \bar{NP} \\ \bar{NP} \end{array} \text{wh-so tall a man} \right]$, which is

maximal. The other rules given in Section 3.1, such as Exclamatory Movement and So-Preposing, are also cross-categorical. Hence, it appears that the relativized A-over-A principle eliminates the need for any special "left branch" constraint: it already accounts for all of the ungrammatical examples in Section 3.1, as well as many others.

It is already suggested in Grosu (1974) that there is no left branch constraint as such. Grosu gives facts from several languages which indicate that the left branch constraint (LBC) expresses a false generalization, and concludes, "(i) the various types of constituents whose behavior the LBC attempts to predict do not behave uniformly in all languages, and (ii) the left/right properties of the constituents at issue are often irrelevant to their reorderability." (Grosu 1974: 317). It should be pointed out that unlike the left branch constraint, the relativized A-over-A principle makes "left branch effects" a function of the transformations and phrase structure of languages--indeed, it is precisely this which permits an explanation of the facts in 3.1 and 3.2.

When we now ask why Subdeletion appears not to obey the "left branch" constraint, although it can be made to obey virtually every other constraint on movement transformations considered here, we find the following answer: there is no "left branch" constraint. There is, instead, the relativized A-over-A principle, which governs the applicability of all transformations. For a movement rule like Question Movement, the principle requires that the maximal

\bar{X} beginning with the interrogative marker wh be moved. Given the Phrase Structure rules of English, this entails that a left-branch modifier of something will not be maximal for Question Movement and hence cannot be detached. For a deletion rule like CD, the principle requires that the maximal \bar{X} which is identical to a corresponding \bar{X} in the head be deleted. If the maximal such \bar{X} is not the whole compared constituent, a left-branch modifier will be deleted. But if it is the whole compared constituent, none of its left-branch modifiers will be "subdeleted". Hence, only the maximally recoverable constituent undergoes Comparative Deletion.

Representing CD and Subdeletion as a single rule (149) expresses the generalization that Subdeletion is simply the effect of CD upon constituents containing nonrecoverable material. One desirable consequence of considering Subdeletion to be a special case of CD is that we can predict that in general Subdeletion will be governed by whatever applicability constraints CD is governed by. There are two further cases which seem to bear out this prediction, in addition to those discussed in sections 1 and 2.

The removal of genitive NP's from the phrases they modify appears to be prohibited in English independently of the left branch constraint, as Grosu (1974) observes. He gives examples similar to these:

- 153a) He's a friend of someone's.
 b) *Whose is he a friend of?

(153b) indicates that (154b) may not be the effect of the "left branch condition" (or of the relativized A-over-A condition):

- 154a) He's someone's friend.
 b) *Whose is he friend?

Grosu suggests that there is a special constraint in English against removing genitive NP's. Confirmation of this suggestion can be found in the fact that although CD can remove left branch modifiers, as we have seen, it cannot remove genitive left branches. To see this, consider the statement in (155).

- 155) John was hated by 20 boys, and he was that many boys' favorite teacher.

Now observe that (156) is not a possible way of expressing (155):

- 156) *John was hated by just as many boys as he was ___ ('s) favorite teacher.

The comparison in (156) seems to be semantically well-formed: it can be roughly paraphrased by "The number of boys that John was hated by equals the number of boys whose favorite teacher he was".

(156) was constructed by removing a constituent nondistinct from the head of the as clause, namely, x many boys. Because this is the entire compared constituent, we can regard (156) as showing that CD obeys the special English genitive NP constraint. We then predict from the analysis in this section that Subdeletion must also obey the constraint, and the prediction is borne out. To see this, consider (157).

- 157) John was as many boys' favorite teacher as Mary was ___.

Here CD has removed x many boys' favorite teacher. By altering this to x many girls' favorite teacher we create a constituent nonrecoverable from the head and thereby induce Subdeletion, obtaining (158):

- 158) John was as many boys' favorite teacher as Mary was ___ girls' (favorite teacher).

