

Pronominalization, Negation, and the Analysis of Adverbs¹

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Introduction

Studies in transformational grammar have made it clear that the grammatical analysis of sentences must be carried on at two levels, deep structure and surface structure. The surface structure of a sentence is roughly equivalent to its parsing, in traditional terms. The deep structure is more abstract. It reflects the logic of the sentence, exhibiting only elementary grammatical relations. And in all cases, the deep structure contains more elements than does the relatively abbreviated surface form of the sentence. In most cases, deep structure will even contain full sentences that do not appear as sentences in surface structure. For example, Chomsky (1957 and 1965) has argued that attributive adjectives are derived from full sentences in deep structure. "The tall man left" would have the sentence "the man is tall" in its deep structure, even though this sentence does not appear as a clause in surface structure. If Chomsky's arguments are correct, and I believe they are, then there is an extra deep structure sentence for every attributive adjective that appears in surface structure. In what follows I will argue that the same is true of either (a) certain adverbial modifiers, in particular, time and place adverbials, or (b) negatives, or (c) both.

1. Pronominalization

Since the inception of transformational studies of pronominalization,² it has been assumed that anaphoric pronouns do not occur in underlying structures; rather, they are derived by transformation from the full noun phrases to which they refer. For example, it has been assumed that (1) is derived from (2):

- (1) *The man who John knows shaved himself.*
- (2) *The man who John knows shaved the man who John knows.*

The two occurrences of "the man who John knows" in (2) are assumed to refer to the same individual.³ We will refer to the view that pronominalization is a syntactic process as Assumption 1.

ASSUMPTION 1: Anaphoric pronouns are derived by a transformational rule from the full noun phrases to which they refer.

A priori, there is no reason to believe Assumption 1. One might just as easily suppose that anaphoric pronouns occur in underlying structure and that there is a rule of semantic interpretation that indicates what the antecedent is for each pronoun. In the absence of any compelling evidence, one could just as well make Assumption 2:

ASSUMPTION 2: Anaphoric pronouns occur in underlying structures and their antecedents are given by semantic rules.

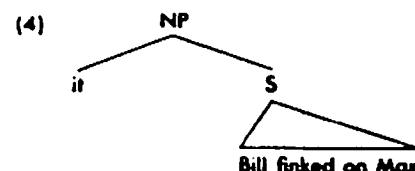
I should like to raise the question as to whether there is any good reason to believe that Assumption 1 is true and Assumption 2 false.

2. Anaphoric "It"

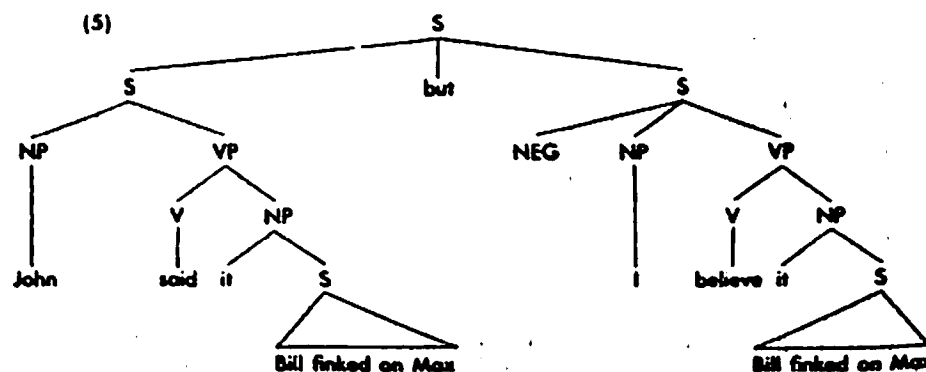
There are a wide variety of cases in English where the anaphoric pronoun "it" stands in place of a noun phrase complement sentence. Consider (3), for example:

(3) John said that Bill finked on Max, but I didn't believe it.

The *it* in (3) is understood as referring to the noun phrase complement of (4).



If we were to make Assumption 1, we would guess that (5) would be the structure underlying (3).



If this deep structure is correct, (3) would be derived from (5) by a rule having the effect of deleting the rightmost S "Bill finked on Max" and leaving behind "it" as an anaphoric pronoun. It is an open question as to whether the process of S-deletion in this case is just a subcase of the ordinary pronominalization rule. At present, there is no reason to believe that it is not, while there is one very strong reason to believe that it is a subcase of ordinary pronominalization.

Anaphoric "it" of the type found in (3) patterns just like other anaphoric pronouns with respect to the constraints of right-to-left pronominalization. Langacker (1966) and Ross (1968) have shown that right-to-left pronominalization is impossible in certain situations.

- (6) a. Although *Irv* was sick, *he* went to the party.
- b. Although *he* was sick, *Irv* went to the party.
- c. *Irv* went to the party, although *he* was sick.
- d. * *He* went to the party, although *Irv* was sick.

(The italicized noun phrases are assumed to refer to the same individual.) Pronominalization is impossible in (6d), where the antecedent is inside an independent subordinate clause and the anaphoric pronoun is in the main clause. The same constraint holds in the case of anaphoric "it," as in (3).

- e. Although Sid asserted that *Max* left, I didn't believe *it*.
- f. Although Sid asserted *it*, I didn't believe that *Max* left.
- g. I didn't believe that *Max* left, although Sid asserted *it*.
- h. * I didn't believe *it*, although Sid asserted that *Max* left.

Since the anaphoric "it" referring to noun phrase complements has the same privileges of occurrence as ordinary anaphoric pronouns, there is good reason to believe that S-deletion is a subcase of ordinary pronominalization.

Suppose this is true. What follows? If I can show that Assumption 1 is true of the above cases of anaphoric "it," then it follows that Assumption 1 is true of ordinary pronouns. In the following section, I will try to show that Assumption 1 is true of a certain class of cases involving anaphoric "it." Given this, I will make the claim that the formation of anaphoric pronouns should be a single unified process: if Assumption 1 is true for some anaphoric pronouns, then it is true for all of them. The basis for this claim is Occam's razor: why should there be two processes of rather different sorts to do the same job? I will discuss this in somewhat more detail below.

