



On Certain Ambiguities

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Paul M. Postal

On Certain Ambiguities

*For Morris Halle on his fiftieth birthday
July 23, 1973*

i. Introduction¹

Hasegawa (1972) argues that a certain range of English data involving ambiguities provides some basis for accepting a theory of grammar containing interpretive rules and grounds for rejecting the conception of generative semantics (GS). However, there is reason to doubt that Hasegawa has understood very clearly what the GS position is. For instance, he denies (1972, 148-149) that the fact that one sentence has n different readings is grounds for assigning it n different "deep structures", where he believes such assignment to be a consequence of GS assumptions. But this is confusing, since this theory claims simply that the underlying structure of a sentence is (a subpart of?) its full logical structure. Therefore, in a case like that dealt with by Hasegawa, GS recognizes the n logical structures and the surface structure, just as he (presumably)² would, and the n different "deep structures", insofar as these are distinct from the logical structures, are nowhere to be found. Indeed, it has been a primary view of GS writings that no real evidence has been attested supporting the existence of a level of "deep structure" distinct from logical structure, and, even more fundamentally, that there is no reason to expect any to be discovered. I shall not pursue this line of discussion here, however.

I will begin this study by considering Hasegawa's treatment, but will then pass beyond it to more general issues. I commence by arguing that the analysis presented by Hasegawa could not possibly either support an interpretive approach to meaning or disconfirm the GS view since he has misconceived the nature of problems involved in the data he discusses. Because of this, his descriptive account turns out to be an artifact which characterizes neither the nature nor the distribution of the relevant properties manifested by English sentences. I will argue this by displaying a range of

¹ The present version of this work has greatly benefited from criticisms by and discussions with George Lakoff, John Lawler, David Perlmutter, Warren Plath, and Haj Ross. Remaining deficiencies are hereby claimed by the author.

² McCawley (1973) argues, not fully convincingly in my opinion, that Hasegawa's conception of semantic representation is as a set of "annotations" of "deep structures". If so, then Hasegawa's position would not be congruent with GS assumptions here. McCawley provides a wide-ranging criticism of Hasegawa's account. Without committing myself to agreement with his remarks in toto (cf. section 11), it should be said that the present discussion is pretty much complementary to his and should best be read in concert with it. In general, I have directed attention to aspects of Hasegawa's treatment which are either not dealt with by McCawley or else given a different emphasis.

cases which Hasegawa's account cannot handle. However, these cases have been chosen not only to provide evidence against his account, but to simultaneously form the basis for some insights into what is actually going on.

After criticisms of Hasegawa's analysis, I then sketch the outlines of what I claim is a more adequate approach,³ provide some arguments in favor of it, and consider a range of theoretical problems which arise naturally in the course of the discussion.

2. Basics

Hasegawa assumes, in agreement with McCawley (1970), and surely noncontroversially, that an adequate overall grammar of English must explicate ambiguities like those in (1) and (2):

(1) = essentially Hasegawa's (16)

John believes that Mary didn't kiss the boy she kissed.

(2) = essentially Hasegawa's (17)

John $\left\{ \begin{smallmatrix} \text{claims} \\ \text{thinks} \end{smallmatrix} \right\}$ that Mary is taller than she is.

As he indicates, the complement in (1) has a contradictory reading, but also a consistent reading in which the description *boy she kissed* is used by the speaker but is not part of the belief attributed to the entity designated by *John*. Similarly, (2) is ambiguous as to whether there is an assertion that John believes the contradiction represented by the independent sentence (3) or whether he is only asserted to have an exaggerated idea of Mary's height.

(3) Mary is taller than she is.

Hasegawa assumes, correctly, I think, but without argument, that the ambiguities in (1) and (2) are the same ambiguity, that is, a function of the same feature of grammar. He assumes further that the relevant property is a matter of what entities are responsible for what statements. Thus the ambiguity in (1) is supposed to involve the contrast of whether the speaker or John makes the statements in the complement, in particular, the statement represented by the restrictive relative clause on *boy*. The situation in (2) is similar. To quote Hasegawa (1972, 147):

Thus the reason why (16) and (17) can have a natural noncontradictory reading seems to be that different portions of the embedded sentence can represent the "assertions"

³ A range of logical structures for various sentences is offered here. The author is perfectly aware that, from nearly any point of view, these are only very primitively characterized at best. The following can be said, however. If the structures are fundamentally incorrect, then their degree of precision is of little importance. If, though, they are basically correct, then there are many far more capable of providing them with the more adequate formulation they deserve. The key issue is whether the representations offered here are precise enough to permit empirical testing of the essential claims made about the logical structures involved. I believe that the answer to this question is positive.

or “judgments” of different persons (*John* or the speaker): it is not required that their thought worlds match exactly in the complement sentence. For example, the person who is responsible for the statement “Mary is ____ tall” can be *John*, whereas (*more*) *than she is* might represent the speaker’s judgment. If *John* is solely responsible for the statement “Mary is taller than she is”, then we get the contradictory interpretation.

Hasegawa proposes to formalize this account by formulating an interpretive rule which applies to “deep structures” (in the sense of structures distinct from logical structures), this rule having the function of constructing different readings by assigning the “assertor” role to either the speaker or the entity designated by the “deep” subject of the verb of propositional attitude (*believe*, *think*, *claim*, etc.).⁴ In Hasegawa’s terms, (1) will receive a consistent reading in case the “assertor” of the relative clause within the complement is the speaker, but an inconsistent one in case the “assertor” is the entity designated by *John*; similarly in (2) with respect to the post-*than* S.

Ignoring any technical problems internal to this approach,⁵ this account is entirely dependent on the underlying and never justified assumption that the ambiguities in question can in fact be analyzed as a function of distinct “assertors”. This idea has some a priori plausibility, but given its fundamental role in Hasegawa’s account, it should be subjected to sharp scrutiny.

Hasegawa’s discussion is based in large part on the complements of verbs like *think*, *believe*, *claim*, *say*,⁶ etc. These complements have the property that they frequently represent propositions. It will be convenient to have a name for such complements, and I will refer to them simply as *P-complements*.

An immediate consequence of Hasegawa’s theory of the facts in question is that the ambiguity will disappear whenever the entity designated by the subject of a verb taking a P-complement is the same as the speaker, that is, for instance, whenever the underlying subject NP is *I*. Significantly, Hasegawa deals with no such cases.

Consider then the result of changing (1) and (2) so that this condition is met:

- (4) I believe that Mary didn’t kiss the boy she kissed.
- (5) I think that Mary is taller than she is.

The claims of Hasegawa’s account are apparently supported since (4) and (5) seem⁷ unambiguous and appear to have only the complement-contradictory readings his

⁴ I assume familiarity here with both Hasegawa’s article and McCawley’s criticism, and thus will make no attempt to re-present Hasegawa’s account in detail. I should stress that the general nature of the objects which Hasegawa’s rule is intended to describe is rather obscure. That is, his conception of semantic representation is quite unclear. This is a question dealt with at some length by McCawley and I will more or less ignore it.

⁵ I will return to such problems below.

⁶ Hasegawa also discusses complements of so-called “factive” verbs like *realize*, claiming that these fail to manifest the kinds of ambiguities found with *believe*, etc. I agree completely with McCawley (1973, 226–227) that this is incorrect. However, since the facts with such verbs are often less clear, I shall avoid them in this discussion.

⁷ Actually, I claim that both (4) and (5) are ambiguous, but that the two readings are difficult to distinguish, for reasons of the sort discussed below in section 6.

account would predict. So far so good. Now, however, change the tense of the main verbs to past:

- (6) I believed that Mary $\left\{ \begin{array}{l} \text{didn't kiss} \\ \text{hadn't kissed} \end{array} \right\}$ the boy she kissed.

- (7) I thought that Mary was taller than she was.

In Hasegawa's terms, tense should be absolutely irrelevant, so that the significant properties of (6) and (7) should be no different from those of (4) and (5). Clearly though, (6) and (7) have the same kind of ambiguities as (1) and (2). Thus they can both be used to report the past existence of either certain simply incorrect assumptions on the part of the speaker, or past occurrences of blatantly inconsistent views. Hasegawa's account, which tries to explicate such ambiguities in terms of distinct "assertors" for statements, is evidently helpless here, predicting falsely that complements like those in (6) and (7) have only inconsistent readings, since the "different" "assertors" of his theory map onto the same individual. More generally, then, Hasegawa's theory is minimally falsified by its mishandling of the class of relevant cases with first person subjects.

Second, observe that Hasegawa's theory of the ambiguities in question depends crucially on the existence of an underlying subject NP designating a mind-possessing entity, an entity capable of sensibly filling the "assertor" role in the same way as the speaker. This predicts that ambiguities of the relevant sort cannot occur in the P-complements of verbs which fail this condition. In reality, however, the ambiguities are manifest in such cases as:

- (8) $\left\{ \begin{array}{l} \text{Those pictures} \\ \text{The police report} \\ \text{Their finding him} \end{array} \right\} \left\{ \begin{array}{l} \text{suggest(s)} \\ \text{might indicate} \\ \text{impl}\left\{ \begin{array}{l} \text{y} \\ \text{ies} \end{array} \right\} \end{array} \right\}$ that Mary didn't kiss the boy she kissed.

- (9) Melvin's being 29 points ahead in the polls $\left\{ \begin{array}{l} \text{suggests} \\ \text{might indicate} \end{array} \right\}$ that he has a better chance of winning than he has.

The only apparent hope for Hasegawa here would be to argue, on the basis of the possibility of *to* phrases in sentences like (10) and (11) that sentences like (8) and (9) involve a deleted *to* phrase NP (probably *to one*) and that this NP is the "deep structure" subject NP to which his interpretive rule applies.

- (10) That suggests to me that Zeus is immortal.

- (11) That indicated to the police that Melvin was a professional rapist.

However, the cost of this is rules of a sort which would otherwise no doubt be rejected in a framework like Hasegawa's, rules which turn an underlying subject into a

postposed *to* phrase and subsequently delete it.⁸ In a GS treatment of sentences like (8) and (9), the main verbs could be treated as combinations of underlying predicates, probably as causatives of predicates like SEEM or APPEAR, so that the *to* phrase NPs would be the subjects of the lower verbals ultimately incorporated into the commanding CAUSE.⁹ But it is such analyses that those holding a "superficial" view of syntactic structure typically wish to avoid.

Further, even a deletion of underlying subjects turned into *to* phrases cannot really salvage Hasegawa's interpretive rule from the problem because the same ambiguities found in (8) and (9) also show up with main verbals like *entail*, *imply*, *have as a consequence*, etc. For example, consider (12), where no underlying NP designating a mind-possessing entity is justified by the meaning (on any reading).

- (12) Those premises $\left\{ \begin{array}{l} \text{entail} \\ \text{imply} \\ \text{have as a consequence} \end{array} \right\}$
 $\left\{ \begin{array}{l} \text{that Mary didn't kiss the boy she kissed} \\ \text{that Mary is taller than she is} \end{array} \right\}$

Moreover, in these cases, it is impossible to construct well-formed examples with *to* phrases.

To further solidify the argument against any meaning rule for the relevant ambiguities of P-complements which depends on underlying subjects designating mind-possessing individuals, note that parallel ambiguities are found in conditional clauses:

- (13) Even if the U.S. were richer than it is, it could not afford that.
(14) Had he not kissed the girl he kissed, he would not have gotten sick.

Obviously, there is no even remotely justifiable "deep structure" for such cases of the sort Hasegawa's theory demands.

The fact is then that the ambiguities Hasegawa encounters are found in a variety of P-complements, like those in (12)–(14), which do not have underlying subjects of the sort which his rule requires to predict the ambiguity. In other words, a descriptive treatment like his either falsely claims that examples like (12)–(14) are monoguous along the relevant parameters, or else claims that, despite the similarities, the properties of (12)–(14) are a function of entirely different causes than those in earlier sentences. The implausibility of the latter tack needs little stress, and such an

⁸ Alternatively, Hasegawa could replace his rule by a less general one which referred disjunctively to subjects and NPs like those in (10) without attempting to derive these from underlying subjects.

⁹ Notice that the relevant ambiguities are found in simpler cases with main verbs *seem*, *appear*, *look*, etc. which is an embarrassment for Hasegawa, independent of cases like (8):

- (i) Joan $\left\{ \begin{array}{l} \text{seemed} \\ \text{appeared} \\ \text{looked} \end{array} \right\}$ (to them) to be taller than she was.

assumption becomes even less acceptable when the failure of the theory with respect to first person NPs is recalled.

So far I have provided two different sorts of counterevidence to Hasegawa's "assertor" theory, both of which have, however, involved P-complements. Note though that his theory involves the implicit claim that the kind of ambiguities found in (1) and (2) *only*¹⁰ arise in P-complements, since it is only these for which the notion of "assertor"¹¹ can possibly¹² make any sense. This is just not the case, though. For instance, the following sentences are ambiguous; and moreover, I claim, ambiguous essentially the way that (2) is:

- (15) The storm prevented it from being hotter than it was.
- (16) His arrival kept us from leaving earlier than we did (leave).

Thus (15), for example, can have a sensible reading on which it means that if it had not been for the storm, the current temperature would be $n + x$ instead of just n . Or, it can have a reading on which it means that the storm prevented the contradictory state of affairs represented by (17):

- (17) It was hotter than it was.

This is weird, since it claims that a physical event prevented a logical impossibility. Clearly, there is nothing in Hasegawa's account to shed any light on the ambiguities of examples like (15) and (16), and he must thus claim that these have an entirely distinct source in the grammar. This will be revealed as a clear case of missing a

¹⁰ Actually, this is not entirely true, since other clauses of a noncomplement sort are also "assertable", at least on occasion. For instance, this is true of *appositive* relative clauses. Significantly, these latter behave quite differently from *restrictive* relative clauses with respect to the phenomena of interest here. Thus compare (i) with (ii):

- (i) They said Marsha hadn't kissed the boy who she had kissed.
- (ii) They said Marsha hadn't kissed the boy, who she had kissed.

While (i) is ambiguous, (ii) is not and entirely lacks any reading under which the complement is contradictory. A proper theory of relative clauses must obviously account for such contrasts. Nothing in Hasegawa's treatment predicts such differences. For a possible explanation of these facts, cf. section 7.

¹¹ It is immediately evident that the concept of "assertor" needs at best to be generalized to something like "possessor of the mind which contains such and such conceptual content" since ambiguities exactly analogous to those in P-complements are found in complements which represent wishes/desires, dreams, etc., which cannot be said to involve assertions:

- (i) Jack wished that Barbara was taller than she was.
- (ii) Dick dreamed that she was more faithful than she was.
- (iii) Irma imagined that she was more beautiful than she was.
- (iv) Lenny pictured her as being taller than she was.

This point is revealed most clearly, perhaps, in the fact that parallel ambiguities also exist in some embedded question clauses:

- (v) Melvin asked when she earned more money than she did.
- (vi) Melvin wanted to know when they kissed the girl who (in fact) they didn't kiss.

¹² I am provisionally assuming here that this notion makes sense for P-complements, a judgment I will later show must be severely revised.

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generalization if one can formulate another account which treats all of the relevant ambiguities homogeneously.

There are two further points to be made about the state-of-affairs type complements in (15) and (16). First, although there are analogues to (1) in which ambiguities of a relevant sort show up, these seem rather weird.

- (18) The storm prevented Mary from not kissing the boy she kissed.

I suggest that the reason is the normal weirdness of having a negative in the complement of *prevent*, which is inherently negative. Second, an adequate theory of the ambiguity of cases like (15) and (16) should explain why there is apparently¹³ no similar ambiguity in the corresponding “positive” cases:

- (19) a. The storm caused it to be hotter than it was.
b. His arrival made us leave earlier than we did leave.

That is, one can not find any sensible readings for (19a) and (19b). If Hasegawa's theory fails to provide any basis for the ambiguity of cases like (15) and (16), still less does it offer insight into why negative causatives like *prevent* and *keep* should contrast with positive ones like *cause* and *make*.

Next, note that ambiguities of the sort in question are also associated with certain occurrences of modals,¹⁴ another fact not predicted by Hasegawa's assumption that the source of P-complement ambiguity is distinct “assertors”:

- (20) Jack could have worked harder than he did.
(21) Jack might not have kissed the girl he kissed (if you hadn't made him).

Thus (20) has a sensible reading, on which it allows that more labor was possible than was accomplished, and a contradictory reading on which it means that the statement represented by (22) is possible:

- (22) Jack worked harder than he did.

The ambiguity of (20) is uncovered by a parallel example in which the pronoun in the second clause is replaced by a noncoreferent:

- (23) Jack could have worked harder than Bob did.

This has two analogous readings. On one, it says that it was possible that Jack worked harder than Bob. This reading involves a comparison of Jack's work with Bob's work. On the other reading, there is a comparison of Bob's work with the work that Jack could have done.

¹³ The remarks of footnote 7 can be applied to (18) and (19) as well.

¹⁴ The reader should at least temporarily ignore any and all ambiguities arising from the possibility of certain modals having different lexical meanings, i.e. differences between so-called root and epistemic readings, differences between logical necessity and obligation, etc. These are not of direct concern here, and when I speak of ambiguities in the text I am making a claim about logical structures in which these possible variations are eliminated.