Here the maximally recoverable constituent is x many, which undergoes Subdeletion. But in contrast to (157) and (158), (159) is ill-formed:

- 159) *John was as many boys' favorite teacher as he was ___ ('s) favorite advisor.

In (159), Subdeletion must remove x many boys('s), which is the genitive modifier in the compared constituent x many boys' favorite advisor, and the result is ungrammatical.

As a final example showing the joint subjection of CD and Subdeletion to constraints, I will mention a complementizer constraint on variables proposed in Bresnan (to appear) as a generalization of the "Fixed Subject Constraint" of Bresnan (1972). This constraint prohibits NP's from being removed from clauses in which they are adjacent to complementizers, in many cases. (The apparent exceptions are predictable.) The constraint is illustrated for Question Movement in (160) and for CD in (161).

- 160a) How many women did you say (that) you would hire ___?
 b) How many women did you say ___ would be hired?
 c) *How many women did you say that ___ would be hired?
- 161a) You hired as many men as you said (that) you'd hire ___.
 b) As many men were hired as you said ___ would be.
 c) *As many men were hired as you said that ___ would be.

Now from (161) and (149) the constraint enables us to explain (162):

- 162a) You didn't even hire as many men as you said (that) you'd hire women.
 b) As many men were hired as you said women would be.
 c) ?*As many men were hired as you said that women would be.

Although (162c) is not as bad to my ear as (161c), the difference between (162c) and (162b) is distinct, for me and for a number of other speakers I have asked.

4. Conclusion

Some deletion rules behave like movement rules with respect to certain applicability constraints on transformations, so these constraints cannot be used to determine whether or not movement has occurred in a derivation. If this conclusion is correct, then alternatives or alternative formulations must be found for these constraints, and these will present a set of difficult problems for further research. There is as yet no adequate explanation for the range of cross-over phenomena in l.l. The exact relation of the island constraints to rule types remains mysterious. The concept of incomplete constituents is obscure, involving a complicated relation between phrase structure rules, surface structure configuration, and lexical information. It would be most difficult, perhaps, to preserve the essence of the Subjacency Condition, which seems to be that transformations cannot have unbounded domains of application. The effect of unbounded domains of application is achieved in Chomsky (1973) by means of cyclic iterations of bounded applications; thus Question Movement of an element across n S nodes is effected by $n + 1$ movements. As a consequence of this condition, every apparent deletion over a variable by a rule which is sensitive to the Complex NP Constraint is necessarily preceded by cyclic iterative movements. But this may require in some cases an unwarrantedly abstract derivation, as in Basque relativization, which deRijk (1972a,b) shows to operate over a variable, subject to the Complex NP Constraint. It is not plausible to hypothesize for Basque a rule like "wh-movement" in English, for Basque lacks both relative pronouns and a Question Movement rule. One could get around this problem by proposing for Basque relatives an analysis in which the antecedent of a relative is raised from the relative by a movement rule (cf. Chomsky 1973: n.70); deRijk briefly discusses and rejects such an analysis (1972b: pp. 12-13). Notice that in Subdeletion we have a rule which cannot involve either "wh-movement" or antecedent-raising without loss of generalizations. Thus the results of this study suggest that there do exist unbounded transformational processes.

These results lead us to reconsider the operations involved in relativization in English. One wide-spread analysis proposes that the

derivation of an example like the troubles I've seen, which lacks an overt relative pronoun, proceeds roughly like this: the troubles [I've seen rel] → the troubles [rel I've seen] → the troubles [∅ I've seen]. ("rel" here is an expository term for the relativized item, in whatever form it may take.) In words, the relativized item is moved to the front of the relative clause and then deleted. This analysis is defended most recently by Keyser (in this volume). An alternative analysis, proposed by Emonds (1970) and Morgan (1972), among others, hypothesizes that the troubles I've seen is derived by means of deletion of the relative item in place, without movement: the troubles [I've seen rel] → the troubles [I've seen ∅].