3. Negatives

Before going on to our discussion of anaphoric pronouns, let us consider a rule of English called "not-transportation," which will provide indirect, but crucial, evidence concerning the nature of pronominalization. "Not-transportation" is the rule that relates (7) and (8):

- (7) I believe that John isn't coming.
 (8) I don't believe that John is coming.

Sentence (8) is ambiguous. It can be merely an ordinary negative, meaning "it is not so that I believe that John is coming." This is simply a denial of the sentence "I believe that John is coming" and does not commit the speaker to any belief at all. But (8) has another meaning — that of (7). It is the latter sense of (8) that we are concerned with. Here the negative appears overtly in the main clause, though logically it is the embedded clause that is negated.

It was proposed by Fillmore (1963) that the latter sense of (8) is derived from the same structure as that which underlies (7), and that the rule of *not*-transportation moves the negative from the embedded clause into the main clause. There is rather strong evidence, as Klima (1964) has pointed out, to indicate that Fillmore's analysis is correct. The evidence involves the possibility of using *until*-adverbials with punctual verbs such as "leave." These adverbials can occur with "leave" only if a negative is present.

- (9) * John will leave until tomorrow.
 (10) John won't leave until tomorrow.

This fact allows us to make two predictions. The first concerns verbs that do not undergo *not*-transportation, that is, those that do not occur in synonymous sentence pairs like (7) and (8). This includes most verbs that take object complements, for example, *state*, *claim*, *hope*, *know*, etc. Sentences (11) and (12) are not synonymous:

- (11) I claimed that John wasn't coming.
 (12) I didn't claim that John was coming.

Under Fillmore's analysis, we would maintain that the *not* of (11) cannot move up from the embedded sentence to the main sentence, and that the *not* of (12) has only one deep structure source, in the main sentence rather than in the embedded sentence. Now consider (13):

- (13) I claimed that John wouldn't leave until tomorrow.

We would predict that the *not* in (13) cannot move to the main sentence, and that (14) would therefore be ungrammatical:

- (14) * I didn't claim that John would leave until tomorrow.

Sentence (14) is ungrammatical: it contains the ungrammatical sentence (9) embedded as the object of "claim." The negative element required to make "leave" modified by "until tomorrow" grammatical must be in the same sentence, and not in a higher sentence, as it is in (14).⁴

Our second prediction concerns the small class of verbs like *believe*, *expect*, *think*, *want*, etc., that do undergo *not*-transportation, that is, those that do occur in synonymous sentence pairs like (7) and (8). Consider (15):

- (15) I believed that John wouldn't leave until tomorrow.

If Fillmore's analysis of (7) and (8) is correct, then we would expect that "not" in (15) would be able to undergo *not*-transportation and move from the embedded clause to the main clause. That is, (16) should be grammatical, which it is.

- (16) I didn't believe that John would leave until tomorrow.

Note also that (16), unlike (8), is unambiguous. Sentence (16) cannot be understood as an ordinary negation, "it is not so that I believed John would leave until tomorrow." This is impossible because the positive sentence "I believed that John would leave until tomorrow" is ungrammatical. Thus, (16) can have only the meaning of (15), and the *not* of (16) must have originated in the embedded clause, not in the main clause.

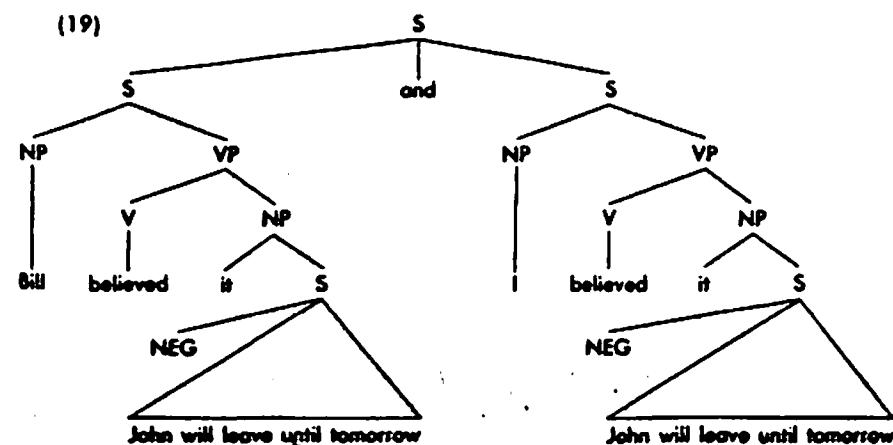
Let us now return to anaphoric pronouns. Consider (17):

- (17) Bill believed that John wouldn't leave until tomorrow, and I believed that John wouldn't leave until tomorrow too.

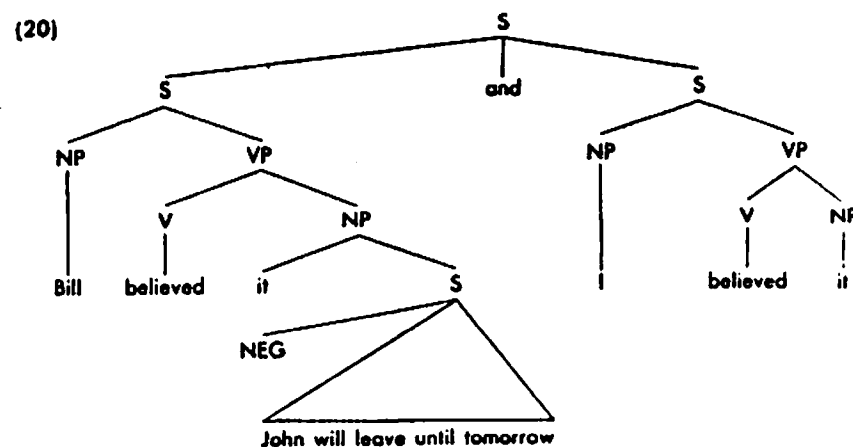
Sentence (17) is grammatical, though its style is rather infelicitous, because of the repeated noun phrase complement "that John wouldn't leave until tomorrow." Sentence (17) can be paraphrased without repetition if one substitutes the anaphoric pronoun "it" for the second occurrence of the noun phrase complement.

- (18) Bill believed that John wouldn't leave until tomorrow, and I believed it too.