Similarly, (21) has a sensible reading, on which it contrasts the actual state of affairs with a state of affairs that might have been, and another reading on which it says that (24) might be the case:

- (24) Jack didn't kiss the girl he kissed.

Clearly, there is nothing in Hasegawa's account to explain the occurrence of these ambiguities, and a supporter of his system must claim that the ambiguities in these cases, like those in state-of-affairs complements, have an entirely distinct source from those in P-complements. Hasegawa's theory claims that the ambiguities are a function of complements and parts of complements which are or can be asserted by various individuals, the ambiguities being a function of who does the asserting. But one sees from (13)–(16) and (19)–(21) that they are rather associated with a much wider range of complements, many of which do not involve assertions at all.¹⁵ Thus the ambiguities they manifest can in no way be characterized in Hasegawa's term s.

I have argued so far that (i) Hasegawa's theory fails for P-complements because of the facts involving the first person, and those involving the occurrence of the ambiguities in P-complements which do not occur with subjects designating mind-possessors and (ii) it fails because basically the same sort of ambiguities manifested by P-complements are found in a range of non-P-complements, which cannot have "assertors".

To strengthen the criticisms of Hasegawa's account, it is important to observe that it fails, even for P-complements, in two other serious ways. Hasegawa limited his discussion to P-complements (and "factive" complements) but, equally significantly, to a certain subset of P-complements which were consistent with a false assumption built into his approach. Namely, there is the unstated claim that the P-complement of a relevantly ambiguous example will necessarily represent a proposition—something that can be asserted. In a case like (25) this view is defensible for both readings.

- (25) Jack believes Mary is older than she is.

Consider (26), however:

- (26) Each one_x of us thinks he_x is cleverer than he_x is.

Here the pronouns in the complement represent bound variables in the logical sense. Therefore, the complement as a whole, on either the consistent or contradictory readings, represents not a proposition but rather a so-called *propositional function* or *open sentence* (more precisely just a proper part of such). Open sentences are not the

¹⁵ I am assuming here that modals are underlying verbs, which obligatorily trigger Raising. Hence in an example like (i), *Joan* and *know French* are the discontinuous parts of the underlying subject complement of *may*.

- (i) Joan may know French.

sort of things which can be true or false. Hence, to say the least, it is obscure what it could mean to say, as Hasegawa's rule does, that on one reading of (26) it is the speaker who "asserts" the sentence (he_x is ____), where on the other reading of (26) it is the [entity represented by the subject of *thinks*]¹⁶ whose judgment is represented by that sentence.¹⁷ Because of facts like those illustrated by (26), Hasegawa's approach presently makes senseless claims in a wide range of cases, since it embodies the evident falsehood that P-complements invariably represent propositions.¹⁸

Consider next the problem raised in footnote 16. This involves a mistake on Hasegawa's part which, though independent of the incorrect assumption that the relevant complements always represent propositions, is nonetheless of the same order. It is to assume that the subject of a verb like *believe*, *think*, etc., is always an NP which designates an individual.¹⁹ Put differently, Hasegawa's account deals only with the simplest and most straightforward case, that in which the subject NP corresponds to what logicians call a constant.²⁰ Independently of earlier problems, his rule is completely inapplicable to other sorts of cases like the following:

- (27) a. Each one of us
 b. Most kids
 c. The average prostitute
 d. Either Bill or Fred
 e. Nobody } believes that cocaine is more dangerous than it is.

In these cases, excepting perhaps (d), the subject NP of relevance to Hasegawa's rule represents a combination of a bound variable plus the quantifier or quantifierlike element which does the binding, plus, in some cases, other elements (i.e. NOT in

¹⁶ The reader will notice that the bracketed NP in this sentence does not in fact sensibly characterize any entity. This is a further problem in Hasegawa's account to which I turn presently.

¹⁷ To quote (Hasegawa 1972, 147):

(20) Definition: By $a(S)$ we represent the "assertor" of S . The "assertor" of an S refers to the person who is responsible for the statement (proposition) S , the person whose judgment the proposition S represents.

¹⁸ This is essentially the same misconception pointed out by Karttunen (1971) in connection with the discussion of the "presupposition" of "factive" verbs like *realize*. Although it had often been said that the propositions expressed by the complements of such verbs were presupposed to be true, Karttunen pointed out that frequently such complements do not express propositions, as in (i), where again the complement represents part of an open sentence.

(i) Each one_x of us realizes that he_x is unhappy.

¹⁹ Strangely, Hasegawa's account read literally does not even allow for the case where the relevant subject NP designates more than one individual.

²⁰ Actually, in my opinion, natural languages do not contain what logicians call constants. For example given a sentence like (i)

(i) Paul is happy.

a logician will regard the italicized NP as representative of a constant under the assumption that this element is uniquely related to a single individual named Paul. But of course the English sentence in (i) can be used to make an assertion about an unbounded number of such individuals, one in each particular usage. Thus we might say that an NP like that in (i) is constant-like and that it contextually functions as any one of an infinite number of constants.

(e)). Moreover, this subject NP can itself be a pronoun bound by a quantifier or quantifierlike element occurring in a different position:

- (28) Each one_x of us could have said that he_x believed that cocaine was more dangerous than it was.

It seems that Hasegawa has not considered how his conception of the ambiguities in question interacts with the fact that in general NPs can represent variables as well as constants. Therefore, his presentation involves the kind of failure to distinguish the distinct semantic functions of surface NPs which philosophers of language and logicians have long railed against. Because of this failure, his rule as stated is literally uninterpretable with respect to any and all cases like (27) or (28), and any claim to have a serious theory of the facts in question dissolves until these problems are dealt with.

In summary, I have so far pointed to at least five different types of flaws in Hasegawa's attempt to analyze a certain range of ambiguities, of which he took (1) and (2) to be typical, in terms of distinct "assertors" for sentences: (i) a flaw involving the first person; (ii) one involving subjects which are not mind-designating; (iii) one involving complements which are not P-complements; (iv) one involving the incorrect assumption that P-complements uniformly represent propositions; and (v) one involving the failure to deal with subjects which do not function as analogues of logical constants. These combine to show, I think, that only to a limited extent has Hasegawa succeeded in formulating a coherent theory and that to the extent that it is coherent, it is incorrect. However, there is one further important criticism to be made of this account.

3. The Ambiguities and "Deep Structures"

One of the interests of Hasegawa's account is just the fact that his interpretive rules apply to "deep structures". Because of this, a validation of his approach would provide support for the existence of such objects. It must be stressed then that the ambiguities in question, no matter what they involve, cannot possibly be explicated by interpretive, or other, rules operating on "deep structures" (in Hasegawa's sense) since, under minimal assumptions about transformational deformations, it is easy to show that the ambiguities are in part determined by the transformational development of underlying structures. Let us restrict attention to the comparative type examples for ease of discussion. The facts for the others are parallel, as the reader can directly determine for himself.

According to Hasegawa, sentences are assigned their "assertor" matrices by rules operating on "deep structures", that is, structures derived in the base, structures formed prior to the application of any transformations. Therefore, the claim is made

that the various transformational deformations of particular "deep structures" necessarily²¹ have the same "assertor" properties.

However, consider (29a–c):

- (29) a. Jack assumed that Mary was older than she was.
- b. That Mary was older than she was was assumed by Jack.
- c. It was assumed by Jack that Mary was older than she was.

It is generally accepted that all of the sentences of (29) have essentially the same underlying structure,²² with (29b) derived by Passive and (29c) by Passive plus Extrapolation. Hasegawa's account, when wedded to these assumptions, then predicts that all three should manifest the same ambiguity. But in fact, the ambiguity is manifested only in (29a) and (29c). (29b) has only the reading on which it is asserted that Jack assumed a contradiction.

Similarly, compare (30a and b):

- (30) a. It was easy for Melvin to believe that Mary was older than she was.
- b. That Mary was older than she was was easy for Melvin to believe.

It is widely though not universally agreed that such pairs have the same underlying form, with (30) derived by the rule Tough Movement.²³ However, again, the first example is ambiguous. The second is unambiguously assigned the contradictory reading for the complement.

Next, examine (31a and b):

- (31) a. Jack may not have reported that Mary was older than she was.
- b. ?That Mary was older than she was Jack may not have reported.

Here it is generally agreed that (31b) is derived from a structure like that underlying (31a) by application of the rule Topicalization. (31b) is strained and may be ill-formed for some speakers. Nonetheless, it remains a fact that (31b) also has only the contradictory reading, although an account like Hasegawa's again predicts it should have the ambiguity manifested by its untransformed correspondent.

Exactly the same situation is found in (32):

²¹ Of course, this ignores the possibility that Hasegawa's account might be supplemented with further rules, not limited to "deep structures", which would alter the "assertor" properties assigned with respect to "deep structures". In this case, one would not in general be able to determine "assertor" properties from "deep structures" and as such the new account would make no general predictions at all. It is safe then to ignore this possibility as involving not so much an extension of Hasegawa's theory as its abandonment.

²² Although it is not at all agreed just what they are. For example, I assume that the underlying form of (29a) involves a verb *assumed* and two NPs, one sentential. But the NP-hood of the complement is denied by Emonds (1970, 1972), Chomsky (1973), and others in that tradition.

²³ For arguments in favor of Tough Movement cf. Berman (1973a, 1973b); for arguments against cf. Lasnik and Fiengo (1973).

- (32) a. The AP wire certainly might have reported Mary to be older than she was.
 b. ?Older than she was, the AP wire certainly might have reported Mary to be.

Once more, the type of topicalization in (32b) is strained at best, but, crucially, the ambiguity of (32a) disappears in the clearly nonbase structure (32b).

Next, let us consider (33):

- (33) a. The *Times* {more than three weeks before that
 because of the interference of that official
 I am quite certain} {reported
 said}
- that Mary was older than she was.
- b. The *Times* {reported
 said} {more than three weeks before that
 because of the interference of that official
 I am quite certain}
- that Mary was older than she was.

Here, all of the cases of (33a) have the ambiguity predicted by Hasegawa's account. But, rather extraordinarily, the cases of (33b) have, in my idiolect at least, only the contradictory type readings, showing that the relative positioning of adverbs and complements can also affect the properties at issue. But there is no reason to believe that differences like those between (33a, b) are established in base structures.²⁴

Finally, let us take (34):

- (34) Tom may believe that Mary is older than she is and Jack certainly does believe that Mary (she) is older than she is.

According to Hasegawa, (34) should be at least four ways ambiguous since there is nothing to prevent assignment of the Cartesian product of the ambiguities in each conjunct separately. This seems incorrect; the complements in the two conjuncts must, I submit, have the same type of reading. Perhaps Hasegawa can appeal to the filtering function of rules for *may*, *certainly*, etc., to account for why (34) is only two ways ambiguous. But now examine (35):

- (35) Tom may believe—and Jack certainly does believe—that Mary is older than she is.

Sentences like (35) are derived from structures like those underlying (34) by the rule Right Node Raising.²⁵ Therefore, Hasegawa's account, even supplemented by some

²⁴ In fact, there is a good case to be made that the positioning in (33b) is a function of the rule Heavy NP Shift. Cf. Postal (to appear) and Ross (to appear).

²⁵ For some discussion of this cf. Maling (1972), Hankamer (1971), and Postal (to appear).

devices to account for the fact that (34) is only two ways ambiguous, predicts that (35) is also two ways ambiguous. I find this conclusion dubious; it is at best hard for me to get the noncontradictory reading for the complement in (35). I will not insist on this, however, since it is perfectly obvious that the result of applying Topicalization to (35), namely (36), is, though strained, monoguous.

- (36) ?That Mary is older than she is, Tom may believe—and Jack certainly does believe.

Only the contradictory reading for the complement is found.²⁶

The range of cases just discussed indicates, I think, that the manifestation of the ambiguity type of interest here is linked to transformationally derived structures and thus that any account like Hasegawa's which tries to mark such ambiguities in "deep structures" is doomed to failure.

Hasegawa's interpretive account is based (i) on the assumption that the ambiguities in question are a function of distinct "assertors" and (ii) on the assumption that the ambiguities in question can be characterized in terms of the properties of "deep structures". But the cases discussed argue that both of these assumptions are incorrect. Consequently, the rule based on them is an artifact rather than an explication of some real feature of the grammar of English. Therefore, any conclusions about the adequacy (superiority) of interpretive treatments or the inadequacy of GS accounts based on the rule in question cannot stand. Finally, no such rule can contribute in any way to supporting the claim that "deep structures" exist.

4. Characterizing the Ambiguities

The previous two sections have been largely negative. Although this is not the appropriate context in which to develop a serious account in detail, I would like to outline what I consider the right direction to take in constructing a proper theory of the ambiguities. I suggest that these ambiguities are in fact *scope* ambiguities involving the relative scopes of (the predicate underlying the) complement verbs *believe*, *think*,²⁷

²⁶ One might wonder about the reason for giving (36) in addition to (31b), since the latter suffices to show that Topicalization blocks one reading. However, (36) adds to the weight of evidence showing that the distribution of the readings in question is determined by principles which must refer to derived structures because in (36) application of Topicalization is only made possible by a previous application of Right Node Raising. Without this, Topicalization would have been blocked by the Coordinate Structure Constraint.

²⁷ At least with respect to the comparative examples, this is, of course, not a new idea. It has been discussed in essence at least by, among others, R. Lakoff (1970), Huddleston (1971), and Ross and Perlmutter (1970), all favorably, and unfavorably by Bresnan (1971) and Hasegawa. As far as I know, the idea that the comparative element was a "higher predicate" originating outside of the clause which ultimately contained it is originally due to G. Lakoff.

Although I am perfectly happy to argue for the merits of a higher predicate, scope theory of comparatives and comparative ambiguities, I must admit to finding it a bit weird that it is necessary to do so in 1974. Given what is known about logical structures in general today, this seems to me to be the absolutely natural hypothesis, the one which anyone would turn to first and would only abandon in the face of powerful counterevidence. However, no such evidence is known.

etc., and, in the comparative case, a binary predicate of comparison (call it MORE).²⁸ Thus, to take a concrete example, the ambiguity of a sentence like (37) is a function of two distinct logical structures (and hence, in GS terms, two distinct bases for the derivation of the surface form) representable schematically²⁹ as (38):

- (37) Jim believes that Mary is older than she is.
- (38) a. MORE x [Jim believes (Mary is old to x)] y [Mary is old to y]
- b. Jim believes (MORE x [Mary is old to x] y [Mary is old to y])

In this and following representations, I enclose restrictive relative clauses in square brackets, complements in parentheses. Thus (38a) represents a comparison of two arguments, x and y ,³⁰ the former characterized by the restrictive relative clause which says that "Jim believes Mary is old to x ", the other characterized by a restrictive relative clause which says "Mary is old to y ". Thus the arguments x and y in (38a) are characterized differently, and this structure represents a consistent synthetic comparison. The comparison is external to the complement of the verb *believes*. That is, the comparative predicate, MORE, commands the predicate which ultimately shows up as the main verb. (38a) thus represents the consistent reading of the complement of (37), one on which the speaker specifies a mistaken belief. In (38b), however, the comparison is internal to the complement of *believe*, and the compared

²⁸ One must also consider the comparative elements in sentences like (i) and (ii), which behave in general like *more*.

- (i) Jim believes that Mary is less intelligent than she is.
- (ii) Jim doesn't believe that Mary is as intelligent as she is.

We can recognize a predicate LESS for the former case, which is nothing but the converse of MORE. The latter is more complicated, and I suggest that *as . . . as* is in fact potentially ambiguous. In contexts like (iii) I claim that it represents the predicate of extensional identity, SAME, to be encountered again below.

- (iii) Mary is exactly as tall as Joan.

However, in contexts like (iv) *as . . . as* cannot represent the symmetrical SAME since the relation in (iv) is asymmetrical. Note (v) as well in this connection:

- (iv) Jack is as intelligent as Mary, in fact he is more intelligent.
- (v) *Jack is as intelligent as Mary, in fact he is less intelligent.

I propose that in contexts like (iv) *as . . . as* represents the combination of NOT + LESS. Note that this analysis is impossible for (iii).

²⁹ This and all following representations are schematic. But there are two possible senses of this characterization. On the one hand, there can be a schematic presentation of well-understood structures, simplified for purely discursive reasons. On the other hand, representations can be schematic because one simply does not understand the overall structure well enough to provide more detailed descriptions without massive arbitrariness. While both senses apply here, the latter is far more basic and important.

³⁰ With respect to the description of (38a) and all following comparative examples, it is assumed that arguments like x and y designate extents, degrees, amounts, rates, etc., whatever these are exactly. Thus, to the extent that English permits the representation of structures like (38a) as surface structures in which the comparative element serves as a main verb, the arguments will tend to be either nominalizations or NPs with heads containing *extent, degree, amount*. Thus (38a) can be very crudely and unnaturally realized as:

- (i) The extent to which Jim believes Mary is old $\left\{ \begin{array}{l} \text{is more than} \\ \text{exceeds} \end{array} \right\}$ the extent to which she (Mary) is old.

arguments are identically characterized intensionally, thus entailing coreference.³¹ But MORE is an asymmetrical predicate, and consequently it is a contradiction to assert that this predicate holds of a pair of (inferably) coreferential arguments. Thus (38b) says that Jim believes this contradiction and provides the other reading of (37).

