

PRONOUNS AND REFERENCE

George Lakoff

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Indiana University
July, 1968**

Chapter 1 Some Constraints on Pronominalization

1.1 Output Conditions

1.1.0 Introduction

In the past few years, several pieces of evidence have come to light which suggest that pronominalization cannot be a surface structure phenomenon; instead, this evidence suggests that the constraints on pronominalization must be stated before certain transformational rules apply. The facts fall into two classes:

- (I) Cases where a transformational rule must be ordered after pronominalization.
- (II) A class of cases where pronominalization, wherever ordered, must apply cyclically; that is, it must apply on an earlier cycle than some other transformation (which might be ordered earlier, but would apply afterwards on a later cycle.)

In the arguments that have sought to establish (I) and (II), a critical assumption has been made, namely, that pronominalization can always apply freely left-to-right (forwards) and that any constraints on the application of pronominalization must be placed on right-to-left (backwards) pronominalization. The cases mentioned in (I) and (II) all involve sentences where forwards pronominalization is impossible in surface structure. The claim made is that in each case there is a more abstract level of analysis where forwards pronominalization is always possible. In what follows I shall attempt to show that the assumption that there are no constraints on forward pronominalization is false, and that the phenomena of (I) can be handled only by imposing such constraints. In addition, I shall present evidence to the effect that the constraints necessary to handle the cases in (I) must be stated as output conditions rather than as conditions on some transformational rule. I will also present evidence indicating that the facts of (II) do not show that pronominalization is cyclic, and also that they cannot be handled by output conditions, even allowing constraints on forward pronominalization. I conclude that there are at least two types of constraints on pronominalization:

- (I) Output conditions, i.e., constraints stated at the level of surface structure which indicate in what configurations pronouns and their antecedents can appear.
- (II) Transformational conditions, i.e., general constraints which forbid certain types of transformational rules from applying to structures which contain pronoun-antecedent pairs.

1.1.1 Adverb-preposing

1.1.1.1 The rule-ordering argument

There is rule of English which moves adverbials to the front of the sentence, deriving (2) from (1).

- (1) John ate supper before Bill left town.
- (2) Before Bill left town, John ate supper.

Ross (1967) argues that this rule of Adverb preposing must precede pronominalization, on the basis of the following examples:^{1,2}

- (3) John ate supper before he left town.
- (4) *He ate supper before John left town.
- (5) Before John left town, he ate supper.
- (6) Before he left town, John ate supper.

Ross suggests that pronominalization may apply right-to-left (backwards) only if it goes down into subordinate clauses. This condition holds in (6), which is grammatical, but not in (4), where "He ate supper" is a main, not subordinate clause. In (6) Adverb preposing has applied before pronominalization, so that the condition on backwards pronominalization will hold at the time pronominalization applies. Had pronominalization applied first, it would have been impossible to block (4) while permitting (5). Thus, we have the ordering:

Adverb Preposing
Pronominalization

Ross, in agreement with Langacker (1966), claims that pronominalization always works from left-to-right (forwards). In the fact of sentences like the following:

- (7) John saw a snake near him.
- (8) *He saw a snake near John.
- (9) Near him, John saw a snake.
- (10) *Near John, he saw a snake.

it was proposed (by Postal, I believe) that (9) be derived from (7) by a second preposing rule which followed pronominalization. If the rule precedes pronominalization, then there is no way to stop (10), while maintaining the principle that pronominalization can always go forward. Thus we have the ordering:

Adverb preposing₁
Pronominalization
Adverb preposing₂

In what follows, I will show that adverb preposing₂ does not exist, that (9) must be derived by adverb preposing₁, and that the generalization that pronominalization can always go forwards is incorrect. Moreover, since adverb preposing₂ was the only rule thought to have to follow pronominalization, a demonstration that it does not exist will make it possible for us to entertain two hypotheses: either pronominalization is the last rule in the grammar, or the constraints on pronominalization are stated as output conditions. Consider the sentences:

- (11) John smokes pot in his apartment.
- (12) *He smokes pot in John's apartment.
- (13) In his apartment, John smokes pot.
- (14) *In John's apartment, he smokes pot.

Here we find the same paradigm as in (7) - (10), so, presumably, (13) would be derived from (11) by adverb preposing₂. Now consider:

- (15) John smokes pot in the apartment, which he rents.
- (16) *He smokes pot in the apartment, which John rents.
- (17) In the apartment, which he rents, John smokes pot.
- (18) In the apartment, which John rents, he smokes pot.

In these cases, we find the same paradigm as in (3) - (6). Presumably, (17) would be derived from (15) by adverb preposing₁.

Note that in (13) and (17) the same type of adverbial is being moved, presumably by different rules. The only difference is that the adverbial in (17) has a clause (an embedded S) in its derived structure, while that in (13) does not. So one might be tempted to say that adverb preposing₁ only moves adverbials containing clauses, while adverb preposing₂ moves only adverbs not containing clauses. This is a curious complementarity, and leads one to think that the postulation of two complementary rules misses a generalization.

Now consider:

- (19) John gives Mary pot to smoke in his apartment, where she stays.
- (20) *John gives her pot to smoke, in his apartment, where Mary stays.
- (21) *He gives Mary pot to smoke in John's apartment, where she stays.
- (22) *He gives her pot to smoke in John's apartment, where Mary stays.
- (23) In his apartment, where she stays, John gives Mary pot to smoke.
- (24) In his apartment, where Mary stays, John gives her pot to smoke.
- (25) *In John's apartment, where she stays, he gives Mary pot to smoke.
- (26) *In John's apartment, where Mary stays, he gives her pot to smoke.

The crucial sentences here are (20) and (24). How can we block (20) while permitting (24)? Is (24) derived by Adverb preposing₁ or Adverb preposing₂? Suppose (24) is derived by adverb preposing₁, which precedes pronominalization. Then "her" in (24) can be derived by forwards pronominalization. If (24) is derived by adverb preposing₂, which follows pronominalization, then "her" in (24) cannot be accounted for, since it would have to be derived by backwards pronominalization in a context where it cannot apply (compare (20)).