As before, we will ask whether the "it" in (18) occurs as such in deep structure, as would follow from Assumption 2, or whether the "it" is derived from a full underlying noun phrase complement, according to Assumption 1. That is, the deep structure of (17) is essentially that of (19).



Under Assumption 1, (19) would also be the deep structure of (18). Under Assumption 2, however, the deep structure of (18) would be (20).



So far we have presented no evidence to decide between Assumption 1 and Assumption 2. Consider (21):

- (21) Bill didn't believe that John would leave until tomorrow, and I didn't believe that John would leave until tomorrow either.

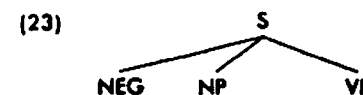
Sentence (21) must have the same deep structure as (19). As we saw above, the occurrences of *not* in (21) cannot originate in the main clauses, but must originate in the embedded complement clauses, as shown in (19). Neither occurrence of *not* can originate in the main clause for the same reason that the occurrence of *not* in (16) could not originate in the main clause, but had to be moved out of the embedded clause. Now consider (22):

- (22) Bill didn't believe that John would leave until tomorrow, and I didn't believe it either.⁵

As in the case of (21), the *not* in the first half of the sentence cannot originate in the main clause, but must be moved there from the embedded clause. But what about the second occurrence of *not* in (22)? It is understood in the same way as the corresponding *not* in (21) and the *not* in the first half of (22). Since it cannot have originated in the main clause either, it must have been moved there by *not*-transportation from the embedded clause. But that means that there must have been an embedded clause in the second half of (22) at some point in its derivation. First the *not* moved into the main clause, and the remainder of the clause was deleted.

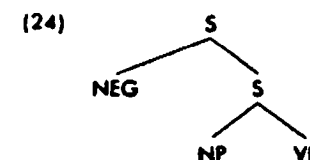
This explanation is possible under Assumption 1, which states that the

embedded clause is there in deep structure. But such an explanation is not possible under Assumption 2 — if we continue to assume that a negative is to be analyzed as part of the sentence that it negates, that is, if we assume the analysis of (23).

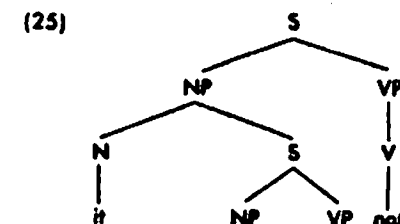


Under Assumption 2, the rightmost S of (19) would not be present in deep structure, as in (20), and hence there would exist no S for the NEG to hop out of. Given our assumptions about the source of NEG, Assumption 2 could not explain the *not* in the second half of (22). Thus, (22) would appear to indicate that Assumption 1 was correct and Assumption 2 incorrect.

However, such a conclusion would depend crucially on the assumption that an analysis of negatives like that in (23) was correct. There are, of course, other possibilities that ought to be considered. For example, in symbolic logic, the negative is treated as a special sort of operator or predicate, external to the proposition it negates. One possible way of translating such a notion into syntactic analysis would be to have deep structures like (24).

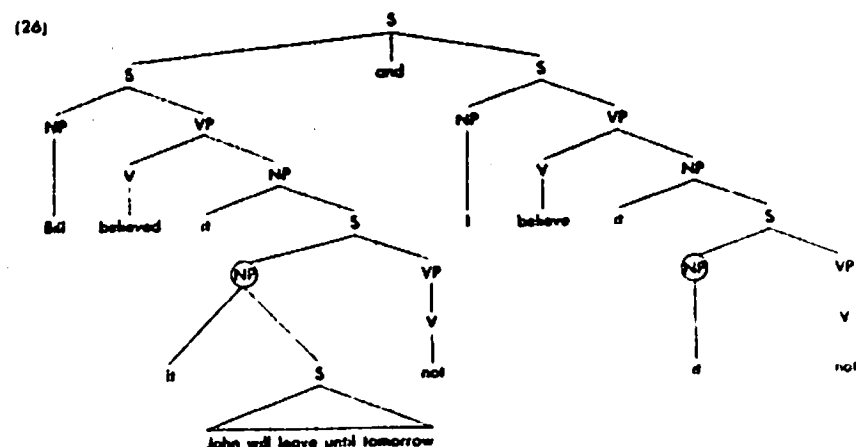


Another possibility would be to consider NEG not a special sort of element but an ordinary predicate, as in (25).



Such an analysis of negation would raise a considerable number of serious questions involving the details of working out such a proposal and the justification of such an analysis which are beyond the scope of this paper. For

our present discussion it will suffice to say that an analysis of negation something like (25) will allow us to save Assumption 2 in the face of the above argument. Under such an analysis, the deep structure of (22) would be (26).

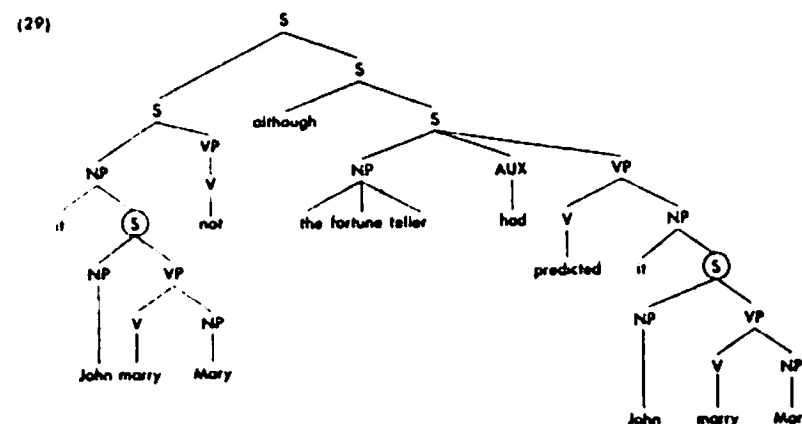


It is assumed that the two encircled noun phrases in (26) are coreferential: that is, the encircled NP *it* on the right is the anaphoric pronoun that refers back to the encircled NP on the left. Diagram (26) might then be a possible deep structure for (22), with the two occurrences of *not* undergoing *not*-transportation. If such an analysis can be worked out in detail, then Assumption 2 could be saved. But, as should be obvious, this would be a tricky business. First, there are two occurrences of *it* on the right, and it is not at all clear which one should be deleted, what the details of the rule should be, and how such a rule might receive independent justification. Second, suppose that *not*-transportation does not apply to (26). How could the resulting bad sentence be blocked? These are but some of the problems that arise from the claim that (26) underlies (22). They are hard, but not necessarily unsolvable. Our ability to maintain Assumption 2 depends on their being solvable.