This account of the contradictory reading of the complement of (37) has an interesting feature. Since it depends critically on the asymmetrical nature of the predicate MORE, the proffered analysis predicts that examples analogous to (37), but representing a symmetrical predicate, would not manifest a contradiction. We can test this prediction since there is a symmetrical³² comparative element, namely, that found in such sentences as (ii) of footnote 28 and (39):

- (39) Mary is as old as Barbara.

Taking the analysis of *as . . . as* on which it represents the comparative SAME, our treatment of (37) as in (38) commits us to a parallel treatment of (40), namely (41):

- (40) Jim believes that Mary is as old as she is.

- (41) a. SAME x [Jim believes (Mary is old to x)] y [Mary is old to y]
 b. Jim believes (SAME x [Mary is old to x] y [Mary is old to y])

These representations predict that (40) is ambiguous, which it is. Note, however, that the complement in (41b) which is the analogue of the one in (38b), is not contradictory but rather tautological. And this is in accord with the relevant reading of (40), which is an assertion that Jim believes a tautology.

The reasons for the tautological nature of the complement of (41b) are straightforward. The complement of *believes* in (41b) consists of the predication of SAME of two arguments, x and y . However, these are intensionally characterized in the same way, and are, therefore, subject to footnote 31, inferentially coreferential. Therefore the tautology follows. It is the tautology of saying that something is the same as itself.

If my earlier claims are correct, however, then (41) represents only one of the two lexical meanings of *as . . . as* and (40) would be in fact four ways ambiguous. There would be two additional structures parallel to (41) but with NOT + LESS in roughly the positions of SAME. Again, the second reading would involve a

³¹ There are obviously severe gaps in this chain of reasoning. The inference is valid in the case in question not only because the two arguments are characterized identically, but also because of the way they are characterized. Specifically, to say x is A 's height and y is A 's height entails that x and y designate the same object only because a person has only one height. In fact, even this is not true, unless a point in time is specified. Evidently, therefore, a fuller account of such structures would have to specify the same point in time for both characterizations. On the other hand, coreference would not at all be inferable from the following pair of characterizations, since a person can have two loves at one point in time.

(i) x [Mary loves x at T], y [Mary loves y at T]

I return to this general problem below in footnote 33.

³² On at least one of the two readings discussed in footnote 28.

tautological complement with the tautology in that case being that of saying something is not less than itself.

Even accepting an account like the one just sketched for comparative examples, with all of its many assumptions and implications (cf. below), the critical question arises of how a parallel treatment can be given for the noncomparative examples like (1). I claim that this can be done in a relatively straightforward way by recognizing that such sentences involve the predicate SAME, a binary predicate expressing extensional identity (identity of reference). I thus suggest that the two structures for (1), repeated here as (42), are as in (43):

(42) John believes that Mary didn't kiss the boy she kissed.

- (43) a. SAME x [John believes (NOT (Mary kiss x))] y [Mary kiss y]
 b. John believes (NOT (SAME x [Mary kiss x] y [Mary kiss y]))

It can be seen that (43) has the same formal properties³³ as (38) or (41). In support of the view that such sentences as (42) involve a predicate like SAME, it can be noted that there are truly parallel sentences involving the word *different*, which manifest the appropriate ambiguity:

(44) John believes that Mary kissed a different boy than she kissed.

In the same terms, (44) would have two structures like those in (45), where DIFFERENT is a binary predicate expressing extensional *nonidentity*.³⁴

- (45) a. DIFFERENT x [John believes (Mary kiss x)] y [Mary kiss y]
 b. John believes (DIFFERENT x [Mary kiss x] y [Mary kiss y])

Thus, in the terms suggested here, it is accidental that (42) ends up as it does rather than as something like (46), from which, I suggest, it is in effect derived by a rule deleting what would otherwise show up as a word like *same*.

(46) *John believes that Mary didn't kiss the³⁵ same boy she kissed.

³³ However, the problems discussed in footnote 31 with respect to the inference of coreference arise again. The question is why a pair of indices, x and y , characterized as in (i), should be inferably coreferents.

(i) x [Mary kiss x]; y [Mary kiss y]

Obviously, this will in no way be a logical fact unless a point in time is specified. But even that will surely not suffice since it is at least logically possible for one individual to kiss several other people simultaneously (simply assume the kisser has lips which are relatively large in comparison with the lips of the kissee, or conversely).

Since, logically, there is no upper bound on the size of lips, it seems that not only does the structure [KISS x , y at T] fail to define a unique binary kisser-kissee set, it in fact does not even specify a necessarily finite set. It seems then that what is needed is a way of indicating "same event" or possibly "same state of affairs" and that the reason (42) involves a contradictory complement on one reading is that the "different" kissing descriptions define the same event. The question of how to represent the notion "same event" or the like is a deep one, which I cannot go into here. McCawley has in various places suggested the device of indexing predicates, but this seems to me little more than an arbitrary notational device. I would guess that events must be represented by indices in logical structure and hence by NPs, like other referential elements.

³⁴ Or, one might claim that a word like *different* represents a combination of NOT and SAME. Alternatively, one might recognize DIFFERENT as primitive, with *same* representing NOT + DIFFERENT. I cannot empirically distinguish among these at present.

³⁵ The fact that this usage of *same* (contrast *different*) requires the definite article may well be predictable by a rule taking into account the meaning. But I do not know how to formulate such a rule.

Such a derivation is supported by a clear gap in the distribution of *same*:

- (47) a. Joan kissed the same boy Sally kissed.
- b. *Joan_x kissed the same boy she_x kissed = Joan_x kissed the boy she_x kissed.
- c. Joan_x kissed the same boy she_y kissed.

5. Lowering Rules I

A crucial property of all the representations in (38), (41), (43), and (45) is that the predicates MORE, SAME, and DIFFERENT originally lie outside of, and in a position commanding, the locus where they eventually end up. Since the morphological consequences of these commanding predicates therefore show up inside “lower” clauses, it is clear that an account like that suggested, interpreted as in GS, involves *inter alia* *lowering rules*. The existence of such rules has been consistently and forcefully challenged by interpretivist opponents of the GS position, Hasegawa included.^{36,37} However, the need for lowering rules (in analyses like those just discussed) within GS is, I suggest, not only not a weakness of such treatments but may in fact be one of their stronger points. Such rules offer a natural way of explaining one of the most striking properties of the class of ambiguities with which Hasegawa tried to deal. This property is expressed in (48):

- (48) The actual distribution of such ambiguities is controlled by syntactic *islands* in the sense of Ross (1967) and later work.

³⁶ Cf. for example Chomsky (1972), Jackendoff (1971), and Bresnan (1971).

³⁷ Jackendoff, for instance, argues as follows (1971, 481–482):

There are several difficulties with this solution. First, if the rule relating (7) or (8) to the surface form (1) is a transformation, that is, if (7) or (8) is taken to be an underlying structure (as in fact it is by Bach and Baker), the transformation performs a suspiciously complex set of operations in producing the surface form. We notice in particular that the transformations deriving (1) and (7) and (8) must delete the main clause and insert lexical material into the subordinate clause, which now becomes the main clause of the sentence. Such transformational operations are not attested among the standard repertoire of transformations; they occur only in those transformations associated with the term “abstract syntax”, in which many semantic properties are accounted for by “higher abstract verbs” which must be deleted by transformations. As a theory of grammar which permits transformations to perform such operations is far more powerful than a theory which does not permit them, it would be preferable to do without them if at all possible. Aside from this rather general remark, it is difficult to comment on the transformations relating (7) or (8) to (1), because they have never been stated with sufficient precision to allow one to work out their interaction with the rest of the grammar.

The following comments are in order. The claim that lowering operations are not attested among the “standard repertoire of transformations” is largely true only by definition. The claim that a theory of grammar which permits lowerings is more powerful than one which does not and is hence less preferable is true only if the theories which do without such lowerings do not contain other devices designed precisely to fill the gap of work done by lowerings. But in fact in all conceptions of such theories so far sketched, there are such devices, namely interpretive rules whose function is typically to carry out the inverse of the operations described by lowerings. Finally, the claim that lowerings have not been described very precisely has some justice to it, but much less than the analogous claim made with respect to the interpretive rules which are their competitors. Jackendoff’s criticisms of lowering rules, which are rather representative of a range of comments in interpretive writings, thus seem to me to have no real force.

This has in fact already been partially illustrated in section 3. There it was shown that none of the cases in (49) have any but the contradictory type of reading for the complements:

- (49) a. *That Mary was older than she was* was assumed by Jack.
- b. *That Mary was older than she was* was easy for Melvin to believe.
- c. *That Mary was older than she was*, Jack may not have reported.
- d. *Older than she was*, the AP wire certainly might have reported Mary to be.
- e. The *Times* said, I am quite sure, *that Mary was older than she was*.

However, in each case, the italicized structure is an island, in Ross's sense. Grammatical rules cannot extract elements from such phrases. The data reveal therefore an a priori unexpected correlation³⁸ between extraction islands and one type of reading of the ambiguous set under consideration.

Moreover, the correlation is broader than (49) indicates. (i) Complements of noun heads have only the contradictory reading, correlating with the well-known fact that these are in general extraction islands:

- (50) a. Melvin believes the claim that Mary is older than she is.
- b. Max accepted the idea that Mary didn't kiss the boy she kissed.

- (ii) The complements of *manner of speaking*³⁹ verbs like *croak*, *groan*, *chortle*, etc. permit only the contradictory reading, and these are in general extraction islands:

- (51) a. Melvin croaked that Mary was older than she was.
- b. Jim moaned that Mary didn't kiss the boy she kissed.

- (iii) Complements in pseudocleft constructions have only the contradictory reading, and these are in general extraction islands:

- (52) a. What Melvin believes is that Mary is older than she is.
- b. What he said is that Mary didn't kiss the boy she kissed.

³⁸ The idea that scope facts correlate with islands, though possibly new for the particular predicates dealt with in this study (MORE, SAME, DIFFERENT, etc.), has in fact been an important theme of GS writings for some years since it was first pointed out with respect to *quantifier scope* by McCawley in the summer of 1968. G. Lakoff (1970b) devoted much of an entire article to it in a paper first written in 1968. It is highly significant, I think, that this major insight of GS work has been ignored by those who both defend interpretivist approaches and criticize GS. For instance, it is, to say the least, odd to find this matter ignored in a work like Chomsky (1972), which purports to be a general critique of GS ideas and which claims that GS has little content which contrasts with Chomsky's own positions. It would have been far more significant if Chomsky had attempted to apply such a line of thought to previous GS work, that is, to work which argued that the scope/island correlation supports the GS view that in general scope bearing elements enter their final loci from commanding structures.

³⁹ Many interesting properties of these are adduced by Zwicky (1971).

(iv) Complements which have undergone Right Dislocation have only the contradictory reading, and these are strict extraction islands:

- (53) a. It is a drag, that Mary is taller than she is.
- b. He believes it, that Mary didn't kiss the boy she kissed.

(v) There is a clear sense in which adverbial subordinate clauses (beginning with *when*, *where*, *although*, *before*, etc.) block readings, and these are in general extraction islands. For instance, a case like (54) has two readings for the complement.

- (54) If Jack thinks Mary is taller than she is, he will buy the wrong dress.

However, it is a priori possible that it would have a third reading, namely (55):

- (55) MORE x [if Jack thinks Mary is tall to x , he will buy the wrong dress] y
[Mary is tall to y]

However, this reading is not an empirically real one for (54), which correlates with the fact that *if* clauses, like subordinate clauses in general, are islands. (vi) An argument of the same form as that involving adverbial subordinate clauses can be based on restrictive relative clauses. Thus, the complement in (56) has two readings.

- (56) Jack called the girl who believes Tom is taller than he is.

A priori, (56) could have a third reading, namely (57):

- (57) MORE x [Jack called the girl who believes Tom is tall to x] y [Tom is tall to y]

However, this is not a real reading for (56), again correlating with the fact that the complement is inside a restrictive relative clause, which is an island. (vii) The argument just given can be repeated in exact detail for nonrestrictive relative clauses. Thus an example like (58) will lack a reading analogous to (57) but containing a nonrestrictive instead of a restrictive relative on *girl*.

- (58) Jack called the girl, who believes Tom is taller than he is.

But this correlates with the fact that the complement is inside the nonrestrictive relative, which are in general islands.

It seems, then, that the correlation between the kind of meaning properties under discussion and islandhood is pervasive and systematic.⁴⁰ It is, I presume, inconceivable

⁴⁰ This is not to suggest that the correlation will be perfect in either appearance or reality. So it has been argued that question complements may manifest an ambiguity which would require them to be derived from external occurrences of elements like MORE and SAME. For instance, on the reading where (i) has a consistent complement it would have to come from a structure of the form of (ii):

- (i) Melvin asked when I kissed a girl who I didn't kiss.
- (ii) SAME x [Melvin asked (when I kissed x)] y [NOT (I kiss y)]

However, it has been argued, for instance by Chomsky (1973), that question complements are islands. Hence examples like (i) seem to be counterexamples to the claim that the boundaries of extraction islands are also

for such correlations to be regarded as nothing but a series of accidents. It follows that a serious account of this range of phenomena must explain this correlation. Hasegawa's account, which tries to mark the readings in terms of rules applying to "deep structures", is immediately falsified by this correlation, as shown in section 3, since at least some of the islands in question are introduced only in derived structures.

It should be apparent that, on the contrary, a lowering theory of the readings in question provides a natural basis for accounting for the meaning-islandhood correlation. What is necessary, essentially, is a generalization of the universal account of the *implications* of island boundaries. Hitherto, with respect to restructuring rules, island boundaries have usually⁴¹ been interpreted as blocking *extractions* of elements; that is, as blocking (to some degree)⁴² movement of an element from inside an island to

the outer limits for the scopes of elements internal to those islands. In fact, however, although question complements certainly restrict extraction, it is incorrect to claim that they are strict islands:

- (iii) It was Melvin who Joan asked (me) when I had called.
- (iv) It is Sally that he doesn't know when to call.

As Ross (to appear) shows, extraction rules form a hierarchy with respect to their strength. The cleft sentence rule is very strong. It can extract elements from contexts which are barriers to many other rules. One can suspect that lowering rules are in general stronger than the strongest extraction rule. This would be quite natural, given the fact that lowering rules in an obvious sense leave no trace of their operation in the surface structure (cf. section 7). Given the fact that the strongest extraction rules can operate on question complements, then, it would follow that insertion rules could also. If this assignment of relative strengths is correct, we might then expect that there would exist cases where even cleft sentences are blocked, but where insertion is not, as attested by scope. I think this is the case. Compare (v-vii):

- (v) **It was Sally who they asked when ____ called Arthur.
- (vi) *It was Sally who they asked when Arthur called ____.
- (vii) They asked when Arthur earned more money than he did (in fact) (earn).

It seems to me that, with some effort, it is possible to get a reading for (vii) of the form of (viii):

- (viii) MORE x [they asked (when Arthur earned x much money)] y [Arthur earned y much money]

But in this case, MORE can be inserted into a complement quite similar to those in (v) and (vi), from which extraction, even by the strong cleft sentence rule, is blocked.

However, things are even more complicated. There are cases (cf. Kuno and Robinson 1972) where quantifier scope treats question clauses as islands. It may be then that the lowering rules for different kinds of elements that undergo them also differ in strength. Such questions have not even begun to be investigated yet. I conclude though that the claim of a correlation between extraction boundaries and scope domains must be interpreted in terms of Ross's modifications to take into account degrees of rule strength and degrees of islandhood. Cf. footnote 42.

⁴¹ But cf. the early GS work referred to in footnote 38.

⁴² As recent work by Ross (to appear) shows, reference to degree is necessary here because rules fall into a hierarchy, with differential abilities to extract elements from various contexts, and contexts fall into a hierarchy with differential resistance to extraction. The relations between these are governed by the following principle worked out by Ross, where R_1 is the weakest rule, C_1 the least resistant context:

(i) If R_j can extract items within C_k , then for all rules $R \geq R_j$ and for contexts $C \leq C_k$, R can extract items from C .

Serious development of this theory depends, of course, on the possibility of a rich substantive characterization of both the rule hierarchy and the context hierarchy, and the theory will be of greatest interest if the relevant parameters turn out to be at least to a significant extent universal. Ross has already taken considerable steps in the direction of formulating a significant set of hypotheses here.

Although Ross's work so far involves chiefly differential strength for extraction rules, I believe this will

outside of it. A straightforward generalization of this would also block (to some degree) movement in the opposite direction, from outside of the island to within it. Thus, this stronger, generalized version of islandhood interference with rule applications blocks traffic in both directions.

With such an account of islandhood, the lowering analysis of the meanings in question pretty much automatically accounts for the absence of the missing readings in the island cases considered.

Let us refer to an element which undergoes a lowering rule as *a diver*. I have thus claimed here that words like *more*, *as*, *same* are the morphological realizations in English of divers. A lowering account plus islandhood theory thus makes the significant claim that:

- (59) The set of possible scopes of the morphological realization of a diver, D, which is inside of an island, I, are all necessarily internal to I.

Let us take a simple example for illustration, namely, the monoguous sentence (60):

- (60) That Mary was older than she was was reported by the *Times*.