In order to demonstrate that movement always takes place before deletion of the relativized item, Keyser (in this volume) constructs ingenious examples showing cross-over-like phenomena in relative clauses with and without overt relative pronouns. By assuming that the cross-over-like constraint is a diagnostic for movements, he is then able to justify an interesting hypothesis which implies that movement always took place in the derivation before deletion in Middle English relative clauses. But we have seen that CD exhibits the same cross-over-like phenomena as relativization (Section 1.1), and nevertheless deletes over a variable (Section 3). Therefore Keyser's key assumption seems unwarranted, and the choice among analyses of Middle English and Modern English relatives is left open. It is interesting to note that Grimshaw (1974) has recently argued from independent evidence internal to Middle English that there must have been at that stage a relativization rule which deleted a relative item over a variable. This rule is in addition to the relative-pronoun fronting rule. Thus the presence of a movement rule in the grammar for a construction does not preclude a deletion rule operating over a variable in the same grammar. Indeed, this very situation seems to arise in those dialects of English which include sentences like the following: It's longer than what it was, We don't have as many apples as what we need. (Cf. Jespersen MEG III 9.62) The what cannot occur in cases of Subdeletion: *longer than what it is wide, *as many apples as what we have cantaloupes. (Jorge Hankamer, a speaker of the dialect in question, has informed me that what does not appear if Subdeletion has occurred. Thus, in Hankamer (1971: p.380), the following two examples are recorded: (11) John writes more plays than Bill does radical pamphlets. and (12) *John writes more plays than what Bill does radical pamphlets.)

Footnotes

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1. Joe Emonds has observed that the verb word normally requires an adverbial complement in addition to a direct object. Many other kinds of arguments for the existence of a rule of CD can be given. For example, the description of the distribution of the expletive there is simplified by hypothesizing such a rule; compare this is as hard a problem as there is likely to be on the exam and *There is likely to be on the exam.

2. Jackendoff (1972) has recently attempted to eliminate the Cross-Over Condition, but his alternative fails to extend to cases covered by the original

Condition, such as the difference between (i) and (ii):

- i) Which_i of the criminals did you bribe to say that I had
 ↑
 paid him_i off?
- ii) *Which_i of the criminals did you bribe him_i to say that I had
 ↑
 paid off?

See Jackendoff (1972: 161).

3. Note that a source like students who were such that their teachers gave C's to them would not solve the problem posed by (32b), because the wh word is not reordered with respect to their, and plainly there is no violation. This type of source is not very plausible in any case: compare Such problems as it is likely that there will be will not be insuperable with *Problems which are such that it is likely that there will be {them} will not be insuperable.
 they

4. Jackendoff (1972) and Wasow (1972) have argued that Equi and Super-Equi are not deletion rules, but rules of interpretation.

5. Aissen and Hankamer (1973) present other data showing that locative preposing occurs in some relative clauses. Surprisingly, they do not draw this conclusion from their data, but see instead a "syntactic conspiracy".

6. For Kuno's explanation to be relevant here, the of phrase in (62) must have been extracted from preverbal rather than postverbal position. I assume that this is so for the following reason. Extraposition of a complement to a (lexical) noun generally yields a "frozen" structure that resists Question Movement, as Ross (1967) observed:

- i) New evidence appeared yesterday about X.
 ii) New evidence appeared yesterday that the President had said X.
 iii) *What did new evidence appear yesterday about?
 iv) *What did new evidence appear yesterday that the President had said?

Similarly, we have

- v) *Which presidential conversations were there records made of ?

But if this assumption is incorrect, then (62) is irrelevant to the point at issue.