It ought to be mentioned that analyses like (24) and (25) have some independent support. Consider (27) (pointed out by N. Chomsky) and (28) (pointed out by W. Browne):

- (27) John didn't marry Mary, although the fortune teller had predicted it (that John would marry Mary).
 (28) It is believed that Sally is not cruel to animals, but I wouldn't put it past her (that Sally is cruel to animals).

In both cases there is a negative sentence on the left side and an anaphoric *it* on the right side which refers back not to the negative sentence, but to the positive sentence corresponding to the negative sentence. In proposals like (24) and (25), the positive proposition is separated from the element which negates it, and so it becomes possible for anaphoric pronouns to refer back to the proposition without the negative. In analyses like (23), where the negative is part of the sentence that it negates, this is not possible. For example, under Assumption 1, (27) would have the deep structure of (29).



The encircled S on the right is identical to the encircled S on the left. The S on the right will delete by S-deletion. If one makes Assumption 2, then the tree above, minus the encircled S on the right, will be the deep structure of (27), and the *it* following *predicted* will be coreferential with the noun phrase [NP it [_S John marry Mary _S] NP].

It should be noted in passing that in accepting (25) as a deep structure for negative sentences, one would be making the claim that an anaphoric *it* may refer to the positive version of a negative sentence [as in (27) and (28)], but not to the negative version of a positive sentence. So far as I know this is correct.

Thus far, we have shown that if the *not*-transportation arguments are correct, then either

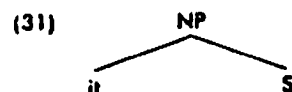
- (30) a. Assumption 1 is correct for anaphoric "it."

or

- b. Negatives appear in deep structure as in (25).

4. Locative and Time Adverbs

From (30a) it follows that whenever one finds an anaphoric "it" of the sort discussed above, the deep structure source of that "it" is a noun phrase of the form

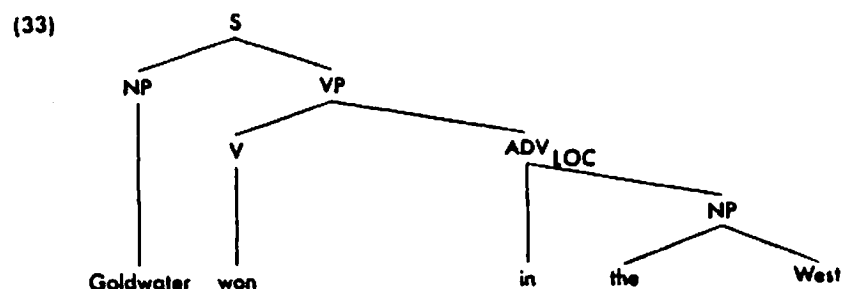


In the process of pronominalization, the S is deleted under identity with another S elsewhere in the sentence.

Given this assumption, we can derive some rather startling consequences. Consider (32):

(32) Goldwater won in the West.

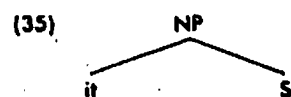
In traditional grammar as well as in most transformational studies, (32) would be analyzed essentially as in (33):



That is, it is generally assumed that "in the West" is a locative adverb modifying "won" and that "won in the West" forms a single deep structure constituent. Now consider (34):

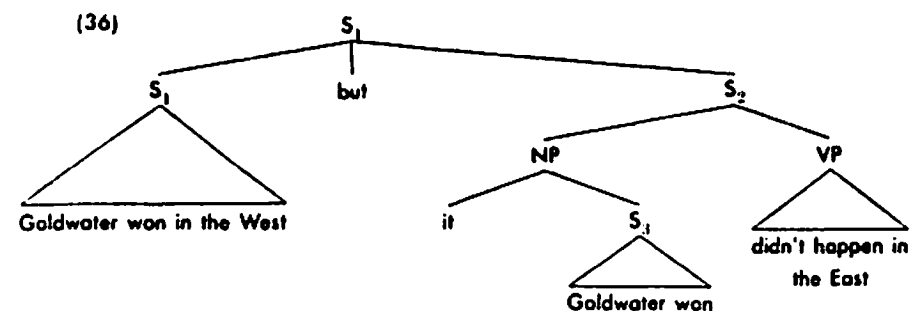
(34) Goldwater won in the West, but it didn't happen in the East.

The "it" in (34) must come from an underlying NP of the form

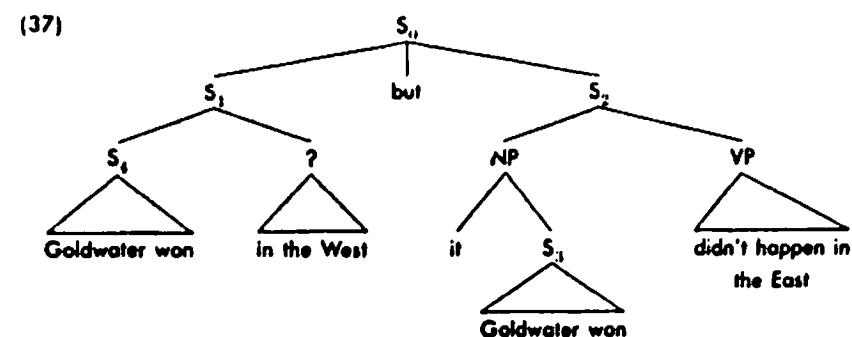


What is the S in (35)? Note that it cannot be "Goldwater won in the West," since the meaning would be wrong — something like that of "Goldwater's

victory in the West didn't happen in the East." (34) does not contain any such strange meaning. The "it" in (34) simply refers to "Goldwater's winning," which means that the S in (35) can only be "Goldwater won." Thus the underlying structure of (34) must be something like (36).



We know that S₃ is deleted in the process of pronominalization and we also know that it can be deleted only if it is identical with some other S elsewhere in (36). The only other occurrence of "Goldwater won" in (36) is in S₁. This means that "Goldwater won" in S₁ must itself be an S — in order for S₃ to delete under identity with it. Thus, (36), filled in somewhat more precisely, must have at least the structure of (37).