In our terms, this would have the two *potential* logical structures (61a, b):

- (61) a. MORE x [the *Times* report (Mary was old to x)] y [Mary was old to y]
 b. the *Times* report (MORE x [Mary was old to x] y [Mary was old to y])

Now, in order for these potential readings to be actually associated with (60), the rule Passive must apply in each structure on the cycle defined by the verb *report*. However, these applications make the complement of *report* a subject and hence an island according to Ross's Sentential Subject Constraint. In the case of (61b), however, the lowering of MORE will take place on a cycle beneath that which allows Passive, since *report* commands MORE. Thus lowering is in no way interfered with in (61b) by the island which Passive + the Sentential Subject Constraint induce. Hence nothing I have said blocks the association of the structure in (61b) with (60), since the diver in (61b), namely MORE, is at every stage internal to the island. Note that (61b) represents the reading on which the *Times* is said to have reported a contradiction.

In (61a), however, Passive (triggered on the *report* cycle) will necessarily precede the lowering of MORE, which cannot take place until at least the next cycle after

also be necessary for lowerings, as hinted in footnote 40. For instance, in my experience, the quantifier *each* is systematically stronger than the quantifier *all*. So, for me, the following examples contrast:

- (ii) Jim asked when I called all of those girls.
 (iii) Jim asked when I called each of those girls.

Both of these sentences have a reading where the scope of the quantifier is internal to the complement of *asked*, but only the latter has a reading on which the scope of the quantifier is superordinate to the main verb.

that whose main verb is *report*. This assumes, of course, that lowering rules are cyclic (cf. section 7). Crucially then, when the point at which lowering can apply is reached, the structure into which the diver MORE must be lowered to derive (6o) from (61a) is inside an island, and the derivation is blocked. Hence, in the terms advocated here, the grammar cannot associate the reading (61a) with (6o), since in this case the ultimate target of a diver is internal to an island not originally containing the diver. But (61a) is the structure on which (6o) would involve a consistent report. That is, (61a) is the structure of the reading of (62) which is not a paraphrase of (6o):

- (62) The *Times* reported that Mary was older than she was.

Therefore, (6o) is left with only the complement-internal contradictory reading represented by (61b).

It is rather striking then that the structures which are independently motivated in GS terms to provide a proper account of the logical forms of the relevant sentences are those needed to interact with lowering rules plus island constraints to block the nonexistent island "external" scope readings of a wide range of structures which, a priori, there is no reason to expect to lack these "external" and hence often consistent (nontautological) readings. This is, I think, a nontrivial explanatory success of a relatively high order and one which I do not see any way of duplicating within interpretive (i.e. lowering rule-rejecting) theories in general.^{43,44}

⁴³ Chomsky (1973) notes certain cases where, in effect, scope facts correlate with extraction possibilities (though he does not use this terminology) and attempts to adduce general principles to explain this in the absence of any attempt to describe scope facts with lowering rules. Cf. section 12 for discussion.

⁴⁴ The reader will have noticed that I presented no cases in which the range of meanings is controlled by the Coordinate Structure Constraint, although the latter is one of the clearest and most pervasive island-defining limitations on extraction rules. My reasons have to do with the great complexity in coordinate constructions generally, and the lack of agreement about how they should in general be described.

However, it should be observed that the limitations on the scope of predicates like MORE and SAME due to the Coordinate Structure Constraint seem to be essentially those observed for amount quantifiers like *many* by G. Lakoff (1970b). Basically, he observed that such elements could not occur as terms of so-called phrasal conjunctions although they could as terms of conjunctions which could be claimed to have a non-conjoined source via the principle of conjunction reduction. Hence he noted such contrasts as that between (i) and (ii)

- (i) Few men and many women left.
- (ii) *Few men and many women left together.

and claimed that the latter was a function of the fact that the conjoined phrase in (ii), being base-derived, would at every stage block lowering of the quantifiers, given the view that such lowerings are controlled by the Coordinate Structure Constraint. For (i), however, it can be claimed that there is a remote structure of the form (iii) and that the quantifier lowering thus took place at a stage before the Coordinate Structure Constraint became applicable.

- (iii) Few men left and many women left.

For MORE, SAME, etc., the facts seem parallel:

- (iv) More than fifty men and more than fifty women left (*together).
- (v) Jack tied (*together) the same man that Sally did and the same woman that Jack did.

So we see that here, as elsewhere, whatever principles control quantifier scope also control the scope of MORE, SAME, etc., as the GS lowering theory of both predicts.

6. Scope Theory and Earlier Problems

In earlier sections, I considered a range of facts which I claimed falsified Hasegawa's theory of the ambiguities under study. I have just sketched an account which explains how the framework I advocate handles one of these types of fact, namely the correlation of ambiguities (or lack of them) with island boundaries. I would like to briefly consider here the way the rest can be treated.

Consider first the fact that sentences like the following with first person subjects are ambiguous.

- (63) I believed that Mary was older than she was.

This follows simply and naturally from the possible alternative structures (64a and b), which are exactly analogous to those in which the subject of *believe* is not first person.

- (64) a. MORE x [I believed (Mary was old to x)] y [Mary was old to y]
 b. I believed (MORE x [Mary was old to x] y [Mary was old to y])

In this framework, no special problems arise about sentences like (63). The problem is to explain the properties of (65); that is, the difficulty of perceiving any ambiguity when the system advocated would allow for two underlying structures exactly analogous to (64) except for tense.

- (65) I believe that Mary is older than she is.

In fact, however, I think there is no difficulty here. It is proper to claim that (65) is ambiguous in just the predicted way, but that the two readings are hard to separate for a very good reason. To see this reason, note that the present tense analogue of (64a) will contain the subpart (66) as the restrictive relative on x .

- (66) . . . I believe (Mary is old to x) . . .

However, there is logically little difference between such a restrictive and the restrictive [Mary is old to x] (attributed to the speaker). A structure of the form (67), like the version in which *believe* commands MORE, in effect involves a contradictory comparison.

- (67) MORE x [I believe (Mary is old to x)] y [Mary is old to y]

The reason is, as stressed by G. Lakoff, that for X to assert P at time T entails that X believes P at T according to a general "conversational postulate" which connects sincere assertion with belief. But, since both readings of (65) involve, at least derivatively, contradictory comparisons, it is not surprising that they are hard to distinguish. Notice that the nature of the "conversational postulate" in question here accounts for the contrast between examples like (63) and (65), differing only in tense. For the postulate requires belief of P only at the time P is asserted. Thus it does not follow

from such a postulate that a structure differing from (67) in the tense of *believe* will be contradictory.

Next, Hasegawa's theory could not account for cases in which ambiguous P-complements did not cooccur with underlying subject NPs of the mind-designating sort, as in (68):

- (68) These statements entail that Bob is older than he is.

However, it is trivial to account for such an ambiguity in scope terms:

- (69) a. MORE x [these statements entail (Bob is old to x)] y [Bob is old to y]
 b. these statements entail (MORE x [Bob is old to x] y [Bob is old to y])

These represent respectively (i) a reading in which what is compared is an age which certain statements entail that Bob has and his actual age; and (ii) a reading in which certain statements entail that Bob's age exceeds his age. These seem to be exactly the two meanings of (68).

It was also pointed out earlier that certain conditional P-complements involved ambiguities of roughly the same sort, also in conflict with Hasegawa's approach.⁴⁵

⁴⁵ Earlier, I noted cases of relevant ambiguities involving modals, for instance:

(i) Jack could have worked harder than he did.

The relevant readings can be initially distinguished as (ii) and (iii):

(ii) MORE x [POSSIBLE (Jack worked hard to x)] y [Jack worked hard to y]
 (iii) POSSIBLE (MORE x [Jack worked hard to x] y [Jack worked hard to y])

However, these representations ignore the fact that examples like (i) are counterfactual, and in the terms sketched below for representing counterfactuality, (ii) and (iii) would be replaced by (iv) and (v):

(iv) a. MORE x [WOULD (POSSIBLE (Jack worked hard to x)) w] y [Jack worked hard to y]
 b. MORE x [POSSIBLE (WOULD (Jack worked hard to x)) w] y [Jack worked hard to y]
 (v) a. POSSIBLE (WOULD (MORE x [Jack worked hard to x] y [Jack worked hard to y])) w
 b. POSSIBLE (MORE x [WOULD (Jack worked hard to x) w] y [Jack worked hard to y])

Unless there are special constraints, the possibility of all these representations means that (i) is four ways ambiguous, instead of two. I will not here try to evaluate the correctness of this claim.

On the contrary, however, an example like (vi),

(vi) Jack can be working harder than he is.

which is not counterfactual (I avoid *Jack can work harder than he does* to eliminate tense problems), can thus not contain WOULD in its representations. Therefore the maximal set of representations is (vii) and (viii):

(vii) MORE x [POSSIBLE (Jack is working hard to x)] y [Jack is working hard to y]
 (viii) POSSIBLE (MORE x [Jack is working hard to x] y [Jack is working hard to y])

Although these are distinct, they are hard to separate because both involve contradictions. (viii) has a contradictory complement and thus asserts that this is possible. (vii) is itself contradictory because the relative on y says that Jack is working hard to y . If, however, it is possible he is working hard to x , and he is working hard to y , x must be identical to y . Therefore, (vii) involves the contradiction of asserting that something exceeds itself. This contradiction is based on the same anomaly found in examples like (ix):

(ix) Jack is five feet tall but it is possible that he is five feet ten.

The source of this kind of incoherence has been studied by Karttunen, who observes insightfully (1972, 3):

There is an interesting constraint on the use of *possible* that we all seem to follow in our ordinary language conversation. This rule can be phrased simply as in (6).

(6) WHATEVER IS CANNOT POSSIBLY BE OTHERWISE

For instance, consider (70) :

- (70) If Bob had been taller than he was, he would have made the team.

It is, however, not such a trivial matter to represent the readings of (70), because the ambiguity is inherently bound up with the problem of counterfactuality. On one reading, the absurd one, (70) involves some sort of implicational relation between a hypothetical situation which is contradictory and a hypothetical situation of athletic success. On the other reading, (70) involves an implicational relation between a hypothetical situation which is consistent and the same outcome. It is rather crucial to note, I believe, that the closest nonhypothetical, that is, noncounterfactual, analogue of (70), namely (71), does not involve any ambiguity and seems only to involve an impossible situation.

- (71) If Bob was taller than he was, he made the team.

Thus an adequate account of the ambiguity in counterfactual conditional contexts like (70) must also explain the lack of ambiguity in noncounterfactual contexts like (71). While this is not a trivial matter, there is a natural approach to such questions in terms of the relative scopes of predicates. What is necessary is to recognize that counterfactuality is itself represented, in part at least, by a predicate.

Suppose for a start we call this predicate WOULD.⁴⁶ We could then suggest as an analysis for a counterfactual conditional like (72) a representation of the form (73):

- (72) If Bob were a bat, he would be able to fly.

- (73) IF (WOULD (Bob is a bat)) (WOULD (Bob is able to fly))

We want this to mean that such a sentence expresses an implicational relation between two states of affairs, one involving Bob's bathood and one involving his ability to fly, both of which are only hypothetical. Pretty clearly though, (73) does not do this as such, for it fails to indicate that the hypothetical world(s) in which the

And again (1972, 5):

Thus far, we have established that it is not acceptable in natural language to state in one sentence that something both is the case and is possibly not the case.

⁴⁶ The morphological consequences of WOULD are quite diverse and of considerable interest in themselves. For example, WOULD seems to surface as *were* in cases like (i) :

- (i) If I were to resign, I would soon go broke.

More precisely, it can probably be argued that *were* represents the combination of WOULD + the element that normally shows up as *will*. In general, WOULD seems to combine (presumably by way of the rule Predicate Raising) with the immediately lower verbal element, giving such combinations as:

- (ii) a. WOULD + can → *could*
 b. WOULD + will → *were* in some contexts, *would* in others
 c. WOULD + have → *had*
 d. WOULD + be → *were*
 e. WOULD + want → *wanted*

Space precludes a serious discussion here.

bathood condition is met are *the same as* those in which aerial mobility is granted. This suggests that it would be more appropriate to regard WOULD as a binary predicate, with its second argument a variable over worlds (distinct from the real world).⁴⁷ Hence (73) would be replaced by (74):

- (74) IF (WOULD (Bob is a bat) *w*) (WOULD (Bob is able to fly) *w*)

Thus now a structure of the form (75) is roughly equivalent to 'S_a holds in world *w*'.

- (75) WOULD (S_a) *w*

Therefore, now (74) claims that (72) means that for a⁴⁸ hypothetical world *w* distinct from the real world, Bob's being a bat in *w* implies his being able to fly in *w*. This seems to me basically correct. I think it is therefore reasonable to assume that something like binary WOULD plays a fundamental role in the logical structure of counterfactual conditionals. Obviously, however, by virtue of the meanings, WOULD will not occur at all in the underlying structure of noncounterfactual conditionals.

With this much in mind, let us return to the ambiguous (70) and monogous (71), which I will repeat here:

- (76) a. If Bob had been taller than he was, he would have made the team.
 b. If Bob was taller than he was, he made the team.

Now, I claim the WOULD apparatus provides us with a natural means for representing the two readings of (76a) and of doing this in such a way that only one reading is possible for (76b). The two readings will be (77a and b):

- (77) a. IF (MORE *x* [WOULD (Bob was tall to *x*) *w*] *y* [Bob was tall to *y*])
 (WOULD (Bob made the team) *w*)
 b. IF (WOULD (MORE *x* [Bob was tall to *x*] *y* [Bob was tall to *y*]) *w*)
 (WOULD (Bob made the team) *w*)

These two structures differ crucially in that in one MORE commands WOULD (that is to say, the comparison is external to the state of affairs which is counterfactual), while in the other WOULD commands MORE, which is then internal to the purely hypothetical state of affairs. (77a) thus represents a reading on which what is compared is Bob's actual height and a hypothetical height reached only in *w*. (77a) then says that, had that hypothetical height in *w* exceeded his actual height, Bob would have made the team in *w*. (77a) is a sensible conditional, because its condition is at least conceivably meetable, since it is consistent. However, (77b) represents an

⁴⁷ Distinct minimally in that the negation of the subject complement of WOULD holds in the real world.

⁴⁸ Actually, it seems that the relevant hypotheticals involve all hypothetical worlds meeting the fixed conditions, hence that *w* should be regarded as a variable over worlds bound by a universal quantifier. This then raises a variety of questions, first and most obviously those concerning the lack of morphological realization of the apparatus involving *w* and second those involving the scope possibilities for the universal quantifier binding *w*. The reader will no doubt forgive me for not dealing with these questions here.

implication in which the hypothetical situation is one in which x is greater than y . But, given their inferred coreference this is contradictory. Therefore, (77b) says that in worlds w in which that contradiction held, Bob would have made the team. These representations seem to me to essentially capture the two different senses of (76a). The crucial property in (77) is the occurrence of WOULD, for it is this which allows for contrasting structures depending on the relative positions of WOULD and MORE.

Consider now (76b). Since this is not counterfactual, there is no possibility that WOULD will occur in the underlying structure. Therefore, the structures otherwise analogous to (77) cannot possibly differ. The only constructible representation is (78), and this represents correctly an implicational relation between a contradictory state of affairs in the real world and a distinct situation in the real world.⁴⁹

- (78) IF (MORE x [Bob was tall to x] y [Bob was tall to y]) (Bob made the team)

Thus, the fact that WOULD cannot occur accounts for the absence of more than one reading. That is, a scope theory explains quite naturally why a sentence like (76a) can have two readings, but one like (76b) cannot. I conclude, then, that, although the representation of meanings for conditionals like (76a) is by no means trivial,⁵⁰ a scope theory seems to be what is needed here.⁵¹

Exactly the same type of analysis provided for sentences like (76) holds for the entirely parallel (79a and b):

- (79) a. If Bob hadn't kissed the girl he kissed, he wouldn't have sighed.
 b. If Bob didn't kiss the girl he kissed, he didn't sigh.

⁴⁹ The question might be raised as to what blocks structures in which MORE commands IF. The answer is island constraints, for, as noted earlier, subordinate clauses including *if* clauses are islands. Hence a MORE external to an IF clause could not be lowered into it.

⁵⁰ If the most typical cases of WOULD are *if* clauses, there is a variety of other cases including complements of elements like *suppose*, *assume*, and complements of *wish*:

- (i) Suppose you were immortal.
- (ii) Assume you were older than you were then.
- (iii) I wish I were richer than I am.

⁵¹ Notice that the italicized structures in examples like (ia–c) are interpreted, at least in many contexts, as paraphrases of (iia–c), respectively:

- (i) a. If *you were taller*, you might be a good ballplayer.
 b. I wish *you were taller*.
 c. Suppose *you were taller*.
- (ii) a. If you were taller than you are, you might be a good ballplayer.
 b. I wish you were taller than you are.
 c. Suppose you were taller than you are.

What is striking is that, whereas a priori one might expect that the diver MORE involved in examples like (i) would have a scope either internal to or external to the complement of WOULD, in fact only the external reading is possible. This suggests a rather interesting *global* constraint on the deletion rule which is responsible for examples like (i), on the assumption that this rule operates on structures essentially like (ii).