However, if (24) is derived by adverb preposing₁, then "his" in (24) cannot be accounted for. Since adverb preposing₁ precedes pronominalization "his" must be derived by backwards pronominalization. However, if backwards pronominalization can only go into subordinate clauses, this is impossible. Note that we could account for "his" in (24) were derived by adverb preposing₂. But, as we mentioned above, we could then not account for "her".

We seem to be caught in a paradox. Given the Ross-Langacker constraints on pronominalization (24) cannot be derived by either adverb preposing₁ or adverb preposing₂. What is going on here? If one looks at each of the starred sentences in (19) - (26) and asks what goes wrong in each one, things become clearer. In each of these cases, the restrictions are the same as those in the simple cases of (11) - (14) and (15) - (18). In (20), (21), and (22), backwards pronominalization is occurring where it shouldn't (as in (12) and (16)). (25) and (26) are out for the same reason as (14), namely, forwards pronominalization is not permitted when the antecedent is in a preposed adverbial with no embedded clause. Note that in both (25) and (26), it is "he" that has gone wrong, not "her". Moreover, "his" is permissible in (24) for the same reason as it is in (13) and "her" is permissible in (24) for the same reason as it is in (18).

Thus, the pronominalization facts that we find in (19) - (26) are the same as those in (11) - (14) and (15) - (18), and should be explained in the same way. The fact that (24) cannot be accounted for by two complementary rules of adverb preposing, separated by pronominalization, indicates that such a description is inadequate for (11) - (14) and (15) - (18) as well. Instead, there should be a single rule of adverb preposing, the one which moves the adverbial to the front in (24), since this single rule, however it is stated and wherever it is ordered, must produce the same results in both (11) - (14) and (15) - (18).

Should this single, general rule of adverb preposing be ordered before or after pronominalization? If it follows pronominalization, then there would be no way of deriving (18) without also deriving (16). In order to derive (18), we would first have to derive (16) and then apply adverb preposing. But adverb preposing be made obligatory if backwards pronominalization has applied as in (16). This would be wrong for two reasons. First, such a condition on a transformation would be unique; no other such conditions are known, and so the theory of grammar would have to be changed in order to state it for this one case. Second, there is the much stronger objection that a clear generalization would be missed by such a rule ordering. In order to derive (18), we would first have to generate (16) 'incorrectly' by backwards pronominalization and then make adverb preposing obligatory just in this case to prevent ungrammatical sentences. Now consider just how we would have to constrain backwards pronominalization in order to get this result. Clearly, we could lift all restrictions on backwards pronominalization, since there are many that do not involve adverbials containing clauses at all; for these cases we would get incorrect results. For example,

(27) *He said that John left.

(28) *He saw the girl who likes John.

A possible restriction would be to allow free backwards pronominalization out of adverbials containing clauses. However, this won't work, since there are adverbials containing clauses that cannot prepose. For example, remain and stay take locative adverbs that cannot prepose.

(29) John remained in England.

(30) *In England, John remained.

If one allowed such backwards pronominalization, one would derive.

(31) *He remained in the apartment which John rented.

This could not be patched up by later adverb preposing:

(32) *In the apartment which John rented, he remained.

Thus, backwards pronominalization would have to be restricted to just those adverbials containing clauses that could later be moved by adverb preposing. That, is, the restriction stating which adverbs could be moved by adverb preposing would have to be stated twice, once for pronominalization and once for adverb preposing. Clearly, a generalization is being missed.

For these reasons, adverb preposing cannot follow pronominalization, and must therefore precede it. This being the case, the facts of (11) - (14) must be handled by a change in the conditions on pronominalization. The scope of backwards pronominalization must be extended to permit (13); correspondingly, the scope of forwards pronominalization must be restricted to exclude (14).

1.1.1.2. The Subject-Nonsubject Division

Preposed adverbial constructions have some additional peculiarities. Consider:

(33) In Mary's apartment, a thief assaulted her.

(34) *In her apartment, a thief assaulted Mary.³

(35) *In Mary's apartment, she was assaulted by a thief.

(36) In her apartment, Mary was assaulted by a thief.

(35) and (36) are just like (13) and (14). In (35), pronominalization cannot go forward from a non-clausal preposed adverb to a subject ('she'). In (36), pronominalization can go backwards from a subject ('Mary') into a non-clausal preposed adverb. (33) and (34) reveal an asymmetry between surface structure subjects and nonsubjects. In (33) (compare (35)) we find that pronominalization can go forward from a non-clausal preposed adverb to a nonsubject. In (34) (compare (36)), we see that pronominalization cannot go backwards from a nonsubject ('Mary') into a non-clausal preposed adverb. Considering that adverb preposing must precede pronominalization, we see that only the subject cases deviate from the Ross-Langacker rules: they are the opposite of what one would expect. The nonsubject cases are entirely in accord with the Ross-Langacker conditions.

This phenomenon alone shows that it is utterly impossible to save, by the use of a rule-ordering argument, the claim that pronominalization can always go forward. Sentences (33) - (34) act as though adverb preposing preceded pronominalization. Thus, no matter where adverb

preposing is ordered with respect to pronominalization, forward pronominalization must be blocked in some environment, and the distinction between subject and nonsubject position must be stated in the conditions on pronominalization.

1.1.1.3 Main Clauses

The subject-nonsubject division has been noted previously by Dwight Bolinger (personal communication) and Adrian Akmajian (personal communication) independently. We noted above in the cases of (3) - (6), that pronominalization cannot go backwards into main clauses. However, the examples (3) - (6) only mentioned subjects of main clauses. If we look further, we will find that though pronominalization cannot go backwards out of subordinate clauses to subjects of main clauses, it can go backwards out of subordinate clauses to nonsubjects of main clauses.

- (37) Mary hit John, before he had a chance to get up.
- (38) Mary hit him, before John had a chance to get up.
- (39) John was hit by Mary, before he had a chance to get up.
- (40) *He was hit by Mary, before John had a chance to get up.

