

WHY YOU CAN'T DO SO INTO THE SINK

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This paper appeared in Report NSF-17 of the Aiken Computation Laboratory of Harvard University under the title "A criterion for Verb Phrase Constituency": the research was supported by a grant from the National Science Foundation to Harvard University. It constituted the first serious attack on Chomsky's (1965) treatment of "strict subcategorization". Lakoff and Ross show that, contrary to Chomsky's claim, an element that plays a role in the strict categorization of verbs need not be a "sister" of the verb; specifically, most of the adverbs that are involved in strict subcategorization of verbs (e.g., manner adverbs, since verbs such as resemble and regard are subject to the constraint that they cannot be combined with manner adverbs) occur higher in the deep structure than Chomsky's claim allows them to. This argument shows that deep structures must be more highly structured than the analysis in "Aspects" suggested and was a step in the direction of deep structures whose constituent structure matched that of logical structure.

One detail of Lakoff and Ross's analysis was quickly superseded: where they treated do so as a unit, created in one fell swoop by a VP-pronominalization transformation, Anderson in 1967 (paper 10 of this volume) argued that clauses with an action verb must be assigned deep structures

having *do* plus a sentential complement and showed that *do* so is merely what arises from pronominalization of that complement. Lakoff and Ross's paper contains one false conclusion whose refutation has resulted in important work in the analysis of pronouns and the relation of reference to syntax. Bouton (1970) observed that, contrary to Lakoff and Ross's claim (see their discussion of Example 38), *do* so can be contained in its antecedent (as in Susan kissed a man who had ordered her to *do* so). The problem of stating the conditions under which an anaphoric device can be contained in its antecedent yields further evidence for the proposals of G. Lakoff [1968c (paper 16 of this volume)] that in logical structure, complements are inside and relative' clauses outside the constituents in which they appear in surface structure (summed up in Lakoff's slogan, "Complements in, modifiers out"). Bouton's work also demonstrated the existence of dialect variants as to what can be the antecedent of *do* so that cannot be described satisfactorily in terms of local (as opposed to global) rules.

I. BACKGROUND

Words and phrases like *often*, *at five o'clock*, *for 2 hours*, *without breaking anything*, *carefully*, *with a hammer*, and *there*, have traditionally been called adverbs. Traditional grammarians considered adverbs to be modifiers of verbs, just as they considered pronominal adjectives to be modifiers of nouns, and they indicated this in their parsings by placing adverbs in the same constituents as the verbs that these adverbs were thought to modify. In transformational grammar, where the notion of constituent structure was made fully explicit, the traditional analysis was largely accepted and was interpreted as indicating that the node VP (verb phrase), which immediately dominates V (verb) and its direct object NP (noun phrase) if it has one, should also dominate adverbial constituents.

Transformational grammarians have recognized for some time that all adverbs cannot be lumped together indiscriminately, and they have concentrated their attention on the fact that certain adverbs may not occur with verbs of certain classes and that other adverbs seem to have to occur with certain classes of verbs. Lees (1960a, pp. 6-14) attempted to account for this phenomenon by setting up a hierarchy of constituents within the verb phrase constituent and claiming that different types of adverbs were

introduced at different levels in the hierarchy. A more recent attempt to account for this phenomenon appears in Chomsky (1965, pp. 95-106), where Chomsky claims that certain adverbials (those of place and time) are sister constituents of VP and may occur freely with any verb, whereas other adverbials are sister constituents of V (are dominated by VP) and are restricted in their occurrence with certain classes of verbs. Taking this as a fact, Chomsky then states a principle of strictly local subcategorization to account for this fact. His principle, in effect, embodies the claim that verbs may be subcategorized only with respect to adverbs that are dominated by the node VP. Chomsky (1965, p. 102) states the following set of rules to illustrate this claim for English:

(i) $S \rightarrow NP \text{ Predicate-Phrase}$

(ii) $\text{Predicate-Phrase} \rightarrow \text{AUX VP (Place) (Time)}$

(iii)
$$\text{VP} \rightarrow \left\{ \begin{array}{l} \text{be Predicate} \\ \left\{ \begin{array}{l} (\text{NP}) (\text{Prep-Phrase}) (\text{Prep-Phrase}) \\ \text{(Manner)} \end{array} \right\} \\ \text{V} \left\{ \begin{array}{l} \text{Adj} \\ \text{S'} \\ \text{(like) Predicate-Nominal} \end{array} \right\} \end{array} \right\}$$