That is, (79a), which is counterfactual, is ambiguous, but (79b), which involves no hypothetical element, is monoguous. The relevant structures would be (80a, b) and (81), respectively:

- (80) a. IF (NOT (SAME x [WOULD (Bob kissed x) w] y [Bob kissed y]))
(WOULD (NOT (Bob sighed)) w)
 - b. IF (WOULD (NOT (SAME x [Bob kissed x] y [Bob kissed y])) w)
(WOULD (NOT (Bob sighed)) w)
- (81) IF (NOT (SAME x [Bob kissed x] y [Bob kissed y])) (NOT (Bob sighed))

Thus again, the impossibility of WOULD in the noncounterfactual case precludes a second reading, accounting for the monoguity of that case.⁵²

Next, recall that Hasegawa's theory was incompatible with the fact that ambiguities were found in state-of-affairs complements, i.e. (82):

- (82) The storm prevented it from being hotter than it was.

It was also noted that negative causatives like *prevent* seem to contrast with positive ones like *make* in that examples like the following *seem* unambiguous, although I denied that.

- (83) The storm made it hotter than it was.

I claim that the facts in (82) and (83) follow rather naturally from a causative analysis, as follows. (82) has two possible structures:

- (84) a. MORE x [the storm CAUSE (NOT (it was hot to x))] y [it was hot to y]
- b. the storm CAUSE (NOT (MORE x [it was hot to x] y [it was hot to y]))

Again, these differ in the relative scopes of MORE and the predicate or set of predicates underlying the main verb, in this case *prevent*. (84a) represents the sensible reading of (82), on which what is compared is the actual temperature and a temp-

⁵² I have cited cases of ambiguous counterfactual conditionals, attributing the ambiguities to the relative scopes of MORE, etc., and WOULD. It is therefore of significance that similar ambiguities are found in the consequent clauses of counterfactual conditional sentences, a fact supporting the view adopted here that these also contain WOULD. Thus:

(i) If it had been raining, I would have been wetter than I was.

This would have the following two structures:

- (ii) a. IF (WOULD (it was raining) w) (MORE x [WOULD (I was wet to x) w] y [I was wet to y])
- b. IF (WOULD (it was raining) w) (WOULD (MORE x [I was wet to x] y [I was wet to y]) w)

Of course, it is then easy to construct cases where both *if* clause and consequent clause manifest the relevant sort of ambiguity:

(iii) If I had been more charming than I was, I would have been more successful than I was.

Overall, (iii) is at least four ways ambiguous, manifesting the cartesian product of the ambiguities in its component clauses.

erature which the storm caused not to be reached. (84b) represents the weird reading of (82), on which it claims that the storm prevented a logical impossibility, namely that represented by the complement of NOT.⁵³

⁵³ It should be asked whether there is a possible structure in which the positions of MORE and NOT in structures like (84b) are (roughly) reversed. Clearly, general base rules for argument + predicate combinations would generate such structures. Thus a logical base will undoubtedly also generate a representation like (i):

- (i) the storm CAUSE (MORE x [NOT (it was hot to x)] y [it was hot to y])

Whether (i), along with (84a, b), is a possible structure of (82) is connected to the following questions. First, can *prevent* be generated from a combination of CAUSE and NOT elements which are not contiguous in logical structure? Second, can MORE be lowered over NOT? If the answer to either of these is negative, then (i) is not in fact a real reading for (82). Since, intuitively, (i) does not seem to provide the correct meaning for (82), these more general questions are of direct relevance. While I can provide no definitive information about this, there is some evidence that the answers to both general questions are negative.

Thus, a sentence like (ii) has readings of the form (iiia, b):

- (ii) Tom prevented Sally from earning more money than Bob earned.

- (iii) a. MORE x [Tom CAUSE (NOT (Sally earned x much money))] y [Bob earned y much money]
- b. Tom CAUSE (NOT (MORE x [Sally earned x much money] y [Bob earned y much money]))

But it clearly has no reading of the form (iv),

- (iv) Tom CAUSE (MORE x [NOT (Sally earned x much money)] y [Bob earned y much money]))

which would mean that Tom caused some amount of money which Sally didn't earn to exceed the amount of money Bob earned. But, of course, a reading like (iv) could be associated with (ii) only if both of the general questions above are answered positively.

Moreover, consider an example like (v):

- (v) Jack proved that Mary was taller than she was.

This has the by now typical ambiguity, with MORE either above or below the predicate underlying *proved* in logical structure. However, when a negative is added to the main clause, as in (vi), we find only two readings, not three.

- (vi) Jack didn't prove that Mary was taller than she was.

That is, (vi) can mean either (viia) or (viib):

- (vii) a. NOT (MORE x [Jack proved Mary was tall to x] y [Mary was tall to y])
- b. NOT (Jack proved (MORE x [Mary was tall to x] y [Mary was tall to y]))

But it certainly cannot mean (viii):

- (viii) MORE x [NOT (Jack proved (Mary was tall to x))] y [Mary was tall to y]

But, significantly, the reading in (viii), unlike those in (vii), can be associated with (vi) only if MORE is lowered over NOT. Thus, independent of causative constructions, there is some ground for the belief that this is not in general possible.

Finally, supporting evidence from causative cases is available as well. Nothing requires contiguous CAUSE + NOT to combine into *prevent* (that is, Predicate Raising is optional). If they do not, then CAUSE should show up as some other word, say *cause*, *make*, etc., with the negative as *not* in the complement. Note, however, that the expected results from (i) or (iv) of this sort are also impossible. That is, the sentence (ix) is not a realization of (i), nor is the sentence (x) a realization of (iv):

- (ix) The storm caused it not to be hotter than it was.

- (x) Tom caused Sally not to earn more money than Bob earned.

Again these facts would follow from a constraint that blocks MORE and similar items from being lowered over NOT.

While I have not studied this matter very much, it thus seems that although the logical base generates structures like (i), (iv), (viii), etc., general constraints on derivations (in particular, one blocking lowering elements like MORE over NOT) block the association of such structures with surface structures whose formation requires lowering. Quite likely this constraint is related to general crossing constraints on quantifiers and other logical elements discussed by G. Lakoff (1969). Cf. the independent discussion of constraints on altering the relative positions of NOT and other elements in Greene (to appear).

Next, under the assumption that the causative *makes* differs from *prevent* essentially in the absence of the negative, we should predict two structures for (83) perfectly parallel to (84), namely:

- (85) a. MORE x [the storm CAUSE (it was hot to x)] y [it was hot to y]
 b. the storm CAUSE (MORE x [it was hot to x] y [it was hot to y])

This then predicts that (83) is ambiguous. I claim that this is correct. Therefore, one needs an explanation of why it is difficult to perceive two different readings for sentences like (83), in contrast to the ease of perceiving different readings for those like (82). The reason is, I think, relatively straightforward, and has to do with a relation between the truth conditions of the complement of CAUSE and the truth conditions of the main structure of which CAUSE is the chief predicate.

To see this, consider the well-known statements (86a, b):⁵⁴

- (86) a. IF (X CAUSE S_1) holds, then S_1 holds.
 b. But, if (NOT (X CAUSE S_1)) holds, then S_1 does not necessarily hold, or not hold.

Thus, if Harry causes Bill to die then he is dead, but if Harry doesn't cause him to die, he may or may not be.

Now, given the validity of (86a), it follows that any object characterized by a relative clause of the form (87) is identical to an object characterized by the relative clause structure (88):

$$(87) [\text{NP } a [\text{s X CAUSE } S_1 \text{ s}] \text{ NP}]$$

$$(88) [\text{NP } a [\text{s } S_1 \text{ s}] \text{ NP}]$$

That is, for instance, an object A which is such that Arthur causes A to die is necessarily an object A which is such that A died; etc.

Therefore, examining the relative clause on the index x in (85a), one finds that the implication in (86a) guarantees that the object designated by x as characterized there is necessarily identical to the object characterized as in (89):

$$(89) [x [\text{it was hot to } x]]$$

Hence the structure (85a) is, in an obvious sense, equivalent to (90), which is contradictory.

$$(90) \text{ MORE } x \text{ [it was hot to } x] \text{ } y \text{ [it was hot to } y]$$

⁵⁴ Cf. the discussion in Karttunen (1970).

Hence the reason why it is hard to perceive the ambiguity of examples like (83) is, I suggest, that both of their readings are in effect contradictory.

On the contrary, the same principles applied to the structure in (84a) explain why this reading does not manifest an anomaly equivalent to that in (84b) (which embodies the claim that a storm prevented a logical impossibility). By the principle in (86a), (84a) would reduce to (91):

- (91) MORE x [NOT (it was hot to x)] y [it was hot to y]

But this has nothing like the properties of (84b). Thus, the presence or absence of the negative in the underlying structures of *prevent* and *make* sentences interacts crucially with the principle in (86a) to account for the differential degree of difficulty in perceiving the distinct readings of examples like (82) and (83).⁵⁵

Next, I observed that Hasegawa's theory was incompatible with the fact that in many cases P-complements represent (parts of) open sentences, as in (92):

- (92) Each one _{x} of us believes he _{x} is taller than he _{x} is.

It should be clear that this fact is perfectly compatible with the theory of ambiguities as scope facts which has been presented here. Obviously, independently of these matters, a full theory of the logical structures of human sentences will have to have a way of representing quantifiers, the variables they bind, etc. Given such an apparatus,⁵⁶ it is then trivial to represent the two readings of examples like (92), namely as (93a, b):

- (93) a. $\bigwedge_{x \in \text{us}} \langle \text{MORE } a [x \text{ believes } (x \text{ is tall to } a)] b [x \text{ is tall to } b] \rangle$
 b. $\bigwedge_{x \in \text{us}} \langle x \text{ believes } (\text{MORE } a [x \text{ is tall to } a] b [x \text{ is tall to } b]) \rangle$

⁵⁵ Our just completed discussion of state of affairs complements was couched entirely in terms of the predicate MORE. The analysis offered can, however, be supported by considering cases otherwise parallel in which SAME replaces MORE.

Compare (i) and (ii):

- (i) Diphtheria prevented John from being taller than he was.
 (ii) Diphtheria prevented John from being as tall as he was.

The key fact about (ii), in contrast to (i), is that it totally lacks nonanomalous readings. Significantly, this follows from the representations which are available in our terms, namely (iiiia–c):

- (iii) a. SAME x [diphtheria CAUSE (NOT (John was tall to x))] y [John was tall to y]
 b. diphtheria CAUSE (NOT (SAME x [John was tall to x] y [John was tall to y]))
 c. diphtheria CAUSE (SAME x [NOT (John was tall to x)] y [John was tall to y])

By principle (86a), (iiiia) is equivalent to (iv), which is obviously contradictory:

- (iv) SAME x [NOT (John was tall to x)] y [John was tall to y]

(iiiic) contains (iv) as complement of CAUSE and thus involves the same contradiction; and (iiib) involves the obvious contradiction of denying that someone's height is the same as his height. Thus, since all the representations are anomalous, we have a natural explanation for the failure of examples like (ii) to have well-formed readings.

⁵⁶ Here I place the open sentence associated with a universal quantifier in angled brackets, and use the sign “ \wedge ” to represent the quantifier, with subscripted material to specify its restricting condition.

No special problems of the sort which plague Hasegawa's account arise,⁵⁷ because this type of analysis is in no way linked to the (false) claim that P-complements necessarily represent propositions.

Essentially the same remarks also hold with respect to the other, related problem which was earlier noted about Hasegawa's theory, namely that it was linked to the mistaken assumption that the subject NP of P-complements are invariable analogues of logical constants. It should be clear that the theory of ambiguities as functions of differential scopes is also in no way wedded to this notion and is perfectly compatible with subject NPs in such cases which represent bound variables of various sorts.

I hope to have shown, then, that each of the major difficulties cited for Hasegawa's account is naturally avoided or overcome by a scope theory of the semantic structure underlying the ambiguities.⁵⁸

⁵⁷ However, there does arise a set of problems involving the possible relative scopes of the universal quantifier and elements like MORE. If nothing special is said, all of the logically possible combinations should occur. This is a matter I have not studied in detail.

⁵⁸ A valid account of the phenomena under consideration here should provide the basis for an explanation of the following significant facts. Obviously, in a wide range of cases, a complement clause can be the antecedent for a coreferential pronoun, as in (i):

- (i) I believe that Tony is a Martian but Sally does not believe it.

Consider then (ii):

- (ii) Jack believes that Sally is older than she is but Joan doesn't believe it.

We have seen that the first clause in such a sentence is ambiguous, depending on whether the complement is interpreted as consistent or inconsistent. We should then expect that the full sentence, even with the specification that *it* is anaphorically connected to the complement of the first occurrence of *believe*, is ambiguous in the same way as its first clause. This is simply not so, however. Fixing the referent of *it* as above, (ii) means only that Jack believes a certain contradiction but Joan does not believe that contradiction. It cannot mean that Jack believes Sally's age is *X* years, where the speaker claims her age is *Y < X* years, and that Joan doesn't believe Sally's age is *X* years. In other words, with an anaphoric connection between the complement and the pronoun, one of the two readings possible for the pre-*but* clause in isolation is unexpectedly eliminated.

Exactly the same situation obtains in the case of examples like (iii):

- (iii) Jack said Sally didn't kiss the girl she kissed but Joan doesn't believe it.

Here again, when the complement is the antecedent of *it*, only the contradictory reading for the complement of *said* is possible. Clearly, something general is going on which accounts for the parallel behavior in (ii) and (iii). Note that in our terms, what is excluded is a reading which depends on a complement-external origin for the diver in question, MORE in (ii) and SAME in (iii).

While I have at the moment no precise theory of facts like these, I strongly suspect that they are related to restrictions like those in cases like (iv, a, b):

- (iv) a. Each one of us believes that Sally is sane but Arthur doesn't believe it.
- b. Each one_x of us believes that he_x is sane but Arthur doesn't believe it.

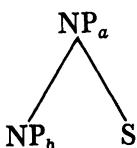
Here, *it* can have the complement of *believes* as antecedent in (a) but not in (b). I suggest that this is connected to the fact that in the latter case the complement consists of a structure containing a "free variable" in the sense of one not bound within the complement itself. The suggestion would be that such complements are not proper antecedents for coreferential pronouns. A consideration of the kind of structures I have proposed for the consistent readings of cases like (ii) and (iii) above, those in which the diver has a complement-external origin, will show that in such cases also there is a sense in which the complements in question contain "free variables". Thus the present account offers the possibility of reducing the facts of cases like (ii) and (iii) to principles independently needed for cases like (ivb). In any event, some explanation for the properties of examples like (ii) and (iii) must be sought for.

7. Lowering Rules II

As already noted (cf. footnote 31), it has been claimed that lowering rules (henceforth LR) have not been described with precision. While this will remain true to some extent, I would like to hazard a few general remarks which serve to constrain the class of possible operations of this sort and to clarify their operation.

First of all, as is implicit in the discussion earlier (particularly in section 5), I assume (i) that all LR are cyclic. (ii) I assume that LR inherently involve the lowering of predicates, main verbs. While other material may be lowered along with these, this is a derivative and subordinate effect.⁵⁹ (iii) I assume that all LR involve the lowering of elements into *restrictive* relative clauses, and that the effect of LR is therefore to turn what was formerly a subordinate clause embedded as part of an NP into a main clause. (iv) I assume that the relative clause just mentioned not only (a) must be part of the *subject NP* of the main verb which is being lowered,⁶⁰ but also (b) must be a modifier of the index which is the head of that subject NP. Earlier, I referred to elements which underwent LR as divers. Here, I would like to refine that usage by specifying that only predicates can be divers. Other elements which are lowered undergo such operations only as a derivative part of the lowering of divers. And in fact, I assume (v) that when a diver is lowered into its subject NP, all of the other immediate constituents of the main clause of which the diver was the main verb are likewise lowered into that NP. In a case where the diver was a transitive element, like MORE, this will mean minimally that not only is MORE lowered into its subject NP, but also that the object NP of MORE is so lowered. (vi) I assume that lowering of divers and their original clause sisters into subject NPs involves two at least conceptually separate steps. The restrictive relative clause on the subject NP, which is the ultimate locus of the lowered elements, will have a head NP. That is, I assume structures of the form:

(94)



In such a structure, the head, NP_b, will be an index, say *x*. And the S will contain at least one index coreferential to *x*. I suggest that the first step in lowering involves attachment of the diver and its original sisters to the head of the complex NP which

⁵⁹ These remarks take no account of those rules which will be needed for parenthetical elements, like nonrestrictive relative clauses, on the assumption that these are inserted into their ultimate loci from commanding positions. In a sense, such rules would also be lowering rules. In English, such elements seem to be rather systematically marked by intonational devices, but this is apparently not a universal (cf. De Rijk 1972).