(38) shows that pronominalization goes backwards to objects of main clauses; the following sentences show that the same is true of other nonsubjects.

- (41) Mary gave him a dollar bill, before Sam had a chance to refuse.
- (42) Mary placed a bowl of chicken soup before him, before Sam had a chance to refuse.
- (43) Mary sacked out in his apartment, before Sam could kick her out.
- (44) Mary butted in during his speech, before I could tell her that John was a top CIA official.

Examples like these could easily be multiplied. They show that, aside from any considerations of rule ordering, any statement of the conditions under which pronominalization can occur must take the subject-nonsubject distinction into account.

1.1.2 Topicalization

There are two rules of English which topicalize a noun phrase by moving it to the front of the sentence. One of these leaves a pronoun behind, as in (45); the other leaves no pronoun behind, as in (46).

- (45) Bill's apartment, Harry always talks to Mary about it.
- (46) Bill's apartment, Harry always talks to Mary about.

Ross has shown that these are separate rules, since they obey different conditions (which are not predictable from ordinary constraints on movement transformations). The topicalization rule that does not leave a pronoun behind cannot operate on embedded pronoun subjects.

- (47) Him, I don't think he has a chance.
 (48) *Him, I don't think has a chance.

Since the difference between these two rules is irrelevant to the discussion that follows, we will consider them together, placing the pronoun in parentheses.

Postal noted that Topicalization produces a pronominalization paradigm like that of (7) - (10).

- (49) Bill always talks to Mary about his apartment.
 (50) *He always talks to Mary about Bill's apartment.
 (51) His apartment, Bill always talks to Mary about (it).
 (52) *Bill's apartment, he always talks to Mary about (it).

Postal concluded, for the same reasons given in (7) - (10), that Topicalization had to follow pronominalization. However, if one considers topicalized NP's containing clauses, one finds the same paradigm as for preposed adverbs with clauses.

- (53) Bill always talks to Mary about this apartment, which he rents.
 (54) *He always talks to Mary about this apartment, which Bill rents.
 (55) This apartment, which he rents, Bill always talks to Mary about (it).
 (56) This apartment, which Bill rents, he always talks to Mary about (it).

As in (15) - (18), these cases would suggest that there are two topicalization rules, one preceding and one following pronominalization; the first would apply to NP's with clauses, the second to NP's without clauses. But as in the case of adverb preposing, we can construct examples parallel to those of (19) - (26) to show that this is impossible.

- (57) Bill always talks to Mary about his apartment, where she used to live.
 (58) *Bill always talks to her about his apartment, where Mary used to live.
 (59) *He always talks to Mary about Bill's apartment, where she used to live.
 (60) *He always talks to her about Bill's apartment, where Mary used to live.
 (61) His apartment, where she used to live, Bill always talks to Mary about (it).
 (62) His apartment, where Mary used to live, Bill always talks to her about (it).
 (63) *Bill's apartment, where she used to live, he always talks to Mary about (it).
 (64) *Bill's apartment, where Mary used to live, he always talks to her about (it).

As in (19) - (26), this paradigm shows that there cannot be two topicalization rules; rather there must be one rule, which precedes pronominalization. Forward pronominalization must be blocked in (52), and backward pronominalization permitted in (51).

Topicalization also reveals the subject-nonsubject asymmetry. Consider

- (65) Mary always talks to Bill about his apartment.
- (66) *Mary always talks to him about Bill's apartment.
- (67) *His apartment, Mary always talks to Bill about (it).
- (68) Bill's apartment, Mary always talks to him about (it).

Compare (66) and (68) to (50) and (52). (52) does not permit forward pronominalization to subject; (68) does permit it for objects. (67) is more interesting. I find it marginally acceptable -- better than (66), but worse than (68). Others I've questioned either agree with my intuitions or find (67) completely acceptable. For the latter dialect, there is an extra asymmetry. In forward pronominalization, the subject-nonsubject asymmetry appears -- (52) and (68) differ -- whereas in backwards pronominalization, there is no subject-nonsubject distinction for this dialect -- (51) and (67) work the same way. In this dialect, a rule-ordering explanation preserving unrestricted forward pronominalization is doubly impossible.

1.1.3 Cleft Sentences

The first of the subject-nonsubject asymmetries was pointed out by Ross (personal communication). Ross noticed that cleft sentences display the same paradigms as (49) -- (52) and (65) - (68).

- (69) John bit his dog.
- (70) *He bit John's dog.
- (71) It was his dog that John bit.
- (72) *It was John's dog that he bit.
- (73) John's dog bit him.
- (74) His dog bit John.
- (75) It was his dog that bit John.
- (76) It was John's dog that bit him.

As in the corresponding topicalization, I find (75) marginal (compare (67)) -- better than (74) and worse than (76). Some agree, and others find (75) completely acceptable.

Ross realized that these facts were a serious anomaly for the theory of pronominalization presented in Ross (1967a) and Langacker (1966). They seem to indicate, as do the topicalization facts, that such a theory is out of the question and that constraints will have to be placed on forward pronominalization. Moreover, any rule-ordering explanation for the cleft-sentence facts is ruled out since cleft-sentence show the same clausal-nonclausal asymmetry as adverb preposing and topicalization. Compare (72) with (77).

(72) *It was John's dog that he bit.

(77) It was this dog, which John owns, that he bit.

(77) shows that forward pronominalization is permitted out of clauses which are inside clefted elements.

As with adverb preposing and topicalization, one might think that there are two rules of cleft-sentence formation: one for clauses, preceding pronominalization; and the other, for non-clauses, which would follow pronominalization. But, as in the other cases, it is possible to construct a paradigm disproving this.

(78) John told Mary about his dog, which she likes.

(79) *He told Mary about John's dog, which she likes.

(80) *John told her about his dog, which Mary likes.

(81) *He told her about John's dog, which Mary likes.

(82) It was his dog, which she likes, that John told Mary about.

(83) *It was John's dog, which she likes, that he told Mary about.