(iv)
$$\text{Prep-Phrase} \rightarrow \left\{ \begin{array}{l} \text{Direction} \\ \text{Duration} \\ \text{Place} \\ \text{Frequency} \\ \text{etc.} \end{array} \right\}$$

(v) $V \rightarrow \text{CS}$

Note that in these rules adverbials of place are introduced both by rule (ii) and by rule (iv). Those introduced in rule (ii) are not dominated by VP and so, according to Chomsky, cannot enter into the subcategorization of verbs and should be able to occur freely with any verb phrase. The adverbs of place introduced in rule (iv), on the other hand, are dominated by the node VP and so they *do* enter into verb subcategorizations and do restrict the occurrence of verbs. As an example of rule (iv) place adverbials, Chomsky offers the sentence:

(1) *John remained in England.*

An example of a rule (ii) place adverbial might be:

- (2) *John solved the problem in England.*

Chomsky argues that *remain* must take a place adverb, though *solve* need not do so, and he claims that this can be accounted for by the strict subcategorization principle, providing that *in England* in (1) is introduced by rule (iv), but that *in England* in (2) is introduced by rule (ii).

However, there are some flaws in this analysis. If, as Chomsky claims, the time and place adverbials introduced in (ii) can occur with any VP, then we should be able to derive the following as grammatical sentences of English:

- (3) Time adverbial:

- a. **John lived in the hotel at 10 o'clock*
- b. **John lived in cities at 10 o'clock*
- c. **The concert lasted four hours at 10 o'clock*
- d. **John ran four miles at that instant*

- (4) Place adverbial:

- a. **John was dead in Bayonne*
- b. **John ran four miles on this spot*
- c. **John drove to New York on this spot*
- d. **John drove to New York in small country towns*

The ungrammaticality of these sentences indicates that the time and place adverbials that Chomsky introduces in (ii) are, in fact, restricted in occurrence with certain VPs. Moreover, restrictions of this sort cannot be handled by Chomsky's principle of strictly local subcategorization.

In the following section, we will present evidence that the principle of strictly local subcategorization cannot handle most of Chomsky's interesting cases. This evidence indicates that most of the adverbs that Chomsky and others have claimed were constituents of verb phrases are really not constituents of verb phrases. These findings are in accord with the evidence presented in G. Lakoff, 1965, Appendix F, where it was claimed that most adverbials are actually derived by transformation from predicates of "higher" simplex sentences. In this paper, we take no stand on that issue. Our aim is merely to point out that most adverbials are not constituents of verb phrases.

II. A TEST

The phrase *do so* is a proform that may substitute for a

verb phrase. Thus, (6) would be derived from the structure underlying (5).

(5) *Harry forged a check, but Bill could never bring himself to forge a check.*

(6) *Harry forged a check, but Bill could never bring himself to do so.*

However, *do so* may be substituted only for a verb phrase containing a nonstative verb.¹ Thus, (8) cannot be derived from the structure underlying (7).

(7) *Bill knew the answer, and Harry knew the answer, too.*

(8) **Bill knew the answer, and Harry did so, too.*

Observe that verb phrases containing adjectives may not reduce to *do so*, whether the adjective is stative or not.

(9) **John was heavy, and Bill did so, too.* (stative)

(10) **John was careful, and Bill did so, too.* (nonstative)

The question now arises as to which of the adverbs that may follow the verb are included in that part of the sentence that is replaced by *do so*. We claim that *do so* replaces all of the constituents of the verb phrase and only these. Thus, elements that may occur after *do so* are outside of the verb phrase (are not constituents of VP), and elements that cannot so occur are inside the verb phrase. An immediate consequence of this claim is that time adverbials, *because*-clauses, and *if*-clauses are, not surprisingly, outside of the verb phrase. Thus, the following sentences are grammatical.