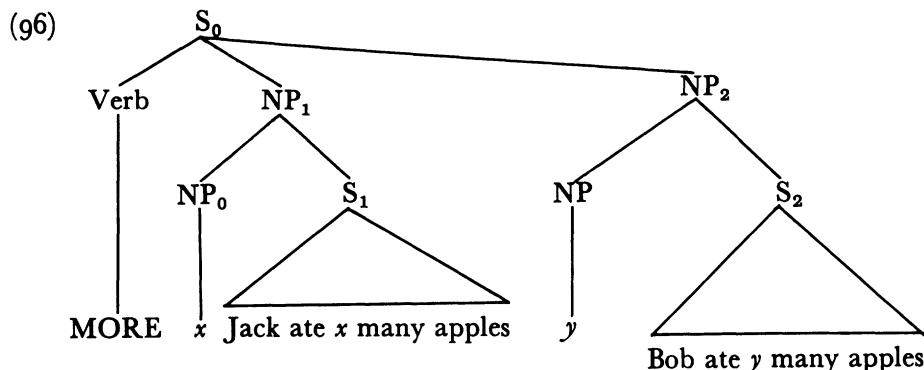
⁶⁰ Naturally, this raises the question of what exactly is meant by a notion like "subject". For this discussion, I will restrict myself to the standard connotations. I should say though that in reality I have rather different ideas about relational notions like *subject* than those which have been assumed within transformational work so far. Cf. Perlmutter and Postal (to appear).

is the diver's subject NP. This part of lowering can then be taken to destroy the original S, leaving a structure like (94), except that where NP_b , originally dominated an index, it now dominates that plus the diver and its original sisters, if any. At this point, the second stage of lowering is applied, in which the derived head NP is inserted in its entirety into the relative clause in the position of the index⁶¹ in that S which was coreferential to the head. This operation can be taken to destroy the top NP (NP_a) in structures like (94), leaving the original restrictive relative clause as a derived main clause. It would be arbitrary at this point in the study of LR to make a determination as to whether the two stages of lowering just distinguished should be regarded as separate rules or as two parts of single complex rules, and the fact that I have terminologically grouped both under the rubric "LR" should not be taken as more than a discursive device.

Let me illustrate the ideas just sketched with a simple example, namely the outline of the lowering derivation of a sentence like (95):

- (95) Jack ate more apples than Bob ate.

In terms established earlier, I would assume an underlying structure of the form:

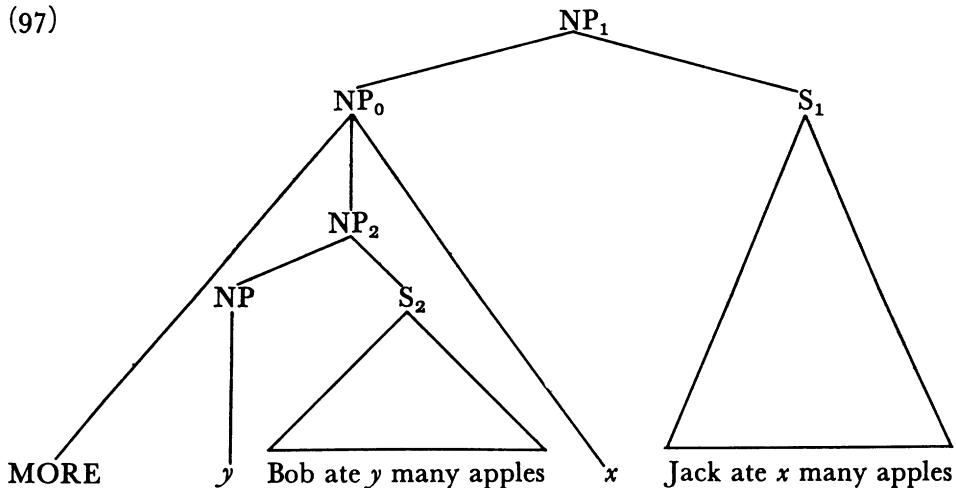


Here I am arbitrarily assuming (i) verb-initial order and (ii) that the leftmost NP is the subject NP. In (96), it follows that MORE is the potential diver and that NP_1 is its subject NP and hence the overall target of lowering. NP_2 is the element that will be derivatively lowered along with the diver. The head of NP_1 is the initial target of lowering and S_1 is the subordinate clause which will ultimately become a main clause.

⁶¹ This formulation makes the implicit assumption that the S in question will contain no more than one index coreferential to the head. Of course, this is in general false. Consequently, an adequate account will have to deal with the general case and specify which of the set of coreferential indices in the S is the target of lowering. This is accomplished, I claim, by the independently needed theory of pronominalization constraints. The principle is roughly that the target is the one of the indices which these constraints would pick out as the ultimate antecedent locus. The notion needed here is essentially that referred to as *prime* in Keenan (1972, 432-440).

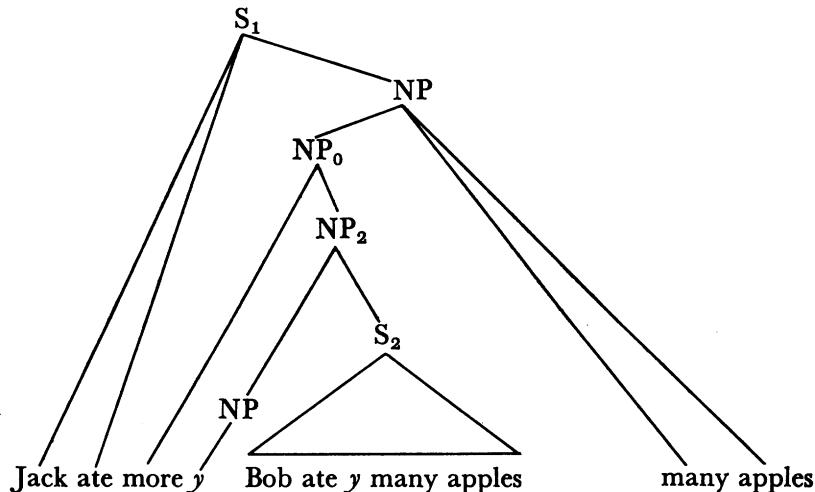
Thus the first stage of lowering will yield (97):

(97)



I should stress that the order of elements in NP_0 is at this point arbitrary. Next, the second stage of lowering will take place. Here NP_0 will be substituted in toto for the index in S_1 which is coreferential with the index directly dominated by NP_0 . This operation is taken to destroy NP_1 and to leave S_1 as the root. The resulting structure is then (98):

(98)



Of course, this is still a long way from the correct surface form. Among other things, many deletions are minimally required. I have not studied these and have little to say about them. The one difference between (98) and the surface structure which I

would like to make a claim about concerns the position of S_2 , the original relative clause on the object NP of the dative, MORE. Namely, I want to claim that the sentence-final position of that S is a function of an extraposition type rule entirely distinct from the lowering processes themselves. Note that such an extraposition does not take place if the object NP of MORE fails to contain an S , as in (99), where the underlying form of the object NP of MORE would be simply the structure of 500 (whatever that is).

- (99) a. John ate more than 500 apples.
- b. *John ate more apples than 500 (apples).

Next, leaving this sketchy treatment in its partially developed form, I should like to turn briefly to some theoretical matters. Chomsky some years ago claimed (1965, 146–147), and he and various supporters have since frequently restated,⁶² that there is a condition on grammars to the effect that transformations cannot insert material into clauses already cycled on. It is obvious that LR as here understood violate such a condition, which I thus claim is incorrect. As already indicated, however, any claim that a theory embodying LR is therefore “more powerful” than one without LR is quite without force⁶³ until it is specified what interpretive devices must be added to LR-free theories to do the parallel work. At any rate, I should like to observe that LR, even as sketchily characterized here, make use of only a restricted portion of the power residing in the class of all possible rules violating Chomsky’s constraint. And I would like to suggest that this is no accident, by imposing a further condition on LR which characterizes rather precisely the class of conditions under which Chomsky’s principle is violable.

This can perhaps best be done by comparing LR with the class of rules which in a sense perform roughly the opposite function, namely raising rules like those involved in Topicalization, *Wh* Movements, etc. The key relevant facts about these are that (i) they typically apply to NPs and (ii) they generate surface structure truncated clauses. In particular, in a sentence like (100), Topicalization has left

⁶² However, in Chomsky (1973), this principle is apparently somewhat weakened by restricting it to so-called *tensed* clauses.

⁶³ Thus the following claim by Hasegawa (1972, 154) is simply erroneous.

Therefore, what the generative semantic approach has to have in excess is the transformations which actually convert the semantic representations into near-surface structures. It is doubtful whether there are independent syntactic motivations for such transformations other than the fact that they are necessitated by the assumption (1). The interpretive approach does not need such transformations and to that extent is “simpler”.

This is a perfect example of comparison of incomparables. For of course, although the interpretive approach does not need the LR, it does need special interpretive devices not found in GS. Hence the assertion of greater simplicity is, not untypically for this type of argument, based solely on the suppression during the argument of relevant unfavorable features of the interpretive system.

behind a clause [they will never be able to convict ____] which is truncated in the sense that it is missing the object NP of *convict*.

- (100) Melvin, I am sure they will never be able to convict.

As is obvious, this is a standard situation for such rules.

One might expect then that the class of LR will be parallel to raising rules like Topicalization, etc., in that they also will leave behind truncated clauses. But, and this is the core of the restriction to be suggested, this never happens. As is clear in the derivation of (95), the original S_0 out of which the diver is lowered is not truncated in the course of the derivation but entirely destroyed. What I am now claiming is that this is not an accident, but a necessary feature of any LR derivation. Unlike raising rule derivations, LR derivations thus cannot leave behind maimed clauses. Another way of saying this is that LR derivations are in a sense invisible, since the resulting structure will have the general configurational form of a structure derived without LR. An obvious consequence of this is that LR lack the kind of self-evident existence which many raising rules have. It is thus not particularly surprising that a class of LR meeting these conditions would be harder to justify and more controversial than raising rules, since the surface properties of sentences will not provide direct clues to their existence.

A consequence of the conception of LR advocated here is that lowering derivations like (101a, b) are impossible since (i) in this case the diver is an NP; and (ii) a maimed clause, namely *Ted said to... ,* is left behind.

- (101) a. [Ted said to me that [they were going to leave tomorrow]] →
 b. [Ted said to [that they were going to leave me tomorrow]]

Derivations like (101) would, if they existed, provide the kind of nearly self-evident evidence for lowering rules which can often be provided for raising rules. What should be stressed then is that the present conception of LR excludes derivations like (101) with no appeal to a principle like that suggested by Chomsky, which excludes all lowering rules, including those LR I claim are empirically needed to describe facts like those in earlier sections.

The fact that LR derivations have the “invisibility” property noted above is relevant to some remarks by Hasegawa (1972, 154–155) criticizing the GS conception (in its McCawley version):

The theory that assigns two different deep structures to sentences like *John claims that Mary didn't kiss the boy she kissed* predicts that, in principle, it is possible that these deep representations might be realized as totally different surface structures, in a way that reflects the deep structural difference. For instance, the elements positioned outside of the embedded sentence in the deep structure (noun phrases, comparatives, and relative clauses) might as well end up in their original place even in surface structure, without being incorporated into the embedded sentence. In other words it is an

accident rather than a necessity that totally different underlying structures such as (42) and (43) exhibit the observed constructional unity in surface structure:

- (42) . . . [Mary didn't kiss X] . . . [(X is) the boy she kissed] (where S₁ may be indefinitely far down the tree)
- (43) Mary didn't kiss the boy she kissed.

In an interpretive theory this is of course a necessary consequence, since it admits no such deep structures as (42). As Bresnan (1971) points out, "a theory in which comparative or relative clauses come from an external source by means of transformations makes of such formal regularities a series of accidents." Thus the "deep structure" in the sense of the (revised) standard theory constitutes a significant linguistic level where maximal constructional regularities are exhibited. Without this level the remarkable convergence of syntactic forms is merely an accident and hence left unexplained.

And (1972, 156):

Thus, if two (or more) distinct deep structures underlie a single surface structure (which is hence constructionally ambiguous), it is generally the case that they can be mapped into distinct surface structures. Indeed, this holds for well-established cases of ambiguity (e.g. the two deep structures underlying Klima's *John will force you to marry anyone* and *John will force you not to marry anyone*). But in the "interpolating" ambiguities discussed in this paper, the putative deep structural differences never produce distinct surface structures. Thus the interpretive solution given in Section 3 provides an explanation for such empirical differences between these two types of ambiguity: it is a necessary consequence of that proposal that there are no distinct surface structures for "interpolating" ambiguities. Speaking in more general terms, it might be possible to require that no cases of "absolute neutralization" (e.g. (42) and (43)) should be allowed in syntax. This requirement might turn out to be too strong, but clearly, if they are to be allowed at all, they must be supported by compelling syntactic evidence. In the absence of any such evidence for the outside origin of various constituents, we may be justified in regarding the external origin theory as highly dubious.

There are several comments which ought to be made to this. First, Hasegawa's claim that the configuration underlying the "external" reading of examples like (102) cannot be realized more directly without lowering is essentially false.

- (102) John claims that Mary didn't kiss the boy she kissed.

The structure underlying the reading of (102) on which the complement is consistent can also be realized essentially as (103):

- (103) The boy who John claims that Mary didn't kiss is
 {the same (individual) as} the boy she kissed.
 identical to

Similarly, the “external” reading of (104) can be realized essentially as (105):

(104) Joe thinks Mary ran faster than she did.

(105) The rate of speed at which Joe thinks Mary ran $\left\{ \begin{array}{l} \text{exceeds} \\ \text{is greater than} \end{array} \right\}$
the rate of speed at which she did run.

To the (quite significant) extent that such paraphrases are not always freely constructible, this can, I claim, be regarded as a function of other constraints and lexical gaps of various sorts having nothing to do with the issues at stake. Hence the “fact” which Hasegawa takes as basic to his criticism is not a fact at all. The actual situation supports GS ideas. Hasegawa’s system at present has nothing to say about the kind of equivalence relations which hold between e.g. one reading of (104) and (105).

Second, consider the claim that it is simply an accident that the structures derived by LR look like independently derivable structures. Clearly, this is only an accident if the theory of universal grammar allows LR derivations in which this is not the case. But I have already suggested that there is a natural constraint or set of constraints on LR derivations which would guarantee that it is. Moreover, this is exactly the logic which has been applied elsewhere in the study of grammatical structure. For instance, it has been noticed by Kimball and others that cyclic transformations tend to derive structures which in significant respects look like their inputs, i.e. ones that are “structure preserving”. Far from assuming, in accord with Hasegawa’s logic, that this is an accident which casts doubt on the existence of cyclic transformations, Kimball, Emonds,⁶⁴ and others have instead tried to formulate conditions on cyclic derivations which would guarantee that no other types of cyclic derivation are possible. Essentially the same considerations can be applied to the fact that LR generate structures with the overall configurational form of non-LR-derived structures. And I do not see how one can accept the validity of the logic of a structure preserving explanation in one class of cases and not in the other. I conclude that Hasegawa’s criticisms of GS here are without force.

One further point might be thought of relevance to the issue of whether scope facts are properly describable by LR of the sort discussed here. We have had frequent occasion to claim that a particular type of reading is blocked for certain structures by island constraints. For instance, it was claimed that it is the inability of LR to pierce

⁶⁴ Structure preserving ideas seem to have been initially due to Kimball and S. Anderson, whose formulations were not originally published. Emonds then developed one version of Kimball’s ideas, particularly in Emonds (1969, 1970, 1972). Kimball’s account has finally been published as Kimball (1972). I should like to stress that although I accept the validity of the general logic of trying to formulate structure preserving conditions, I do not accept as correct any of the structure preserving constraints on cyclic rules so far formulated. I claim that ultimately these constraints involve grammatical relations like *subject of* in a crucial way. Cf. Perlmutter and Postal (to appear).

island boundaries which accounts for the fact that an example like (106) lacks any reading in which the complement is consistent.

- (106) Joan believed the claim that Melvin was older than he was.

Now, an opponent of LR might be led to observe that every case we have attested of blocked readings is such that, despite the fact that one derivation is blocked, the example is nonetheless derivable in a distinct way and hence well-formed. Such an opponent might then be led to assume that (i) this is always the case and that (ii) therefore, in a clear sense, the rules in back of the distribution of ambiguities are "purely semantic" and hence not properly reconstructible as LR. It seems to me that even if its crucial premise were true, this argument would have no real force. But I will not argue this since the premise is not true. There are cases in which the island constraint limitations on LR yield structures which have no possible derivation and are hence not merely missing a potential reading but in fact ill-formed.

For example, it has been noted⁶⁵ that contexts like (107) are in general islands, in contrast to those like (108) which are in general not.

- (107) a. that picture of _____
- b. Melvin's pictures of _____
- (108) a. a picture of _____
- b. (some) pictures of _____

Significantly, then, we find examples like (109) in which the divers *same* and *more* occur and have a scope superordinate to the surface main verb.

- (109) a. Jill bought a picture of the same orgy that Arthur did.
- b. Jill bought pictures of more bishops than Tony did.

That is, the structure of (109b) would be (110):

- (110) MORE x [Jill bought pictures of x many bishops] y [Tony bought pictures of y many bishops]

We should expect then a priori to find sentences parallel to (109) containing NPs like those in (107). But this is impossible:

- (111) a. *Jill bought $\left\{ \begin{matrix} \text{Melvin's} \\ \text{that} \end{matrix} \right\}$ picture of the same orgy that Arthur did.
- b. *Jill bought $\left\{ \begin{matrix} \text{Melvin's} \\ \text{those} \end{matrix} \right\}$ pictures of more bishops than Tony did.

⁶⁵ By a variety of people: cf. especially Ross (1967). Such constraints are discussed at length in Chomsky (1973), who proposes principles to account for them. I think his account is untenable, a conclusion partly argued for in Postal (to appear). Cf. also section 12.

Thus in these cases, the island constraints block lowering into the contexts in question and for independent reasons there is no derivation of the divers with an origin internal to the islands. Hence ungrammaticality results. Thus any argument that LR are “purely semantic”, which is based on the assumption that the violations of the constraints on such rules never yield ungrammatical structures, collapses.