(84) It was his dog, which Mary likes, that John told her about.

(85) *It was John's dog, which Mary likes, that he told her about.

For the same reasons mentioned in the discussions of (19) - (26) and (57) - (64), sentences (78) - (85) show that no simple rule-ordering solution is possible for the pronominalization phenomena in cleft sentences. Pronominalization must follow, not precede, cleft sentence formation.

1.1.4 Pronouns and Stress

The only rules that I know of that had been thought to follow pronominalization are adverb preposing, topicalization and cleft sentence formation. As I have just shown, these rules cannot follow pronominalization, and it seems that no transformational rule does, at least in English. Is this an accidental fact? Do there just happen not to be any rules that follow pronominalization? Or is it a necessary fact? Could there in principle be no such rules?

I would like to claim that it is a necessary fact, a fact about the nature of anaphoric processes in language, not a fact about one rule in English. We have assumed, following Langacker and Ross, that the constraints on the occurrence of pronouns were to be stated as part of the rule of pronominalization. Instead, I would like to suggest that these constraints are not part of any rule, but are instead well-formedness conditions on possible surface structures in English -- output conditions, like those discussed by Ross⁴ and Perlmutter.⁵ Assume that the rule of pronominalization is separate from the statement of the constraints on pronominalization. Let the rule apply freely forwards and backwards, and let a set of constraints at the end of the grammar throw out certain combinations of pronoun and antecedent as ill-formed. Such notions can be incorporated into the theory of grammar in the following way.

- (86) (I) Restrict the form of possible pronominalization rules so that no structural conditions can be placed on them (i.e., they must apply freely).
 (II) Widen the scope of possible output conditions to include the appropriate constraints on the occurrence of pronoun-antecedent pairs.

If the theory of grammar is changed in this way, then it will follow that no transformational rule could follow that point in the grammar where pronominalization constraints are stated. This is a much stronger claim than simply saying that the constraints are part of the pronominalization rule and that the rule just happens to be the last one in the grammar of English.

So far, I have shown that the constraints on pronominalization may be stated at the very end of the grammar of English. I have not shown that they must be stated there. However, there does exist very strong evidence to that effect. The evidence concerns stress. As is well known, stress interacts with pronominalization. Whenever an NP serves as the antecedent to a pronoun, both the NP and the pronoun must be unstressed. Consider the following sentences, pointed out by David Perlmutter.

- (87) When he entered the room, Mary kissed John.
 (88) *When he entered the room, Mary kissed John.

Direct objects normally take stress, but as (88) shows, a direct object cannot both be stressed and serve as an antecedent. This is true not only with pronoun-antecedent pairs, but also when a noun phrase is used anaphorically to refer back to another noun phrase.

- (89) When Harry entered the room, Mary kissed the bastard.
 (90) *When Harry entered the room, Mary kissed the bastard.

In these examples, the bastard can refer to Harry only if it is unstressed, although a direct object would normally be stressed in that position. The same is true in the following cases:

- (91) When Harry entered the room, Mary kissed the president.
 (92) *When Harry entered the room, Mary kissed the president.
 (93) When Harry entered the room, Mary kissed Harry.
 (94) *When Harry entered the room, Mary kissed Harry.

This is true not only when a pronoun or noun phrase is used anaphorically, but also when the anaphoric expression is null.

- (95) That Mary was going to marry someone else bothered John.
 (96) That Mary was going to marry someone else bothered John.

In (95) the fact that John is unstressed indicates that it is being used as an antecedent. Thus someone else in that sentence refers to someone other than John. That is, someone else has within it an understood anaphoric expression; which has no phonetic representation. In (95) John is its antecedent. However, in (96), where John has

stress and therefore cannot be used as an antecedent, someone else is understood as someone other than an unspecified NP (which cannot be John). Thus an NP must be unstressed if it is to take part in any type of anaphoric relationship.⁶

Now consider sentences like (38).

(38) Mary hit him, before John had a chance to get up.

Compare (38) with (97).

(97) *Mary hit him, before John got up.

In (38) and (97), John and him are in the same structural positions relative to one another. The only difference is that in (38) the verb phrase that follows John is long and in (97) it is short. This is true not only in these cases, but in general. The longer the VP, the relatively more acceptable these sentences become: the shorter the VP, the less acceptable they become. For example,

- (98) *Mary hit him, before John left.
- (99) *Mary hit him, before John ate supper.
- (100) *Mary hit him, before John left town.
- (101) *Mary hit him, before John could leave.

but,

- (102) Mary hit him, before John left in his Rolls Royce for a dinner engagement at the Ritz.
- (103) Mary hit him, before John ate supper with the president of the company that his father had bought the previous week.
- (104) Mary hit him, before John left town to visit his aged grandmother in a small village at the foot of Baldface Mountain.
- (105) Mary hit him, before John could leave for the opening night of the play that had been reviewed so favorably in the Times.

And, as would be expected, such sentences are of questionable acceptability if the VP is of intermediate length.

- (106) Mary hit him, before John left in his Rolls Royce.
- (107) Mary hit him, before John ate supper with the queen.
- (108) Mary hit him, before John left town on a visit.
- (109) Mary hit him, before John could leave town.

If one pronounces these sentences, one can see that the length of the following verb phrase has an effect on the stress level of the subject. The normal English stress rule will assign John secondary stress in sentences like the above. But a later phonetic rule (which is probably universal) will reduce this stress further, depending on the length of the following VP. The longer the VP, the lower the stress on John. In (38), the stress on John is made low enough for John to be considered as possible antecedent. But in (97), John retains secondary stress, which is too high to permit a noun phrase to be considered as a

possible antecedent. If this interpretation of the data is correct, it would seem that possible pronoun-antecedent relationships are in part determined by a phonetic stress rule. This rule would apply after all the syntactic transformations and after all the phonological rules as well. It applies as close to the output of the grammar as any rule I know of. If the phonetic stress reduction is really what is involved here, then we have a very strong argument for treating constraints on pronoun-antecedent pairs as being stated in output conditions, since the information necessary for stating these conditions would be available only in the output of the grammar (after all the syntactic and phonological rules have applied).