(11) *John took a trip last Tuesday, and I'm going to do so tomorrow.*

(12) *He voted for Johnson because he thought Johnson was good, but I did so because Goldwater is evil.*

(13) *He would take the job if they paid him \$25,000, but I would do so if they paid me only \$18,000.*

On the other hand, direct objects, indirect objects, and directional adverbs are, also not surprisingly, inside the verb phrase. The grammaticality of the (a) sentences below shows that *do so* can replace parts of sentences that include these elements, and the ungrammaticality of the (b) sentences shows that *do so* must replace the verb and all of these elements.

- (14) a. *John took the exam, and I did so, too.*
b. **John took the midterm exam, and I did so the final.*
- (15) a. *John gave a book to Pete, and I did so, too.*
b. **John gave a book to Pete, and I did so to Mary.*
- (16) a. *John loaded a sack onto the truck, and I did so, too.*
b. **John loaded a sack onto the truck, and I did so onto the wagon.*

One interesting result of this test is that it corroborates Fillmore's (1963) claim that the *for*-phrase in

- (17) *Bill bought a car for John.*

is outside the verb phrase, while the indirect object *to*-phrase of

- (18) *Bill gave a book to John.*

is inside the verb phrase. Fillmore's argument rests on the fact that while (19) and (20) look similar,

- (19) *Bill bought John a car.*

- (20) *Bill gave John a book.*

(19) may not passivize to (21), though (20) may passivize to (22).

- (21) **John was bought a car by Bill.*

- (22) *John was given a book by Bill.*

In (15) above, our test indicated that the indirect object *to*-phrase is inside of the verb phrase. (23) indicates that the *for*-phrase is outside of the verb phrase.

- (23) *I bought a car for John, and I'll do so for you too.*

Another interesting result is that this test supports Chomsky's claim that place adverbials are inside the verb phrase in some cases and outside of it in other cases.² The ungrammaticality of (24) shows that *in England* is inside the verb phrase in (1) above, and the grammaticality of (25) shows that *in England* in (2) is outside of the verb phrase.

(24) **I remained in England, and John did so in France*

(25) *John solved the problem in England, and I did so in France.*

The surprising result that this test yields is that most of the adverbs that have been thought by Chomsky and others to be inside the verb phrase are really outside the verb phrase.

Manner adverbials:

(26) *John flies planes carefully, but I do so with reckless abandon.*

Duration adverbials:

(27) *John worked on the problem for eight hours, but I did so for only two hours.*

Frequency adverbials:

(28) *John takes a bath once a year, but Harry does so twice a month.*

Instrumental adverbials:

(29) *The army destroys villages with shells, but the air force does so with napalm.*

Means adverbials:

(30) *The army destroys villages by shelling them, but the air force does so by dropping napalm bombs on them.*

Purpose adverbials:

(31) *John gambles in order to satisfy his masochistic urges, but Bret Maverick does so in order to make money.*

For someone's sake:

(32) *John made a million dollars for his mother's sake, but I did so for my own sake.*

With-phrase:

- (33) *John solved the problem with Mary and I did so with Jane.*

Instead of:

- (34) *John applied to Harvard instead of applying to M.I.T., but he should have done so instead of applying to Yale.*

Without-clause:

- (35) *The army destroyed the city without killing anyone and the air force did so without causing any damage.*

We propose the following rule to account for these phenomena.