But if "Goldwater won" is an S in S₁, then the analysis in (33) must be grossly wrong. In (33), "Goldwater won" is not even a constituent, much less an S. Thus, if our line of reasoning is correct, locative adverbs like "in the West" do not occur in the same VP constituents as the verbs that they modify in underlying structure. Perhaps it is inappropriate to speak of a locative adverbial modifying a verb; logically, it "modifies" an event, which is specified by a full sentence (in this case, "Goldwater won"). If something

like (37) is correct, then locative adverbs are not part of the sentences they modify in deep structure.

Note that our result holds not only for the particular locative adverbial in (37), but for the full range of such adverbials. For example,

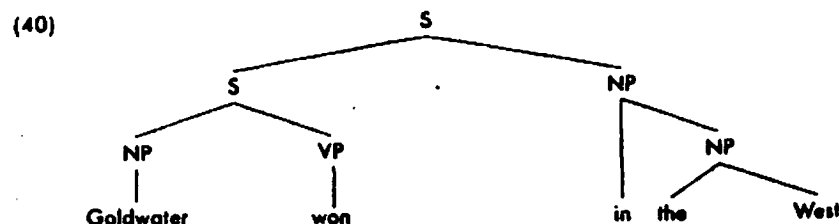
- (38) a. A Brink's truck was robbed outside of town, but it could never have happened within the city limits.
 b. John proposed to Mary by the river, although everyone had guessed that it would happen indoors.
 c. The train exploded near Mexico City, although the assassins had planned for it to happen at the border.

Moreover, similar results can be obtained for time adverbials.

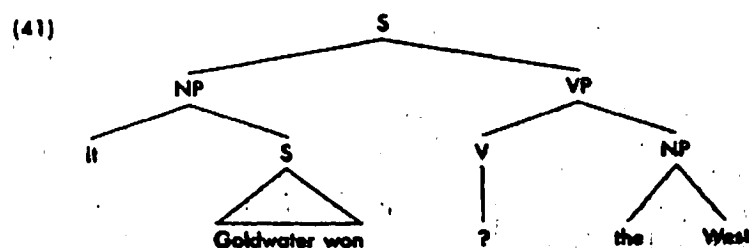
- (39) a. Goldwater won in 1964, but it won't happen in 1968.
 b. A Brink's truck was robbed in the evening, but it couldn't have happened during the daytime.
 c. John proposed to Mary in May, although everyone had guessed it wouldn't happen until August.
 d. The train exploded before noon, although the assassins had planned for it to happen at 3 o'clock.

By the same arguments that were used in the case of (34), we can show that the time adverbials in (39) are, like locative adverbials, outside of the sentence they modify in deep structure.

Let us now ask what it means to say that such adverbials are outside the sentences they modify. I would certainly not be willing to claim that the underlying structure of (32) is (40)



although that is all the structure that we have evidence for. My best guess is that the structure underlying (32) is something like (41):



The verb in (41) indicated by "?" would have a meaning something like "took place in" or "was located in" and would be deleted by some as yet unknown rule. This rule would be specific to English and other similar languages, but would not apply in languages like Chinese, Javanese, and several West African languages, where the verb "to be" precedes locative adverbs. In those languages, a deep structure analysis like (41), with "be" replacing "?", seems to be well motivated on the basis of fairly obvious surface structure facts.

It ought to be noted that the fact that I do not know exactly what the structure of (41) looks like and the fact that I do not know what would be the rules involved in the deriving (32) from such a structure do not at all invalidate the line of reasoning that I have pursued. All that I have argued is that some such structure and some such rules must exist. Given (30a) and the principle of recoverability of deletion, the above results follow.⁶

5. Conclusion

If the line of reasoning we have pursued is correct, then we must conclude that either

- (42) a. Time and locative adverbs do not occur in deep structure as parts of the sentences that they modify. Rather they appear to be derived from predicates of other, "higher" sentences, as in (41).
 b. Negatives occur in deep structure outside of the sentences that they negate, perhaps as in (33).
 c. Both (42a) and (42b) are true.

Condition (42a) follows from Assumption 1 (for anaphoric "it"), and (42b) follows from Assumption 2.

Suppose Assumption 2 is correct and anaphoric pronouns occur in deep structures. Then there must be some semantic apparatus to indicate what these pronouns may refer to. A reasonable constraint on such would be (43):

- (43) Anaphoric pronouns may refer only to single constituents. (Perhaps only to NP constituents.)

Suppose we were to adopt Assumption 2 with condition (43). Consider (34):

- (34) Goldwater won in the West, but it didn't happen in the East.

Since "it" refers to "Goldwater won," condition (43) says that "Goldwater won" must be a single constituent (presumably an S) in (34). If locative adverbs are inside the sentences they modify, this is not possible. Thus it follows from Assumption 2 and condition (43) that locative adverbs are external to the sentences they modify. (The same case can be made for time adverbs.) Thus in order to disprove (42a) one must show *both* that Assumption 2 is right and that (43) is wrong.

If (42a) is correct, then the deep structures of English sentences will look

more like those of the corresponding sentences in languages like Chinese, Javanese, etc., thus increasing the likelihood that a common set of deep structures for these languages can be found. At the same time, it would indicate that the supposed grammatical category *locative adverb* does not appear as such in the deep structures of English sentences and open to serious inquiry the question of whether such a category exists in the deep structure of any natural language. But no matter which of (42a), (42b), or (42c) is true, our results indicate that deep structures are somewhat more abstract, further removed from surface structures, than had previously been thought. Considering other recent results in transformational studies, this should hardly be surprising.⁷

NOTES

1. This work was supported in part by grant GN-1934 from the National Science Foundation to Harvard University.

2. See Lees and Klima (1963).

3. For discussions of identity of reference, see Katz and Postal (1964); Chomsky (1965); and Postal (1966a).

4. Dwight Bolinger has pointed out (personal communication) that *not-transportation*, if formulated as an optional transformation (as I have suggested), would not be meaning-preserving. Consider the following:

- (a) I don't think Bill left.
- (b) I think Bill didn't leave.