Though pronoun-antecedent constraints seem to involve stress, they cannot, of course, be stated only in terms of stress contours. As we have seen, such syntactic notions as subordinate clause and main clause are involved in these constraints. The above examples show that pronominalization can go backwards into a main clause from a subordinate clause just in case the antecedent NP has low stress. However, pronominalization cannot usually go backwards, no matter how low the stress on the antecedent. For example, consider (110).

- (110) *He said that John had left town to visit his aged grandmother in a small village at the foot of Baldface Mountain.

But not only must such syntactic notions as subordinate clause be mentioned in these constraints, but as we saw earlier, the notion subject must also be mentioned. As we saw, pronominalization can go backwards from subordinate to main clauses if the antecedent has low stress -- but only if the pronoun is not a subject. If the pronoun is the subject of the main clause involved, backwards pronominalization is impossible no matter how low the stress or how lengthy the intervening subject matter. For example, compare (102) with (111).

- (111) *He was hit by Mary, before John left in his Rolls Royce for a dinner engagement at the Ritz.

Moreover, increasing the length of the VP following he does not improve the sentence.

- (112) *He was hit by Mary with a baseball bat found in a cellar in Roxbury, before John left in his Rolls Royce for a dinner engagement at the Ritz.

So it seems that the notion subject must also be mentioned in the output condition that states pronoun-antecedent constraints. The examples mentioned in section 1.2 above provide further evidence for this.

It is interesting that the question of phonetic stress reduction enters into pronoun-antecedent constraints in exactly those places where the subject-nonsubject distinction is needed to state such constraints. This is true not only of backwards pronominalization into a main clause, but also of the cases discussed earlier of preposed adverbs, topics, and cleft sentences. Akmajian and Jackendoff have

pointed out that if the length factor is taken account of in these constructions, then the possibilities for pronominalization will vary with length, as in the sentences just discussed.

Adverb Preposing

- (14) *In John's apartment, he smokes pot.
- (113) In John's apartment near the railroad tracks in the Pamrapo district of Bayonne, N.J., he smokes pot.

Topicalization

- (52) *Bill's apartment, he always talks to Mary about it.
- (114) Bill's apartment in that neighborhood of the Bronx where so many important literary figures grew up, he always talks to Mary about it.

Cleft Sentences

- (72) *It was John's dog that he bit.
- (115) It was John's dog with the large fangs and the unspeakably terrifying growl that he bit.

It may be accidental that the two cases known to me where phonetic stress reduction plays a role in pronominalization constraints are exactly the cases where the subject-nonsubject distinction plays a role. If this is not just a coincidence, then the theory of grammar must be changed in a way which I cannot at present imagine in order to account for the correlation. Pending further research on the subject, I will assume that it is sheer coincidence.

1.1.5 Changes in the Theory of Output Conditions

1.1.5.1 Some additions

If certain of the constraints on pronominalization are to be stated as output conditions, then the theory of output conditions will have to be broadened to include:

- (i) Variables
- (ii) A definition of main clause and subordinate clause
- (iii) A definition of subject and nonsubject
- (iv) A specification of phonetic stress level
- (v) A means of indicating identity of intended reference
- (vi) The notion command
- (vii) A limited use of quantifiers

A specification of the output condition needed to block the appropriate sentences containing preposed adverbs and topics would have to contain at least the following information.

- (116) Structural description:

X - NP - X - NP - X

1 - 2 - 3 - 4 - 5

The sentence is unacceptable if:

- (a) 2 has the same reference as 4
- and (b) 2 commands 4
- and (c) 4 is [+PRO] and [-REL]
- and (d) 2 is above the appropriate stress level
- and (e) 4 is a subject
- and (f) There is at most one S node which dominates 4 but does not dominate 2

Condition (f) is necessary, since forward pronominalization is blocked only if the pronoun is the subject of the highest sentence in question. Thus, (116) will block (117), but not (118).

(117) *John's house, he always talks about it.

(118) John's house, Mary says that he always talks about it.

To my knowledge, the constraints in (116) will handle the cases where forward pronominalization is blocked for preposed adverbs, topics, and cleft sentences. (116) states the constraints in terms of structural conditions. However, there may be a different generalization at work here. Preposed adverbs, topics and clefted elements are all elements that are being focussed upon by the speaker, or given special prominence. Thus, it is possible that the appropriate output conditions should mention elements that are being given special prominence, assuming that some notion such as prominence can be formally specified. The theory of output conditions would then have to be broadened to include:

(viii) The notion prominence with respect to a given S-node.

One might think that if one includes the notion prominence in the theory of output conditions, one might be able to avoid the use of quantifiers in stating output conditions. Condition (f) could then be done away with and replaced by a new condition which mentions prominence. Unfortunately such a new condition would also have to use quantifiers. Thus, (116) could be replaced by (119).

(119) Structural description:

X - NP - X - NP - X

1 - 2 - 3 - 4 - 5

The sentence is unacceptable if:

- (a) 2 has the same reference as 4
- and (b) 2 commands 4
- and (c) 4 is [+PRO] and [-REL]
- and (d) 2 is above the appropriate stress level
- and (e) There exists an S_1 such that 4 is the subject of S_1 and 2 is dominated by a node which is prominent with respect to S_1 .

(119) would, like (116), rule out (117), while permitting (118). In (117), John would be term 2 and he would be term 4. John's house would be prominent with respect to the S_1 , he always talks about it. Since he (term 4) is the subject of S_1 and since John (term 2) is dominated by a node (the NP dominating John's house) which is prominent with respect to S_1 , condition (e) would be met and (117) would be blocked.

In (118), John would again be term 2 and he would be term 4. But in (118), John's house would be prominent with respect to the S_1 , Mary says he always talks about it. Thus, Mary is the subject of S_1 , and he (term 4) is not. Therefore, condition (e) cannot be met, and (118) is not blocked. As should be clear from this example, quantifiers are needed to guarantee that the S with respect to which prominence is defined is the same as the S that 4 is the subject of. Thus, the addition of the notion prominence would add a new device to the theory of output conditions without allowing us to get rid of any of the old ones.