To conclude this section, I would like to return briefly to contrasts between restrictive and appositive relatives mentioned in footnote 8. Recall pairs like the following:

- (112) a. They said Max hadn't kissed the girl $\left\{ \begin{matrix} \text{that} \\ \text{who} \\ \phi \end{matrix} \right\}$ he had kissed.
- b. They said Max hadn't kissed the girl, $\left\{ \begin{matrix} \text{who} \\ \text{which girl} \end{matrix} \right\}$ he had kissed.

The question is why the latter is unambiguous. Now, in our terms, the reading type possessed by (112a) but not (112b) devolves on a structure of the form (113):

- (113) They said (SAME x [Max hadn't kissed x] y [Max had kissed y])

Observe then that the restrictive relative in (112a) originates as the relative on the object NP of SAME and enters the relative on the subject of SAME as a derivative effect of the lowering of the diver. As stated, this occurs cyclically.

There are then several possible lines of description for sentences like (112b) which fail to have readings parallel to (113) but in which the relative in question is appositive. One might claim that appositives are simply not part of NPs within the cycle. Or, one might say that even if they are present, they cannot be derivatively lowered by LR; that is, that they block otherwise valid applications of LR. The former notion, being far more general, has the greater interest. At the moment, it offers only the hope of descriptive adequacy with respect to contrasts like those in (112). But a true explanation would be available if it could be shown that strong independent grounds support the conclusion that appositive relatives are connected to their ultimate locus NP only postcyclically. At the moment, the most that can apparently be said is that there are no known reasons which would support the need for such a connection during the cycle.

8. Lowering Constraints: An Apparent Contradiction

The careful reader may well have noted an apparent contradiction between the account of LR in the previous section and my earlier claim that LR obey island constraints. For, in the previous section I claimed that LR inserted elements into restrictive relative clauses, while in earlier sections I made use of the long-known fact

that restrictive relative clauses are extremely strict islands. On the face of it, this is a contradictory set of assumptions.

However, observe that the conclusion of inconsistency depends crucially on the way in which island constraints are formalized. If they are interpreted in effect as involving absolute bans on traffic across island boundaries, then the account here is indeed inconsistent. Such an interpretation takes into account nothing but the question of whether island boundaries exist in the input structure and are "crossed" in the operation. However, there is a different, somewhat weaker interpretation, which has in fact already been suggested and defended by G. Lakoff (1970a). Namely, it can be required that violations of island constraints involving an application *A* of a rule *R* ensue only if (i) there are islands boundaries *B* in the input to *R*; (ii) *A* "crosses" *B* in the appropriate way (by extraction as traditionally, and by insertion under the generalization advocated above); and crucially also (iii) *B* are preserved in the output of *A*.

Given this interpretation, with its crucial addition (iii), notice that all of the traditional cases of violations of island constraints with respect to restrictive relative clauses are unaffected. Thus, for instance, an example like (114) in which an NP is topicalized out of a restrictive relative remains ill-formed because the island forming structure is preserved in the output of Topicalization.

- (114) *Melvin, I will never find the girl who kissed.

Similarly, the island constraint explanation of the fact that an example like (115)

- (115) John knows the girl who believes Mary is older than she is.

lacks a reading in which MORE is superordinate to the logical correspondent of *know* is unaffected because a lowering of MORE into its surface position would not destroy the restrictive relative on *girl*.⁶⁶

However, as stressed in the previous sections, those restrictive relative clauses which are the targets of the lowering of the head in the second stage of LR are transformed into main clauses (into nonrelative clauses by the second stage operation itself). It follows that the principles defining island boundaries make these clauses islands in the input to the second stage lowering but not in the output. Condition (iii) above on the interpretation of island violations then accounts naturally and automatically for the lack of violations in such cases. Therefore, within the terms of such

⁶⁶ Although it would destroy a larger relative containing that one. Thus the structure of the impossible reading of (115) would be (i):

(i) MORE *x* [John knows the girl who believes Mary is old to *x*] *y* [Mary is old to *y*]

In the (in fact ill-formed) derivation of (115) from (i), LR would destroy the relative clause on *x* (in the sense of making it a nonrelative) but not affect the relative clause character of the italicized clause. Hence an island whose boundaries are violated persists in the output of the LR and the relevant application is blocked not because it involves insertion into the relative on *x*, which does not survive, but because it involves entry of that on *girl*, which does.

an interpretation, there is no inconsistency whatever between (a) the claim the LR insert elements into restrictive relative clauses; and (b) the claim that many scope constraints are a function of island constraints on the operation of LR, and in particular the claim that this set of restrictions includes the constraint that restrictive relative clauses are islands.⁶⁷

9. Lowering Rules and Katz's Compositionality Principle

I have sketched an account of various semantic elements like MORE, SAME, etc. and their relation to surface structures which involves LR, given some arguments for an LR approach, and criticized an incompatible account of Hasegawa's which involved so-called interpretive principles. This account explicitly rejects LR and an "external" origin for elements like MORE.

It would be a mistake, however, to assume that all of those approaches to the relation between superficial grammatical organization and logical form which have been called "interpretive" would or even could reject LR in favor of a syntactic derivation of the relevant sentences in which no constituents have external origins. In fact, if I understand what has been a basic principle of Katz's approach⁶⁸ to semantics from the beginning, namely its view that the meanings of sentences and their parts are *compositionally* determined by semantic rules operating on the constituents of those sentences and sentence parts, then such an approach seems to me logically committed to LR. The reasons are straightforward.

Consider an example like (116), on the reading where the complement is not contradictory.

- (116) Mary believes Joe is smarter than he is.

If the syntax underlying a Katz-style semantic component does *not* derive a sentence like (116) by way of LR, that is, from a deep structure in which the comparative

⁶⁷ It should be stressed that just as the destruction of island boundaries by lowering operations permits, by way of condition (iii) in the text, a diver to be inserted into a relative clause (which then ceases to be such), nothing in general forbids operations subsequent to such lowerings from removing elements from these former relative clauses. Thus, as Ross observes, this is the case with operations extracting elements from superficial clauses containing *more*, as in (i):

- (i) Sonia, Bob used to tickle more often than Mary did.

Here, *Sonia* has been extracted from the clause *Bob used to tickle more often . . .* although this is a former relative clause, as can be seen from the underlying structure of (i), namely (ii):

- (ii) MORE x [Bob used to tickle Sonia at x frequent intervals] y [Mary used to tickle Sonia at y frequent intervals]

I assume Topicalization, which performs the extraction in (i), is postcyclical. Thus, at the point when it applies in the derivation of (i), the original relative clause has already been turned into a main clause and nonisland, and it thus imposes no impediment to rules like Topicalization.

⁶⁸ For recent accounts of this cf. Katz (1971, 313) and (1972, especially Chapter 2, section 4 and Chapter 8, section 2).

element is external to the complement, then one of the syntactic constituents of (116) will be its object complement:

- (117) Joe is smarter than he is.

But, in isolation, this has, given coreference between *Joe* and *he*, only a contradictory reading. Thus such an LR-free grammar could properly permit specification of the reading of (116) on which it involves a contradictory belief. But I see no way in which it could derive the reading on which it involves a consistent belief.

It follows then that a consistent application of the logic of Katz's compositionality idea leads to LR. Indeed, as Ross points out, this is what led to the formulation of LR in the first place. Thus, when writers like Hasegawa speak of an "interpretive" approach to examples like (116) which dispenses with LR, they are to that extent, knowingly or not, abandoning compositionality assumptions.⁶⁹

10. Scopes and NP Content in Logical Structure

I have criticized Hasegawa's account of the ambiguity of examples like (118)

- (118) a. Jack thinks Mary is taller than she is.
- b. Jack thinks Mary didn't kiss the boy she kissed.

and developed an account of such sentences in which the key contrast is the different position of predicates like MORE and SAME with respect to other predicates like that underlying the word *think*. Elements like MORE and SAME are then members of the class of divers, nodes which undergo LR.

It is appropriate to point out that the conception just sketched not only differs from Hasegawa's approach but also differs in important ways from that first described by McCawley (1967, 1970) and reiterated in essence in McCawley (1973). This is worth stressing because McCawley's conception, like that offered here, (i) is internal to GS; (ii) also involves rules which lower constituents; and (iii) is similar to one developed by the present writer some years ago, though never published.

According to this position, which contrasts with that advocated in this article, the two meanings of a sentence like (118b) are a function of differing loci in logical structure of the restrictive relative clause⁷⁰ on the object of *kiss*. On one reading, that

⁶⁹ In another connection, Chomsky (1972, 187) has made such a rejection explicit while claiming that examples like (i) do not involve deletion in the second clause, in which case the reading of that clause is also not determinable in a system meeting Katz's conditions.

(i) John hasn't been here for a month but Bill has.

For some discussion of the (un)tenability of suggestions like Chomsky's, cf. Ross (1969), Grinder and Postal (1971), and Postal (1972b).

⁷⁰ In my earlier conception, it was restrictive relative clauses which had multiple possible origins, inside or outside of complements. In McCawley's version it is whole NPs containing such relatives which have this property. From the present point of view, this difference is apparently without any relevance.

in which the complement is consistent, the restrictive relative clause is part of the main clause; on the other, it is part of the complement. The interpretation offered for this is that in one case the characterization of the object in question as 'boy she kissed' is part of the proposition claimed to be entertained by Jack, while in the other case it is not, being simply the identifying device used by the speaker. Since McCawley's account is now well known, I will not elaborate. Suffice it to say that this aspect of McCawley's (and my earlier) view is quite similar in a way to Hasegawa's theory of sentence "assertors". In both cases, it is assumed to be a question of what individuals are responsible for what descriptions. Within both Hasegawa's and McCawley's theories, it is in effect assumed that the content of certain NPs in complements like (118) is "attributable" on occasion not to the speaker but to the entity designated by the subject of the verb of propositional attitude. As noted earlier, this view has a certain a priori plausibility for such cases.

I now think, though, that this conception, call it *the NP content theory*, is quite incorrect.⁷¹ However, it is not my intention to argue for this claim here, since the whole matter is of great complexity and tied to a number of involved and difficult questions about the logical structure of complement constructions. I will restrict attention to a few comments designed to clarify the differences between the NP content view and that which I now favor.

The idea that the ambiguity of a sentence like (118b) devolves on differing positions of the NP content has a certain appeal because it seems to make sense to think of such cases as involving the presence or absence of the description as part of the proposition which is thought. In short, the "in vs. out" conception of the content of NPs with respect to complements like those in (118b) seems to make sense because it seems reasonable to think of complements representing propositions as containing or not containing descriptions of the entities referred to by the arguments of those propositions. Now, although I do not know that this has previously been pointed out, any such approach will have to be generalized because of cases like (119 a-c):

⁷¹ To my knowledge, this was first argued in an interesting but unfortunately (as far as I know) unpublished paper by Janet Dean Fodor (1968). She argued for the position, which I now accept, that in all cases restrictive relative clauses are attributable to the speaker, except in direct discourse contexts like (i):

- (i) Did I kiss the girl I kissed, Melvin wondered.

Indeed, one can say, I think, that the difference between direct and indirect discourse is just this. Our postulation of an underlying predicate SAME for cases like (ii) is consistent with just such a view as that argued for by Fodor, since we represent the readings on which the complement is inconsistent as either (iii), (iv), or (v):

- (ii) Joe believes Harry didn't find the book he found.
- (iii) Joe believes (NOT (SAME x [Harry found x] \wedge [Harry found y]))
- (iv) Joe believes (NOT (Harry found x [SAME x y [Harry found y]]))
- (v) Joe believes (NOT (Harry found x [Harry found x]))

According to the NP content theory, the NP content "book he found" is internal to the complement and hence "attributed" to Joe and not the speaker. But in all of (iii)-(v) all of the restrictive relative clauses can be regarded as attributed to the speaker. For some discussion of representations like (iv) and (v), cf. section 11.

- (119) a. Jack dreamed Mary didn't own the house she owned.
 b. Jack imagined that Mary didn't own the house she owned.
 c. Jack wished that Mary didn't own the house she owned.

Obviously, these complements represent not propositions but dreams, imaginations, and wishes, and yet they have the same properties as P-complements with respect to ambiguity. One must then be prepared to say that the presence or absence of the NP content within the complement is interpreted such that the description is or is not part of the dream, imagination, etc.

The class of cases like (118) and (119), for which there appears to be a natural interpretation for a complement internal vs. complement external locus of NP content, share a common feature. They all involve complements which in some sense represent the conceptual content of minds. That is, the complements in (118) and (119) can all be taken to describe the kinds of things which can be regarded as having a mental representation. And thus it makes sense to think of certain descriptions as being or not being part of those representations.

One problem with the variable locus NP content theory then is immediately posed by those state of affairs complements brought up earlier as part of one line of disconfirmation of Hasegawa's theory. It should be evident that they provide something of the same sort of problem for the NP content theory, and in so doing further reveal the similarity between the two noted earlier. Consider:

- (120) a. Joe forced Mary to kiss the boy she kissed.
 b. Joe thinks Mary kissed the boy she kissed.

(120a), like (120b), is ambiguous. Just as the latter has a weird reading on which it is claimed Joe thinks a tautology, the former has a weird reading on which it claims Joe brought about a tautological state of affairs. Both, however, have at least one other nonweird reading. In the terms advocated here, the logical structures of these would be respectively:

- (121) a. Joe FORCED (SAME x [Mary kissed x] y [Mary kissed y])
 b. Joe THINKS (SAME x [Mary kissed x] y [Mary kissed y])
 c. SAME x [Joe FORCED (Mary kissed x)] y [Mary kissed y]
 d. SAME x [Joe THINKS (Mary kissed x)] y [Mary kissed y]

Now, obviously, the theory of differential NP content loci can formally provide two different structures for sentences like (120a), one with the relative (or the whole NP) (*the boy*) *she kissed* originally inside the complement, the other with it outside. The difficulty, as I see it, is that there is no sensible interpretation for this contrast in cases like (120a), where the complement designates a state of affairs rather than some mentally representable content. I will not attempt to elaborate this line of criticism, but I hope that the discussion of (120a) has served to clarify the difference between the present theory, with its uniform treatment in terms of relative scopes,

recognizing SAME in a variety of underlying structures where it has no surface realization, and a theory which attempts to locate the semantic differences in differing positions of the content of NPs. I will end by simply listing some other examples that are like (120a) in the relevant respect that they are ambiguous and yet have complements which do not represent mentally codable material:

- (122) a. I wasn't able to have Bob kiss the girl he kissed.
- b. I tried to get Bob not to say what he said.
- c. I attempted to make Bob not kiss the girl he kissed.

In all these cases, of course, the complements represent states of affairs, and in none of them can I see what sense it makes to say that a certain description either is or is not part of the representation of such.

11. The R. Lakoff and R. Huddleston Exchange

R. Lakoff (1970) claimed that the higher comparative element analysis of sentences like (123) was "not sufficiently general" because, although examples like (124) are predictably awful (i.e. tautological), the results of embedding these in certain contexts (eg. (125)) are unexpectedly all right:

- (123) Jerry thinks he is taller than he is.
- (124) Jerry is as tall as he is.
- (125) a. The fact that Jerry is as tall as he is disturbs me.
- b. Jerry is as tall as he is because his mother fed him blintzes.

She claimed that the properties of (125a, b) were the same as those of counterfactual conditionals like (126), about which I have already had a lot to say.

- (126) If Wilt weren't as tall as he is, he'd be a lousy basketball player.

Lakoff argued that (125a, b), like (126), involved comparisons of states of affairs in different possible worlds. In our terms, this would amount to the claim that examples like (125a, b) involve underlying structures containing WOULD.

Huddleston (1971) denied Lakoff's claim that (123) and (125) are a function of the same factors as well as her claim that examples like (125) involved comparison over worlds.

According to Huddleston, who finds the higher comparative element analysis attractive, the problem of the contrast between (124) and (125) involves the difference between assertion and presupposition. He claims that (124) is anomalous not only because it is a tautology, but also because it is an asserted tautology. (125a) is then not anomalous, although according to Huddleston it involves an embedded tautology, because this tautology is only presupposed and not asserted. He points out that

examples like (127) are also anomalous in isolation but yield natural sentences when embedded in a structure like [The fact ____ disturbs me].

- (127) a. John said what he said.
- b. John left when he left.
- c. John has the job he has.

If Huddleston is right, then the examples noted by Lakoff do not bear as such on the merits of a higher comparative predicate analysis of examples like (123), etc., and examples like (125) cause no special problems. However, while I think Huddleston is right that (i) rather different matters are involved in (123) and (125) and that (ii) sentences like (125) do not involve comparison over different worlds, and while I suspect that he is on to something with his reference to a contrast between presupposed and asserted portions of structure, nonetheless it seems to me that his analysis is not nearly articulated enough to really deal with the basic issue.

On the face of it, Huddleston's account would seem to provide the wrong logical structures for all of the examples like (125). For instance, consider (125a). According to Huddleston, the subject of this in fact involves the embedded structure represented by (124). If so, then the meaning of (125) should be that the state of affairs represented by (124)⁷² disturbs me, but this is not the case.⁷³ The claim of the sensible reading of such a sentence is that Jerry's having a certain height disturbs me. Thus, under the assumption that Jerry is seven feet tall, this reading of (125a) is *truth-functionally equivalent* to (128):

- (128) The fact that Jerry is seven feet tall disturbs me.