7. It is worth noting that one can maintain that Question Movement is a cyclic COMP-substitution rule without adopting precisely Chomsky's analysis here. For example, Bresnan (1971: Appendix II) argues that Question Movement is a cyclic rule, but one which applies only to a structure of the approximate form Q - X - [wh] - Y; "Q" is analyzed as a [COMP, + WH] (Bresnan 1970, 1974). Thus, in the analysis I have proposed, how many students in (69b) could move only into the interrogative COMP₁, by-passing the non-interrogative COMP₂.

8. There is no counterexample in This is more trouble than it's worth, for the deletion site does not directly follow the contracted auxiliary: This is more trouble than it's worth [x much trouble].

9. Note that for the pronoun to have the head as its antecedent does not necessarily imply coreference; see the discussion in Partee (1972).

10. One difference I have noted between Subdeletion and CD is that the acceptability of sentences involving Subdeletion seems to decay more rapidly as length and complexity increase than with CD. (And this seems more pronounced with Subdeletion into than clauses, for some reason.) As with all complex comparatives, acceptability seems to be enhanced by suppression of the complementizer that and by emphasized parallelism:

- i) John has as many problems as he believes he has solutions.
- ii) I believe I have as much reason for liking him as you believe you have for hating him.

Adrian Akmajian has pointed out to me (personal communication) that examples of Subdeletion involve more "natural contrasts" or "foci" than similar examples of CD; compare (iii) and (iv):

- iii) Rockefeller managed to sell more banks than Hughes thought that he could buy __. (CD)
- iv) ?Rockefeller managed to sell more banks than Hughes thought that he could buy __ airlines. (Subdeletion)

In (iii), the foci include Rockefeller and Hughes, sell and buy; in (iv) they include these as well as banks and airlines. Increasing parallelism eliminates contrasts and tends to reduce the number of foci; compare (iv) and (v):

- v) Rocky thought that he could sell more banks than Hughes thought that he could sell airlines.

The natural contrasts in (v) are Rocky and Hughes, banks and airlines. It is possible that the reduced acceptability of some cases of Subdeletion is caused by the proliferation of foci or resultant stacking up of stresses. Examples (iii)-(v) were provided to me by Akmajian; see Akmajian (1973) and the references cited there for a discussion of focus.

11. As both Ross (1967) and Grosu (1974) have observed, extraposition of a modifier from a phrase fronted by movement rules can produce spurious counterexamples to such a generalization, such as How many are left of those old containers? Note that separation of the prepositional phrase from the left branch modifier is possible even without Question Movement: Not many are left of those old containers.

12. --in exactly what sense is an interesting problem. In Bresnan (1973) a relation weaker than identity is used, namely, "nondistinctness" (cf. Chomsky 1965: 81, 181). But anaphoric relations also appear to play a part in the deletability of compared constituents (Bach, Bresnan, and Wasow 1974). The nature of the nondistinctness condition is discussed further in Bresnan (in preparation). Cf. n.15 below.

13. In fact, nonconstituent subparts of the compared constituent can be deleted, as shown in Bresnan (in preparation). An example is There aren't as many nuggets of gold in the jar as there appear to be of pyrite; it can be demonstrated that x many nuggets is not a constituent of x many nuggets of pyrite. The rule given in Section 3.3 accounts only for the deletion of x many in this example. Deletion or omission of nuggets is

effected by another rule, which, unlike Subdeletion, is optional: compare There aren't as many nuggets of gold in the jar as there appear to be (nuggets) of pyrite and There are many nuggets of gold in the jar, but there appear to be just as many (nuggets) of pyrite. Independent evidence that this other rule interacts with Subdeletion to remove nonconstituent sequences is given in Andrews (1974).

14. Higgins (1973: 164-165, n. 10) makes a similar observation.

15. The nondistinctness relation must be defined so that only a phrase containing the unspecified determiner 'x' counts as nondistinct from a corresponding phrase in the head. Also, the formulation (149) omits certain details. See Bresnan (in preparation).

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