1.1.5.2 The Anaphora Hierarchy

As we mentioned above, full noun phrases can be used as anaphoric expressions just as pronouns can. And these sometimes obey the same output conditions as pronouns do.

- (120) Mary kicked him, when Fat Max insinuated that she had been sleeping with Algernon for several months.
- (121) Mary kicked the bastard, when Fat Max insinuated that she had been sleeping with Algernon for several months.
- (122) *He was kicked by Mary, when Fat Max insinuated that she had been sleeping with Algernon for several months.
- (123) *The bastard was kicked by Mary, when Fat Max insinuated that she had been sleeping with Algernon for several months.

Here the full NP, the bastard, obeys the same constraints as those on backwards pronominalization from subordinate clauses into main clauses. In such examples, the bastard must act like a pronoun and cannot act like an antecedent, and Fat Max must act like an antecedent and cannot act like a pronoun.

- (124) Mary kicked Fat Max, when the bastard insinuated that she had been sleeping with Algernon for several months.
- (125) Fat Max was kicked by Mary, when the bastard insinuated that she had been sleeping with Algernon for several months.

(125) is grammatical since the bastard acts like a pronoun and since forward pronominalization is possible in that environment.

The question arises as to exactly when a full NP can act like a pronoun and when it cannot. One might think that NP's that can act as pronouns are limited to epithets like bastard, bum, bitch, schmuck, etc.; however, I believe that any definite description can function in that way.

- (126) Mary slapped Dirksen, when the Illinois Republican insinuated that she had voted for Lyndon Johnson.
- (127) Mary slapped the Illinois Republican, when Dirksen insinuated that she had voted for Lyndon Johnson.
- (128) Dirksen was slapped by Mary, when the Illinois Republican insinuated that she had voted for Lyndon Johnson.
- (129) *The Illinois Republican was slapped by Mary, when Dirksen insinuated that she had voted for Lyndon Johnson.

Here the Illinois Republican is a definite description used as a pronoun. Lest readers consider this just another example of an epithet, let us consider some more innocuous examples. Assume that Dirksen is wearing a blue suit.

- (130) Mary slapped Dirksen, when the man in the blue suit insinuated that she liked Lyndon Johnson.
- (131) Mary slapped the man in the blue suit, when Dirksen insinuated that she liked Lyndon Johnson.
- (132) Dirksen was slapped by Mary, when the man in the blue suit insinuated that she liked Lyndon Johnson.
- (133) *The man in the blue suit was slapped by Mary, when Dirksen insinuated that she liked Lyndon Johnson.

Here the man in the blue suit is clearly a definite description and not an epithet.

The generalization concerning the conditions under which an NP can serve as an anaphoric expression involves a distinction among four types of noun phrases.

- (134) 1. proper names (e.g. Dirksen)
 2. definite descriptions (e.g. the man in the blue suit)
 3. epithets (e.g. the bastard)
 4. pronouns (e.g. he)

These types of noun phrases form a hierarchy as given in (134). In general, an NP with a lower number in the hierarchy may be an antecedent of an NP with a higher number, but not vice versa. An NP cannot be the antecedent of an NP with the same number, unless one is a repetition of the other or unless both are pronouns. For example,

- (135) Napoleon entered the room and Napoleon announced that Jean-Luc would hang.
- (136) *Napoleon entered the room and Bonaparte announced that Jean-Luc would hang.

(135) and (136) show that a proper name can be an antecedent of another proper name, only if the two are identical. As further examples, consider the following:

- (137) Napoleon entered the room and the emperor announced that Jean-Luc would hang.
- (138) *The emperor entered the room and Napoleon announced that Jean-Luc would hang.

- (139) Napoleon entered the room and the bastard announced that Jean-Luc would hang.
 (140) *The bastard entered the room and Napoleon announced that Jean-Luc would hang.
 (141) Napoleon entered the room and he announced that Jean-Luc would hang.
 (142) *He entered the room and Napoleon announced that Jean-Luc would hang.

Although (138), (140) and (142) are all unacceptable, (138) is better than (140), which is better than (142). That is, there is a hierarchy of unacceptability here which mirrors the hierarchy of (134). The greater the difference in numbers with respect to the hierarchy of (134), the less acceptable the sentence.

best -- (138) --- the emperor	Napoleon ...	
	2	1	ungrammatical
middle -- (140) ---	...the bastard	Napoleon	
	3	1	sentences
worst -- (142) ---	... he	Napoleon	
	4	1	

Just as there is a hierarchy of unacceptability here, so there is a hierarchy of acceptability as well. Though (137), (139), and (141) are all grammatical, (141) is the most acceptable, (139) less so, and (137) somewhat less. Again, the acceptability hierarchy mirrors the hierarchy of (134). The greater the difference in numbers with respect to the hierarchy of (134), the more acceptable the sentence.⁷

best -- (141) --Napoleon	he.....	
	1	4	grammatical
middle - (139) --	...Napoleon	the bastard..	
	1	3	sentences
worst -- (137) --	...Napoleon	the emperor..	
	1	2	

Let us now turn to definite descriptions. According to the hierarchy of (134), definite descriptions can be antecedents of epithets and pronouns, but epithets and pronouns cannot be antecedents of definite descriptions.

- (143) The emperor entered the room and the bastard announced that Jean-Luc would hang.
 (144) *The bastard entered the room and the emperor announced that Jean-Luc would hang.
 (145) The emperor entered the room and he announced that Jean-Luc would hang.
 (146) *He entered the room and the emperor announced that Jean-Luc would hang.

Moreover, the hierarchy of (134) predicts that definite descriptions cannot be antecedents of definite descriptions, unless they are identical.

- (147) The man with his hand in his vest entered the room and the man with his hand in his vest announced that Jean-Luc would hang.
- (148) *The man with his hand in his vest entered the room and the emperor from Corsica announced that Jean-Luc would hang.