Similarly, for an example like (129) the meaning is not that I am disturbed by the state of affairs represented in (130), which could hardly be otherwise, but rather that I am disturbed by the fact that he made a fixed statement.

- (129) The fact that John said what he said disturbs me.
- (130) John said what he said.

Some initial clarification of these points is provided by considering the representations of such examples which we are committed to according to earlier assumptions. For the tautological (124), the representation suggested by almost everything said earlier would be (131), assuming we arbitrarily concentrate on the 'same' reading of *as*.

- (131) SAME x [Jerry is tall to x] y [Jerry is tall to y]

⁷² I will claim subsequently that examples like (124) are in fact ambiguous, and thus that really two somewhat different states of affairs are involved.

⁷³ Or, rather, it is only one meaning, the absurd one, and not that of interest, which is free of anomaly.

(131) is obviously tautological. Therefore, if, following Huddleston's ideas, we assumed that (125a) had the structure of (124) embedded in its subject, we would be committed to an analysis of (125a) of the form:

(132) the fact that (SAME x [Jerry is tall to x] y [Jerry is tall to y]) disturbs me

However, this obviously only represents an absurd meaning of (125a). We still have no representation for the sensible reading, on which the claim is only that I am disturbed by Jerry's having a certain height.

Clearly, we cannot even experiment with an alternative to (132) in which SAME commands *disturb* in logical structure, since post-*fact* complements are strict islands and the LR derivation would be blocked.

My suspicion is that the sensible reading of (125a) does indeed, as Huddleston's comments suggest, involve an embedding with the structure of (124). However, it must be observed that our assumptions so far in fact permit (124) to be represented not only as (131) but also as (133), in which the diver is not the highest predicate but is in fact internal to a relative clause.

(133) Jerry is tall to x [SAME x y [Jerry is tall to y]]

Therefore, I claim that a reasonable reconstruction of Huddleston's proposal is that the proper representation for the sensible meaning of (125a) involves an embedding of (133) as in (134):

(134) the fact that (Jerry is tall to x [SAME x y [Jerry is tall to y]]) disturbs me

And (134), unlike (132), does not involve an embedded tautology, since in reality (133) is not a tautology. Rather, it makes a perfectly synthetic claim that some individual's height is such and such, and it has the special property of identifying this height in a very uninformative way. Thus a sentence with the reading (133) can only be used under the assumption that the hearer knows the height in question.

If these somewhat speculative remarks are at all correct, then the significant point which emerges from the discussions by Lakoff and by Huddleston is that there is a real but subtle and hitherto undiscussed ambiguity in examples like (124), a difference represented by the contrast between (131) and (133).⁷⁴

⁷⁴ Besides any inherent difficulties in the line of analysis suggested in the text, based on ambiguities so far ignored, there is the empirical problem raised in R. Lakoff's original note and not dealt with by Huddleston. This problem is the existence of contrasts like (iia, b):

- (i) a. The fact that Jerry is as old as he is worries me.
- b. *The claim that Jerry is as old as he is worries me.

There is nothing in either Huddleston's comments or my reconstruction of them in terms of scopes, occurrence of predicates in restrictive relatives or not, etc., which would account for a contrast like that in (i), if it is in fact genuine. That is, the sharp differentiation in (i) is based on R. Lakoff's judgments. It is not so clear to me

It should be clear that the possibility of contrasting pairs like (131) and (133) is guaranteed by the general assumptions made here about logical structures. That is, I am assuming that these consist of combinations of "logical clauses", each consisting of a predicate and one or more NP arguments. NP arguments can themselves contain "logical clauses" of at least two types, restrictive relative clauses and complement clauses. In such circumstances, nothing precludes in general the occurrence of predicates like SAME, MORE, etc., as the main predicates of restrictive relative clauses.

As a consequence, where I have throughout this paper generally focused on two distinct logical origins for an element like *more* in a context like (135)

- (135) Melvin thinks Lucy is more capable than she is.

namely, one origin in which MORE is the highest predicate of the entire logical structure and one in which it is only the highest predicate of the complement, there is in fact at least one other possibility—that MORE is the highest element of a restrictive relative. Thus, (135) would have the following additional structure, so far usually ignored in this study:

- (136) Melvin thinks (Lucy is capable to x [MORE $x y$ [Lucy is capable to y]])

However, since (136) is contradictory, it is hard to distinguish from the reading of (135) on which MORE is the main predicate of the complement, since that also is contradictory.

G. Lakoff has kindly reminded me of an important and relevant commentary on the Lakoff–Huddleston exchange by W. Christie, Jr. (1972). Christie is interested in contrasts like the following:

- (137) a. John is taller than he is.
- b. Joan thinks John is taller than he is.
- c. The fact that John is taller than he is is disturbing.

- (138) a. John is as tall as he is.
- b. Joan thinks John is as tall as he is.
- c. The fact that John is as tall as he is is disturbing.

that (ib) has only anomalous readings. It may seem that examples parallel to (ib) inherently involve the absence of factivity:

- (ii) a. The discovery that Jerry was as old as he was . . .
- b. ?The wish that Jerry was as old as he was . . .
- c. ?The possibility that Jerry is as old as he is . . .

But I think this is not the case, as shown in examples like (iii):

- (iii) The possibility that Jerry was as old as he was (never occurred to us).

Contrasts like (iic) and (iii) show that factors like tense are relevant. While I don't have much idea about what is going on here, I see nothing which would conflict with the general line of description adopted in the text.

That is, according to Christie, (137a) is contradictory, (138a) tautological. When either the contradiction or the tautology is embedded below a nonfactive, the anomaly disappears. However, when these are embedded below a factive, as in (137c) and (138c), the anomaly disappears only in the case of the original tautology. Christie argues that this is not a fact peculiar to comparative elements, but also generalizes to cases like (139a, b), as shown by (140a, b):

- (139) a. What is true is true.
- b. What is true is false.
- (140) a. The fact that what is true is true worries me.
- b. The fact that what is true is false worries me.

Christie then concludes that the asymmetry exhibited by contradictions and tautologies with factive and causal contexts is to be sought not in the nature of comparison but in the interaction of contradictions and tautologies with factive and causal contexts. Hence he also concludes that the facts noted by R. Lakoff do not count against the higher predicate theory of comparatives.

I think Christie is essentially correct and that the analysis presented here goes a way toward explaining the apparent contrast between tautologies and contradictions which he notes. According to the present system, the reason that (138c) has a non-anomalous reading is that (138a) is actually ambiguous and has a nontautological reading. Thus the nonanomalous reading of (138c) is a function of embedding that reading. The same formal possibilities exist in (137). That is, (137a) is in fact ambiguous, having either of the following logical forms:

- (141) a. MORE x [John is tall to x] y [John is tall to y]
- b. John is tall to x [MORE x y [John is tall to y]]

However, whereas the analogue to (141b) in the case of the symmetrical SAME is not tautological, but merely a synthetic statement with an uninformative restrictive clause, (141b) is as contradictory as (141a). Hence embedding (141b) in a factive context will yield just as much of an anomaly as embedding (141a).

Essentially the same sort of analysis holds for examples like (139), except that there is another possible analysis. In the terms available here, (139a) can be represented as any of (142a, b, or c):

- (142) a. \ SAME x [x is true] y [y is true]
- b. x [SAME x y [y is true]] is true
- c. x [x is true] is true

Here (142a) is a tautology, while both (142b, c) involve synthetic statements with uninformative relatives. Embedding either of the latter two in a factive context will

therefore yield a nonanomaly. For (139b) the three formally possible structures are:

- (143) a. SAME x [x is false] y [y is true]
- b. [SAME x y [y is true]] is false
- c. x [x is true] is false

However, all of (143) are contradictory, and there is nothing which can be embedded in a factive context to yield a nonanomalous result. All of these cases are based on the principle that while a restrictive relative which says what the main clause it is embedded in says yields a statement whose arguments are simply poorly identified, a restrictive which says the negative of the main clause in which it is embedded necessarily yields a contradiction.

12. Island-Scope Correlations and Interpretive Rules

Earlier, especially in section 5, I argued that (i) there is an extensive correlation between scope facts involving MORE, SAME, etc., and extraction rule islands; and (ii) that this correlation supports the GS theory of scope involving "higher" predicates and rules which lower elements. And I suggested that the possibility of explaining this correlation provided by the GS theory was a result for which it was difficult to imagine any interpretive theory analogue.

One should point out then that despite these claims, Chomsky (1973) has in fact attempted to provide an account of inherently rather similar facts which makes no appeal to higher predicates or rules which lower constituents. Rather, Chomsky offers a way of dealing with such correlations that is purely internal to an interpretive framework and independent of any "abstract" syntactic analyses or lowering operations. In order to maintain my original judgment, then, it will be necessary to consider the merits of the kind of analysis Chomsky advances.

Briefly, and limiting ourselves to essentials, Chomsky, basing his remarks on observations of Lasnik's, is concerned with examples like (144a-c):

- (144) a. I didn't see many of the pictures.
- b. I didn't see pictures of many of the children.
- c. I didn't see John's pictures of many of the children.

According to Chomsky, both (144a, b) have two readings, one in which $\text{not}(n't)$ is "associated" with *many*, the other in which it is "associated" with *see*, a reading he suggests not all speakers accept. Further, for those speakers who accept both readings of (144a, b), (144c) has only the reading that "associates" *not* with *see*. Now, this notion of "associate" is not defined by Chomsky, nor, as far as I am aware, does it correspond naturally to any well-defined tradition of logical or semantic description.

Nonetheless, little is lost, I think, if one translates his description into scope terms and represents the two readings of (144b), for instance, with the two structures (145a, b):

- (145) a. NOT (MANY x [I saw pictures of x of the children])
- b. MANY x [NOT (I saw pictures of x of the children)]

In this reconstruction then “A is associated with B” means roughly “A is the first predicate above B”. Continuing then, the claim would be that (144c) has only the reading (146):

- (146) MANY x [NOT (I saw John’s pictures of x of the children)]

However, something has obviously gone wrong, for (146) is no more a possible reading for (144c) than the following is:

- (147) NOT (MANY x [I saw John’s pictures of x of the children])

It thus may seem that our scope reconstruction of Chomsky’s description in terms of “associate” is inadequate. However, I think that the problem lies elsewhere. Fundamentally, Chomsky is entirely correct in his claim that the syntactic difference between examples like (144b) and (144c) is correlated with the fact that the latter lacks semantic possibilities possessed by the former.

This contrast is just that between nonisland and one type of island discussed briefly above toward the end of section 7. However, Chomsky is incorrect, I think, in his description of the semantic possibilities, ignoring what is really a third reading of (144b). This reading is one in which MANY originates in a relative clause (probably a nonrestrictive one) and hence has a scope which is superordinate to neither NOT nor *saw*. Schematically, this reading might be as follows, where “[],” indicates a nonrestrictive relative:

- (148) NOT (I saw pictures of x , [MANY x], of the children)

My claim then is that the addition of the element *John’s* eliminates the possibility of readings for (144c) analogous to either (145a) or (145b) and leaves only a reading analogous to (148).

The key point obviously is that both the readings (146) and (147) involve the logical element MANY which is external to the island structure in the logical representation but whose correspondent, the word *many*, is internal to it. Therefore, deriving these readings for (144c) would involve LR operating across island boundaries, which they cannot do. The facts are thus consistent with our general approach to scope/island correlations.

But Chomsky (1973) takes quite a different point of view, namely the one cited below:

The observations are moderately subtle, but I believe that Lasnik’s judgments are correct. Notice that the facts, as stated, follow from the specified subject condition,

which does not permit association of *not* with *many* in (47) (= my (144c): PMP). If (following Lasnik) we regard assignment of scope of negation as a matter of semantic interpretation, the specified subject condition again blocks a semantic rule. Or, if, on the other hand, it is claimed that a rule of *not*-movement extracts *not* from the NP object to give the first (normal) interpretation of the sentences of (46) (= my (144a, b): PMP), this syntactic rule is blocked in (47) by the same condition.

Now, I am chiefly interested here in the purely semantic account. The latter treatment, involving *Not* Movement, would surely be inadequate, since the facts involve variations in the scope of MANY as well as in the scope of NOT.

Concentrating then on the account in terms of interpretive rules, Chomsky is suggesting that there is a general condition, one of several he considers, which blocks both syntactic processes and interpretive rules. This principle is his *specified subject condition*, which, in its initial formulation (1973, 11), is as follows:

- (26) No rule can involve X, Y in the structure
 $\dots X \dots [\alpha \dots Z \dots -WYV \dots] \dots$
 where Z is the specified subject of WYV in α

Now, according to Chomsky, *John's* is the specified subject of *John's pictures of many of the children*. Thus he is claiming that an interpretive rule cannot "associate" *not* and *many* in (149a) although it can in (149b) because only the former has *not* and *many* separated by a specified subject:

- (149) a. I didn't see John's pictures of many of the children.
 b. I didn't see pictures of many of the children.

The reason the rule cannot "associate" *not* and *many* is a straightforward deduction from the powerful and almost unrestricted negative existential in the formulation of the specified subject condition.

Clearly, such a formulation would also be applicable to cases like (150a, b), in which there is no negation.

- (150) a. I saw John's pictures of many of the children.
 b. I saw pictures of many of the children.

That is, the principle could account for why *many* in (150b) can be "associated" with *saw*, whereas this is impossible in (150a), since again only the former has a specified subject between *many* and *saw*.

It may seem at this point that, contrary to my earlier judgment, an account like Chomsky's shows that it is possible to provide a theoretical basis for the correlation between extraction islands and limitations on the scope of logical elements. I think, though, that this is not the case and that an account of the sort considered by Chomsky has inherent weaknesses. Two separate questions should be distinguished. First, there is the problem of *descriptive adequacy*: can a set of rules and principles be constructed in

the sort of terms Chomsky is interested in which will yield the right factual claims? That is, can the system correctly predict the set of scope/island correlations? Second, and far more important, is the problem of *explanatory adequacy*. Can such a system explain why this correlation exists; can it offer some principled reason why natural languages fall into the set of languages having such a correlation rather than outside of it?

Let us consider the first problem. As formulated, it is easy to see that Chomsky's system cannot meet the test of descriptive adequacy. This follows most visibly from examples like (151):

- (151) Jane thinks she is more wholesome than she is.

As we have seen over and over, such sentences have a reading in which *more* is logically superordinate to *thinks*, which would mean in Chomsky's terminology that *more* is "associated" with *thinks*. But, according to Chomsky, clauses have specified subjects just as much as nominals do, and *she* in (151) is a specified subject. Hence the natural reading of (151) would be blocked by his principle, which allows "no rule" to involve elements appropriately separated by a specified subject. This case is no accident. In general, the scopes of all sorts of elements—comparative, quantifier, SAME, etc.—are unaffected by what Chomsky calls (clausal) specified subjects.

This piece of disconfirmation of Chomsky's description system is of relatively little interest here, however, for the much deeper issue remains. Even if descriptive adequacy could be achieved in some way, can a genuine explanation be attained? And here one can, I think, say something stronger. While the failure of descriptive adequacy may be contingent and can be patched in some way, the proposal misses achieving a genuine explanation for deep and basic reasons.

The key issue here is why putative interpretive rules for assigning scope ("association") correlate in their limitations with syntactic rules of extraction. Chomsky's implicit answer is that they do so simply because *all* rules are subject to the same constraints ("No rule can involve . . ."). In other words, in this approach, the correlation between two types of rule is explained in terms of the claim that there are general properties constraining all rules. The trouble is that this claim is obviously and thoroughly incorrect. In fact, Chomsky himself notes this in effect (in his footnote 16), pointing out that the rules which establish coreference between NPs do not obey the kind of constraints that extraction rules do. So, for instance, coreference is perfectly possible across specified subjects:

- (152) Jane_i bought Bill's picture of her_i.

Moreover, this is not an isolated case where the claim that all rules obey constraints is falsified. Notice for instance the following cases in which the deletion rules of Sluicing (Ross 1969) and VP Deletion cut across island boundaries with no violations:

- (153) a. Somebody puked but we haven't called the man who (said he) found out who.
 b. Joan called the man who (said he) didn't want her to do so.

In (153a) Sluicing operates into a restrictive relative clause, while in (153b) VP Deletion does so. And yet, as we have seen, the rules relevant for scope assignment as well as extraction rules are both blocked by the boundaries of such clauses. Any claim therefore that this correlation is due to the fact that all rules behave in such and such a way is falsified.

It follows that Chomsky has provided no genuine principle which predicts that what are *in interpretive systems* two different kinds of rules—syntactic rules of movement and interpretive rules of scope—correlate in restrictions, whereas other rules do not. This is a particularly serious flaw, since other rules that Chomsky seems to regard as interpretive, namely those that assign coreference, do not correlate with extraction rules. Thus, in such a system, some interpretive rules obey the constraints and some do not, while extraction rules do. In the kind of account offered in GS, however, scope rules correlate with extraction rules because both are movement rules. Co-reference assignment (and deletions) have nothing to do with movement, however. Hence the resulting correlations and lack of them seem to have a natural basis in the GS system. In contrast, nothing has been said in interpretive terms so far which would suggest that the facts are anything but accidents. Thus, as claimed earlier, and despite Chomsky's remarks, nothing like an explanation of scope-island correlations seems available in systems which reject the lowering operation approach.

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