If one asks whether the speaker is more certain of his assertion in (a) or in (b), one must conclude that he is more certain in (b) and that, in (a), where *not-transportation* has taken place, he is somewhat uncertain. Thus the occurrence of *not-transportation* is correlated with some uncertainty on the part of the subject of *think*, or whichever verb happens to be present. This explains the observation by Paul and Carol Kiparsky in their paper *Fact* that *not-transportation* never occurs with factive verbs. Since it is presupposed that the subject of a factive verb knows that the complement of the verb is true, he cannot be uncertain about it. Consider

- (c) John regrets that Bill didn't leave.

It is presupposed in (c) that John knows that Bill didn't leave. Therefore, John can't be uncertain about it. If *not-transportation* indicates uncertainty, then, for strictly semantic reasons, the rule cannot apply with factive verbs.

It ought to be noted that Bolinger's observation does not affect our argument at all, since in sentences like (a) the negative still belongs logically to the embedded sentence, and, as (13) through (16) show, the negative is in the embedded sentence grammatically as well. Further grammatical evidence that there is a rule of *not-transportation* is provided by expressions like *lift a finger*, which require a negative in the same sentence in deep structure.

- (d) * John lifted a finger to help Bill.
- (e) John didn't lift a finger to help Bill.

With *lift a finger*, we get the same pattern as with *until tomorrow* in (13) through (16).

- (f) I claimed that John didn't lift a finger to help Bill.
- (g) * I didn't claim that John lifted a finger to help Bill.
- (h) I thought that John didn't lift a finger to help Bill.
- (i) I didn't think that John lifted a finger to help Bill.

And sentences like (22) show up as well:

- (j) Max didn't believe that John would lift a finger to help Bill, and I didn't believe it either.

It has been claimed by Jackendoff (1967) that there is no rule of *not-transportation*. Rather, the negative is introduced in deep structure just where it occurs in surface structure, and a rule of semantic interpretation associates the negative with the sentence that it logically negates. I would like to consider just what innovations in linguistic theory would be required to make such a proposal work.

Jackendoff claimed that one could predict from the meaning of a verb whether or not it participated in *not-transportation*. In other words, Jackendoff claimed that the *not-transportation* verbs formed a natural semantic class (or a disjunction of such classes), and that it would never be the case that there would exist two synonyms such that one participated in *not-transportation* and the other did not. Since Jackendoff's claim involves meaning, it would necessarily be a cross-linguistic claim, involving synonyms in different languages.

These claims are simply false. There are only a handful of verbs in English that undergo *not-transportation*: *think*, *want*, *believe*, *likely*, *seem*, *reckon*, *guess*, *expect*, *suppose*, *anticipate*, and perhaps a few others. The class differs from person to person. A number of people I've spoken to do not have *reckon*, *guess*, or *anticipate* as *not-transportation* verbs. This fact alone is sufficient to show that one cannot predict the ability to take *not-transportation* just from the meaning of the verb. Now consider individuals (and there are quite a number) for whom *expect* takes *not-transportation* but *anticipate* does not. If the rule refers to natural semantic classes, then there will have to be a natural semantic class that includes *expect* but excludes *anticipate*. The same is true of *expect* and *guess*, of *guess* and *suppose*, and of *guess* and *anticipate*. To show that this is possible, one would have to take sentences like

- (k) I expect that Bill will leave.
- (l) I guess that Bill will leave.
- (m) I anticipate that Bill will leave.
- (n) I suppose that Bill will leave.

and show that any one of them can be true while the others are false. I doubt that this is possible.

Similarly, *want* is a *not-transportation* verb, while *desire* is not.

- (o) I don't want you to lift a finger to help Bill.
- (p) * I don't desire that you lift a finger to help Bill.

Jackendoff's proposal would require that *want* be included in a natural semantic class, from which *desire* is excluded. To show this, one would have to consider sentences like

- (q) I want Bill to leave.
- (r) I desire that Bill leave.

and show that one can be true while the other is false. This seems unlikely.

There are cross-linguistic counterexamples to Jackendoff's hypothesis as well. In German, *hoffen* is a *not-transportation* verb, while *hope* in English is not one.

What these examples show is that one cannot predict from the meaning of a verb whether or not it will take *not-transportation*. This means that if the phenomenon is to be handled by a rule of semantic interpretation, the rule will have to have exceptions; hence a theory of exceptions for semantic rules must be added to the theory of grammar. Moreover, since *not-transportation* applies only to a handful of irregular verbs and adjectives, and not to the mass of regular cases, the theory of semantic exceptions would have to permit minor semantic rules. Thus, the exception apparatus for syntax would have to be duplicated for semantic rules. I know of no independent motivation for this apparatus in semantics.

Even if we were to accept such a revision of semantic theory, Jackendoff's proposal would require even further drastic revisions in the theory of grammar. This follows from the fact that the *not* can occur indefinitely far away from the verb it negates, so long as each of the intervening verbs may take *not-transportation* (i.e., *believe*, *want*, *think*, etc.). Consider the following:

- (a) I believe that John wants Bill *not* to lift a finger to help Irv.
- (b) I believe that John *doesn't* want Bill to lift a finger to help Irv.
- (c) I *don't* believe that John wants Bill to lift a finger to help Irv.

If *not-transportation* is a syntactic rule, then it can apply cyclically, moving the *not* step by step up the tree. However, if *not-transportation* is to be handled by a rule of semantic interpretation, then the rule must apply anticyclically, working its way down the tree and checking at each step for the presence of the appropriate type of lexical exception. Thus, the concept of an anticyclical semantic rule would have to be introduced into semantic theory. There is no independent motivation that I know of for such an addition to semantic theory.