Epithets also follow the hierarchy of (134). Epithets may be antecedents for pronouns, but pronouns may not be antecedents for epithets.⁸

- (149) The bastard entered the room and he spat on the floor.

- (150) *He entered the room and the bastard spat on the floor.

And, as the hierarchy predicts, epithets may be antecedents of other epithets only if they are identical.

- (151) The bastard entered the room and the bastard spat on the floor.

- (152) *The bastard entered the room and the bum spat on the floor.

However, two different epithets referring to the same person may occur in the same sentence, provided that there is another noun phrase in the sentence that serves as an antecedent to both of them.

- (153) After we let Sam into the house, the bastard entered the living room and the bum spat on the floor.

In (153) Sam is antecedent to both the bastard and the bum. This works not only for epithets, but for definite descriptions as well.

- (154) *The Illinois Republican entered the living room and then the man with the silver hair began to make a speech.

(154) is unacceptable since a definite description cannot be the antecedent of another definite description. (155) is acceptable if we understand Dirksen to be the antecedent of both the Illinois Republican and the man with the silver hair. So, in (153) and (155) we have the following situation.

.....Sam.....the bastard.....the bum.....
Dirksen.....the Illinois Republican....the man with
 silver hair.....

The same is true with pronouns.

- (157) After we let Dirksen into the house, he entered the living room and then he began to make a speech.

Here both occurrences of he refer back to Dirksen, as in (158).

- (158) ...Dirksen.....he.....he.....

This situation arises not only within sentences, but also across sentence boundaries.

(159) We let Dirksen into the house. He entered the living room and then he began to make a speech.

(160) We let Dirksen into the House. The Illinois Republican entered the living room and then the man with the silver hair began to make a speech.

(161) We let Sam into the house. The bastard entered the living room and the bum spat on the floor.

Thus sentences like (152) and (154) are unacceptable only if it is assumed that one of the underlined noun phrases is the antecedent of the other. If, instead, we assumed that both are anaphoric expressions referring back to an antecedent in a previous sentence, then these sentences are acceptable. So sentences like (162) He entered the room and then he spat on the floor: (161)

(162) He entered the room and then he spat on the floor: (161) are acceptable if both occurrences of he are understood as referring back to some person in a previous sentence. The first he cannot be understood as the antecedent of the second he.

1.1.5.3 The general notion "antecedent of"

The examples in the previous section indicate anaphoric noun phrases in general can be subject to the same constraints as pronouns. This means that output conditions must be stated not just for pronouns but for anaphoric noun phrases of all sorts. As we saw in the previous section, one cannot tell just from the form of a single noun phrase whether it is anaphoric. Instead, one must be able to pick out antecedent-anaphoric pairs by a principle based on the hierarchy of (134) and output conditions must be formulated in terms of this principle. We can define the general notion "antecedent of" as follows:

(162) Given two coreferential NP's, NP_i and NP_j , we will say that NP_i is the antecedent of NP_j , if (a) NP_i ranks higher than NP_j in the hierarchy of (134) or if (b) NP_i and NP_j are identical in form and NP_i precedes NP_j .

(162b) is necessary for cases like (163).

(163) Dirksen was kicked by Mary; when Dirksen insinuated that she had voted for Lyndon Johnson.

In (163) the first occurrence of Dirksen must be considered the antecedent of the second occurrence of Dirksen. In the case of repeated noun phrases, the first is always considered the antecedent of the second.

With a definition of "antecedent of," we can state the output condition for cases (120) - (133) and similar cases.

(164) Structural description: $X - NP_1 - X - NP_1 - X$

1 2 3 4 5

The sentence is unacceptable if:

- (a) There exist S_a and S_b such that S_b is subordinate to S_a ,
- and (b) S_a dominates 2 and S_b dominates 4 and S_a does not dominate 4 and S_b does not dominate 2,
- and (c) 4 is the antecedent of 2, and either
- (d) 2 is the subject of S_a , or
- (e) 4 is stressed, or both
- (e) and (f) hold.

(164) will handle all the cases I know about of backwards anaphora from a subordinate clause to a main clause.⁹

Similarly, we can account for the unacceptability of backwards anaphora in coordinate clauses, as in (135) - (154), with an output condition like (165).

(165) Structural description: $X - NP_1 - X - NP_1 - X$

1 2 3 4 5

The sentence is unacceptable if:

- (a) There exist S_a and S_b such that S_a and S_b are coordinate,
- and (b) S_a dominates 2 and S_b dominates 4 and S_a does not dominate 4 and S_b does not dominate 2,
- and (c) 4 is the antecedent of 2.

There are still other cases where the general notion of antecedent is necessary. (166) is an example of an output condition that applies only to anaphoric noun phrases that are not pronouns.

(166) Structural description: $X - NP_1 - X - NP_1 - X$

1 2 3 4 5

The sentence is unacceptable if:

- (a) 2 is the antecedent of 4
- (b) 2 commands 4 and 2 does not command 4,
- and (c) 4 is not a pronoun.

(166) will account for the following sentences:

- (167) *Johnson thinks that Johnson is popular.
- (168) *Johnson thinks that the Texan is popular.
- (169) *Johnson thinks that the bastard is popular.
- (170) Johnson thinks that he is popular.
- (171) *Johnson likes people who like Johnson.
- (172) *Johnson likes people who like the Texan.
- (173) *Johnson likes people who like the bastard.
- (174) Johnson likes people who like him.

As (166) is stated, it will apply only when the antecedent precedes the anaphoric noun phrase. However, that same constraints hold when the anaphoric noun phrase precedes its antecedent.

- (175) That Johnson is unpopular bothers Johnson.
- (176) *That the Texan is unpopular bothers Johnson.
- (177) *That the bastard is unpopular bothers Johnson.
- (178) That he is unpopular bothers Johnson.
- (179) People who know Johnson hate Johnson.
- (180) *People who know the Texan hate Johnson.
- (181) *People who know the bastard hate Johnson.
- (182) People who know him hate Johnson.

Note that (179) is grammatical, since by the definition of antecedent in (162), the first occurrence of Johnson is the antecedent of the second. Because of this, condition (166) is not met, and thus it cannot rule out (179). Thus, (179) is acceptable for the same reason as (183) and (184), where the anaphoric noun phrase commands its antecedent.

- (183) People who know Johnson hate the Texan.
- (184) People who know Johnson hate the bastard.

(175) is not subject to condition (166) for the same reason as (179) is. In (175) the anaphoric noun phrase commands its antecedent. In my idiolect I find (175) of questionable acceptability, which is also true of (185) and (186), which share the same condition.

- (185) That Johnson is unpopular bothers the Texan.
- (186) That Johnson is unpopular bothers the bastard.

(164), (165), and (166) show that the notion "antecedent of" is necessary for the general statement of output conditions. To my knowledge, the definition of antecedent given in (162) is universal, as is the hierarchy of (134).

1.1.6 Dialect Variations

As I have pointed out above, the constraints we are dealing with are subject to some dialectal and idiolectal variation. Actually, there is a considerable amount of variation, more than I have mentioned so far. I noted that, in my speech, (186) is unacceptable but (187) is acceptable.

- (186) *He was kicked by Mary, before John had a chance to get up.
- (187) Mary kicked him, before John had a chance to get up.

Though the majority of the speakers I've asked share this view, there are some who find (186) and (187) both ungrammatical, and there are some isolated individuals who find both of them grammatical.

I mentioned above that many people find (34), (67), and (75) grammatical. These individuals do not have the constraint that

backwards pronominalization can go into topicalized elements only from subjects. Instead, they permit free backwards pronominalization into topicalized elements.

Another case of such variation has been reported by Stanley Peters. Apparently there is a Texas dialect where sentences like (188) are grammatical.

(188) It bothered him that John was sick.

Variations like these can be described in terms of a theory of output conditions like that proposed in § 1.1.5. If one can pick out the structures in which the variation occurs, they can be listed as extra conditions in statements like (116).

Paul Postal has pointed out an even more interesting case of variation from speaker to speaker. Some speakers find (189) acceptable, although it is unacceptable in my speech.

(189) His mother hates John.

I have found that the same speakers who accept (189) will accept (190).

(190) In John's apartment, he smokes pot.

These speakers will reject, as will all the speakers I have asked (191) and (192).

(191) *He hates John's mother.

(192) *Near John, he saw a snake.

And these speakers like all others will accept (193) and (194).

(193) Women who know him hate John.

(194) In the apartment which John rents, he smokes pot.

If one groups speakers who accept (189) and (190) into what we will call Group A and put those who do not accept them into Group B, and if we pick out as the relevant NP the leftmost underlined NP in the above sentences, one gets the following distribution:

(195)	Relevant NP	Group A	Group B
	Head NP	no good	no good
	Unembedded modifier NP	okay	no good
	Embedded NP	okay	okay

The distinction between the two dialects seems to be a matter of how far down in the tree the relevant NP must be. Group B requires that it be embedded in a subordinate clause, while Group A will allow it to be an unembedded modifier. Since two different conditions are involved, this indicates that output conditions should include some notion like "sufficiently far down on the tree," which can vary from speaker to speaker in its exact definition, but would not vary from condition to condition.

If the constraints on pronominalization are to be stated as output conditions, then it is not at all surprising that they should vary from speaker to speaker, since other output conditions (see Ross, 1967b, Chapter 3) are known to be subject to such variation.

FOOTNOTES

1. In these examples, the underlined noun phrases are assumed to refer to the same individual. (4) is ungrammatical if he is understood as referring to John. It is, of course, grammatical if he is understood as referring to some other person not mentioned in the sentence. Thus, we are not discussing whether the sentence, taken in isolation, is grammatical or not. Instead, we are discussing whether the sentence with the interpretation imposed upon it by the underlining is grammatical.
2. Some speakers will differ with my judgments as to the acceptability of these sentences and of many others that will be discussed below. This should not be surprising, since the constraints we are discussing are subject to dialectal and idiolectal variation. This variation will be discussed, though not in much detail, in section 1.1.6.
3. I find this sentence of marginal acceptability. Of the people I have questioned, some agree with my judgment, some find it fully acceptable, and some find it unacceptable. The notations '?' and '?*' will be used below to indicate such marginal sentences.
4. See Ross, 1967b, Chapter 3.
5. See Perlmutter, 1968.
6. Essentially the same observation was made independently by Akmajian and Jackendoff (1968).
7. This hierarchy makes a claim with respect to possible dialect differences in the acceptability of these sentences. There are some people for whom (137), the 'worst' case, is ungrammatical. That is, some people will consider as ungrammatical sentences which I consider as grammatical but perhaps somewhat awkward, like (137). But I know of no cases where someone will reject (139) as unacceptable, while accepting (137). People will never reject what I call the 'middle' cases while accepting the 'worst' cases. To this extent the hierarchy limits the range of possible dialectal and idiolectal variation in these cases.
8. One might think that epithets can only be used anaphorically and can never appear as antecedents. However, as Robin Lakoff has pointed out, this is not so.

- (a) Some bastard broke into my house and he drank up all my beer.

As R. Lakoff notes, these cases are especially interesting since in a sentence like

- (b) Some bastard drank up all my beer.

the reason that I am calling that person a bastard is contained in the sentence, namely, because he drank up all my beer. This is not the case with definite epithets, as in (149). One might then conclude that only indefinite epithets can appear as antecedents and that definite epithets must be anaphoric. But, as (c) shows, this is false.

- (c) The cops caught the bastard who drank up all my beer and they locked him up.

9. 9. In (164), (165), and (166) the notation 'NP₁' in the structural description is used to indicate that the two NP's are to be understood as having the same reference. No great significance should be attached to this choice of notation.
10. Since I have not done an extensive serious study of these variations, the facts I present in this section can only be considered anecdotal. I think it is important that this subject matter be studied seriously and I consider this section only as indicating a direction that such studies might take.