Still, the facts require an even more drastic revision of the theory of grammar. All known selectional restrictions on the occurrence of lexical items are finite in scope. Usually they apply in the same sentence (subject-verb and verb-object selections) and sometimes one sentence away (verb-verb selections; i.e., *force* requires an activity verb in its complement). If *not-transportation* is a syntactic rule, then this can be maintained for cases like *X*, where *lift a finger* would require that a negative be present in the same sentence in deep structure. The negative could then be moved away by successive application of *not-transportation*. However, Jackendoff's proposal requires that a negative be present somewhere, perhaps indefinitely far away, for *lift a finger* to be selected. Thus Jackendoff's proposal requires that selectional restrictions extend over an indefinitely large stretch of tree. But that is the least of the difficulties, since *lift a finger* requires not only that there exist a negative commanding it somewhere up the tree, but also that there exist, between the negative and *lift a finger*, a continuous sequence of *not-transportation* verbs, each commanding *lift a finger*. Since *not-transportation* verbs must be represented as lexical exceptions to a minor semantic rule, the selectional apparatus must refer to indefinitely long sequences of lexical exceptions of a particular sort. Again there is no independent reason for supposing that such a selectional apparatus exists.

To make Jackendoff's proposal work, the following apparatus must be introduced into the theory of grammar:

1. A theory of exceptions and minor rules for rules of semantic interpretation.

2. Anticyclical semantic rules.
3. Selectional restrictions of indefinite scope.
4. The use of indefinitely long chains of lexical exceptions in the statement of selectional restrictions.

Since none of these has any independent motivation, there is no good reason to believe that they exist. However, there are some very good reasons to believe that they do not exist.

- (1) The theory of exceptions necessary for just this one semantic rule would be duplicating the exception apparatus in syntax, which is justified on independent grounds.
- (2) Anticyclic semantic rules have the same effect as cyclic syntactic rules. The cycle is independently motivated for syntax, so inventing anticyclic semantic rules for this one case is again unnecessary duplication of theoretical apparatus.
- (3) Allowing selectional restrictions to range indefinitely vastly increases the power of the theory of grammar and predicts that there should be other such selections of indefinite scope. Until there is independent evidence for this, there is every reason to try to maintain that selectional restrictions are finite in scope.
- (4) This shows that there would be a generalization missed in Jackendoff's proposal. According to this proposal, it is an accidental fact that *lift a finger* would require the presence of *not* and the presence of lexical exceptions to the semantic equivalent of *not-transportation*. Why this rule and not some other? Surely this is no accident. Moreover, Jackendoff's proposal would require that the same lexical exceptions be mentioned twice in accounting for sentences with *lift a finger*, once to permit the selectional restrictions and once to permit the operation of the semantic rule. Again, something is being missed. Lexical exceptions should be employed only in permitting the operation of the appropriate rule. They shouldn't have to be duplicated in selectional restrictions.

From this, I conclude that *not-transportation* is a syntactic phenomenon, and that it is handled by a syntactic rule, as was claimed by Fillmore.

So it is apparent that *not-transportation* is a syntactic rule, which is all that our argument requires. However, Bolinger's observation does have other important consequences for syntactic theory. *Not-transportation* is a syntactic rule that is correlated with a fixed meaning. In the Katz-Postal and *Aspects* theories, the deep structure would have contained a syntactic representation of this meaning — perhaps an arbitrary marker, *U*, bearing the appropriate meaning and restricted in occurrence to *not-transportation* verbs. The rule could then be made obligatory, triggered by the presence of *U*. This solution is obviously a fudge; there is no independent motivation for hypothesizing *U* in just such cases. If we reject such an *ad hoc* solution, there are just two alternatives that I can think of:

- (a) The rule is obligatory and sensitive to semantic information.

or

- (b) The rule is optional and changes meaning if it applies.

My guess is that (a) is correct, since there is other evidence that syntactic rules must take semantic information into account.

The phenomenon of *not*-transportation is relevant to a number of issues in syntactic theory, and certainly deserves further study. Any such investigation should, however, take into account a further observation of Bolinger's. In the case of English *not*-transportation, we find the following situation:

(I) Certainty	Negative appears with the verb it negates.
Uncertainty	Negative is moved away from the verb it negates.

However, there is another logical possibility that might occur in some natural language:

(II) Uncertainty	Negative appears with the verb it negates.
Certainty	Negative is moved away from the verb it negates.

Any of the theories that we have mentioned that can describe the situation in (I) can also describe the situation in (II). According to these theories, it is an *accidental* fact of English that (I) occurs and that (II) does not. All of these theories would predict that if *not*-transportation occurred in some other language, one would have just as much reason to expect it to be correlated with certainty (II) as with uncertainty (I). Bolinger suggests that this is wrong, that it is not at all an accident that the movement of the negative away from the verb it negates represents uncertainty. Rather, he says, the movement of the negative away from its normal position is a natural way of softening a negative statement. In accordance with this view, (I) would be a very natural phenomenon and (II) would be impossible (or at least highly unnatural). I do not know if there are any languages where (II) occurs, but my intuition (for what it is worth) tells me Bolinger is right. If he is, then none of the theories of grammar that I know of, or can even imagine, can describe his observation — and to that extent all present theories of syntax are inadequate.

5. In the examples that we have given so far, *not*-transportation has applied either in both of the conjoined sentences, or in neither. However, there is no mechanism in our present version of the rule to keep it from applying to one sentence but not the other. Thus *not*-transportation could apply in the first conjunct, but not the second, and vice versa. However, if this happens, then pronominalization with "it" becomes impossible.

- (a) * Bill believed that John wouldn't come until tomorrow and I didn't believe it either
 (b) * Bill didn't believe that John would come until tomorrow and I believed it too.

How can we account for this? Note that in order to account for (22) we must assume that *not*-transportation must apply before the formation of the anaphoric pronoun. The latter rule can apply only if the two noun phrases in question (the objects of "believe") are identical. They will be identical only if *not*-transportation has applied

in both or in neither. Otherwise, there will be a *not* present in one that is absent in the other; the two noun phrases will not be identical, and the formation of the anaphoric pronoun will be blocked. The resulting sentences, without pronominalization, would be:

- (c) ? Bill believed that John wouldn't come until tomorrow, and I didn't believe he would come until then either.
 (d) ? Bill didn't believe that John would come until tomorrow, and I also believed that he wouldn't come until then.

These are stylistically awkward because of the repetition involved and the lack of parallelism, but they are considerably better than (a) and (b).

6. For further results along a similar line of reasoning, see Lakoff and Ross, in preparation.

7. Between the time this paper was submitted to the publisher (September 1967) and the time of editing (June 1969), there have been a number of discoveries which have a bearing on the topic discussed in this paper. First, Robin Lakoff (1969) has found an even stronger argument for the existence of a syntactic rule of *not*-transportation. The argument is based on tag-questions. With a positive declarative sentence one gets a negative tag and vice versa.

- (a) The Knicks won, didn't they?
 (b) The Knicks didn't win, did they?

With most verbs that take complements, the tag goes on the main verb, not the verb inside the complement.

- (c) John knows that the Knicks didn't win, { doesn't he?
 • did they? }
 (d) John doesn't know that the Knicks won, { does he?
 • didn't they? }

When the main verb, however, has the meaning of "suppose" and is used performatively, that is, with a first person subject, present tense, nonrepetitively, then the tag goes with the verb in the complement, not the main verb.

- (e) I suppose the Knicks didn't win, { • don't I?
 did they? }
 (f) I suppose the Knicks won, { • don't I?
 didn't they? }

Mrs. Lakoff now considers sentences like (g):

- (g) I don't suppose the Knicks won, did they?

She observes that the tag goes with the verb of the complement, as in (e); note the plural *they*. However, the tag is positive even though *won* has no overt negative. Thus, at the time that the rule of tag-formation applied, the negative must have been on *win*, not on *suppose*; the negative must have been moved up to *suppose* by a subsequent application of the rule of *not*-transportation. This is corroborated by the fact that *suppose* occurs in (g) in a performative usage, but since performative utterances are not subject to logical negation, the *not* associated with *suppose* in (g) could not have been there in underlying structure.

Since this paper was submitted, a tremendous amount of work has been done in the area of pronominalization, some of which vitiates some of the minor arguments in this paper. For example, it was assumed, since anaphoric pronouns in general obey the same constraints on occurrence, that they were therefore to be accounted for by a single unified process. This assumption was made because it was also assumed that such constraints were to be stated as part of some sort of transformational rule. However, it is demonstrated in Lakoff (1968) that the pronominalization constraints discussed by Langacker and Ross are not part of a rule, but are rather output conditions. Thus, it would no longer follow that Assumptions 1 and 2 would have to be mutually exclusive, and it might be possible that some pronouns are derived by deletion rules, while others are present in underlying structure. In fact, strong evidence is presented in Lakoff (1969) that pronouns indicating identity of sense must be derived by deletion rules, while those indicating identity of reference must not. Since the anaphoric *it* discussed in the bulk of this paper is of the identity of sense sort and must be derived by a deletion rule, the main argument of this paper is not vitiated by this result.

Chomsky (1969) has attempted to provide a *reductio* argument against the main conclusions of this paper by arguing that if (38) and (39) show that locative and time adverbs are from "higher" sentences, then (h) must show that direct objects are from "higher" sentences.

- (h) Irving refused the peanut butter sandwich, but *it* wouldn't have happened with a bagel.

This is a fallacious argument. Recall that Ross (1967) points out that in rules deleting constituents under identity, pronouns commanded by their antecedents are ignored in the definition of "identical constituents." Ross discusses sentences like (i).

- (i) Having the police after him bothered John, but *it* would never bother Mary.

As Ross points out, the *it* in (i) must be derived from "having the police after *her*." Since *Mary* commands *her* prior to the deletion, the difference between *him* and *her* is ignored by the general principle cited above. For a detailed discussion of such cases, see Lakoff (1969). Given Ross's observation, it is clear what is going on in (h). Prior to the deletion rule, the sentence on the right of (h) would be of the form: [_{NP} *it* [_S *Irving refuse it*]] *would never happen with a bagel*. Since *bagel* commands *it*, *it* is ignored in checking for identity of constituents.

One might then ask the following question: Why not say that in sentences like (j)

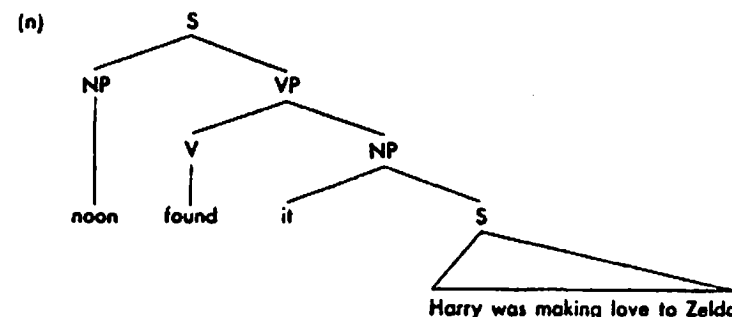
- (j) Nixon won in 1968, but *it* won't happen in 1972.

the sentence on the right is derived from an underlying: [_{NP} *it* [_S *Nixon win then*]] *won't happen in 1972*? The answer, I think, lies in a very interesting construction pointed out to me by Ross (personal communication).

- (k) Noon found Harry making love to Zelda.
(l) 1969 found Richard Nixon in the White House.
(m) Opening day found Amos Otis the third baseman of the Mets.

Found functions here as a two-place predicate relating a time expression (its subject)

to a complement sentence (its object). Thus, (k) would be derived from a structure of the form (n).



Found requires that subject-raising apply and that its complement contain the copula. Thus, *found* seems to be an overt occurrence of the predicate hypothesized above for ordinary occurrences of time adverbs, namely, one relating a time expression to a complement sentence. The only difference would be one of order, which could be accounted for if the rule of subject-object inversion had applied to *found*.

Now note that the complement sentence in the object of *found* cannot contain time adverbs, either in full or anaphoric form.

- (o) * Noon found Harry making love to Zelda at 12 o'clock.
(p) * Noon found Harry making love to Zelda then.

This is natural, since the function of *found* is to specify the time reference for its complement sentence. If *found* is an overt manifestation of the abstract predicate hypothesized above, then sentences like (o) and (p) would rule out the possibility of an embedded time adverb in such cases.

It should be noted in addition that (k) is synonymous to (q).

- (q) Harry was making love to Zelda at noon.

Thus, we have the situation where a time expression which shows up on the surface as an adverb in (q) appears in a synonymous sentence as a superficial subject. Under any analysis, *noon* in (k) will have to be either an underlying subject or underlying object of *found*, depending on whether or not one assumes subject-object inversion. Thus, if semantic representations preserve the grammatical relations found in deep structure, *noon* in (q) will have to enter into the same grammatical relations as it does in (k) — namely, subject or object.