- (36) x - VP - Y - VP - Z
 1 - 2 - 3 - 4 - 5 ⇒
 1 - 2 - 3 - do so - 5

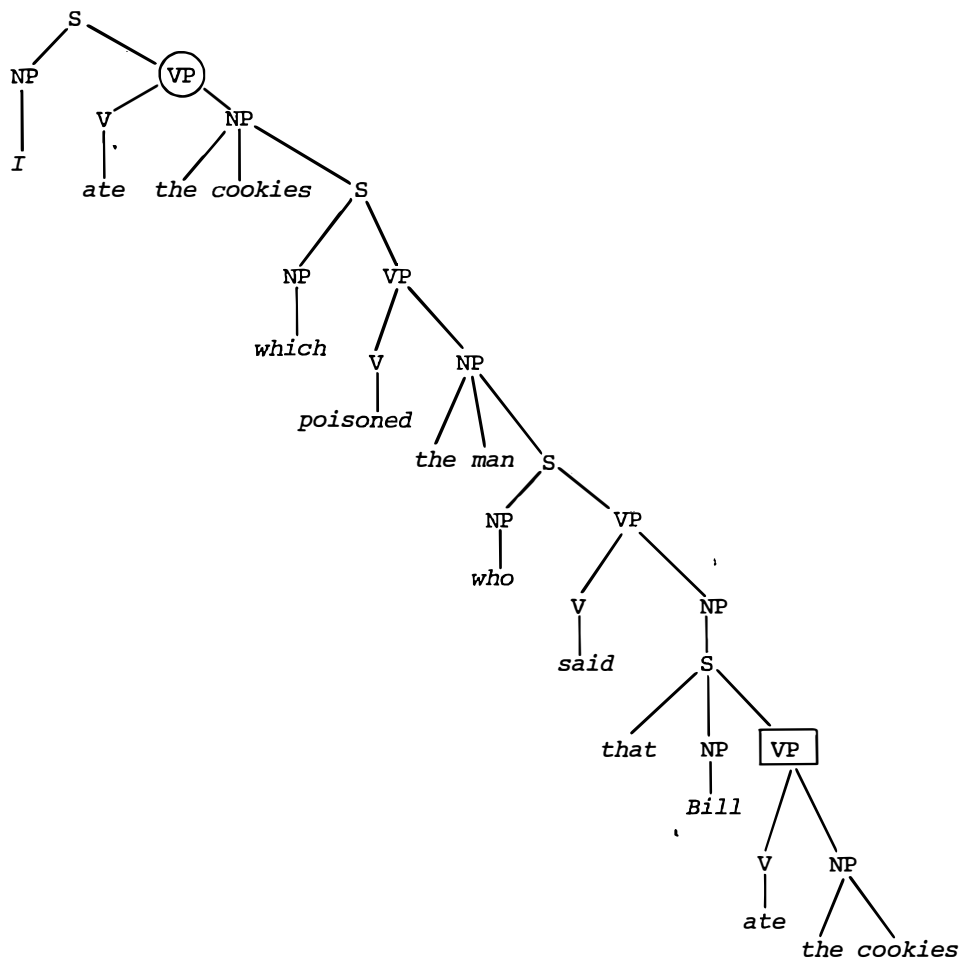
where 2 = 4 and 2 begins with a nonstative verb.

Notice that the structural index of (36) can be met only if neither VP is contained within the other. This has the consequence that (37) can not be transformed into (38).

- (37) *I ate some cookies which poisoned the man who said that Bill ate some cookies.*
 (38) **I ate some cookies which poisoned the man who said that Bill did so.*

The reason for this is that in (39), which is the structure underlying (37), the VP in the box is contained within (i.e., dominated by) the VP in the circle.

(39)



However, (40) can be transformed into (41), because the time adverbial is outside the verb phrase [cf. (11)].

(40) *I left after he told me to leave.*

(41) *I left after he told me to do so.*

The (b) sentences below cannot be derived from the (a) sentences, because the underlined VP in each of the (a)

sentences is contained within the VP to which it would have to be identical in order for rule (36) to operate. That is, the same situation arises as arose in figure (39).

- (42) a. *I gave a book to a man who said that Bill gave a book to him.*
b. **I gave a book to a man who said that Bill did so.*
- (43) a. *I threw a snowball at a man who said that Bill threw a snowball at him.*
b. **I threw a snowball at a man who said that Bill did so.*

The ungrammaticality of (38), (42b), and (43b), is evidence that direct objects, indirect objects, and directional adverbs are inside the verb phrase. (41) showed that time adverbials are outside the verb phrase, and the following examples provide additional confirmation for our claim that most adverbials are outside the verb phrase.

Manner adverbials:

- (44) *John flies planes the way I tell him to do so.*

Duration adverbials:

- (45) *John will work on the problem for as long as I tell him to do so.*

Frequency adverbials:

- (46) *John hit the ball exactly the number of times that I told him to do so.*

Instrumental adverbials:

- (47) *John will murder your wife with any weapon you instruct him to do so with.*

We feel that the material we have discussed above is suggestive of the correctness of our claim, but there are many puzzling constructions with *do so* that we do not yet understand and that we have not included in this paper. We hope to be able to present a more nearly complete analysis in a later progress report.

NOTES

¹For an account of the distinction between stative and nonstative adjectives and verbs, see G. Lakoff (1965) and G. Lakoff (1966).

²Although Chomsky describes *in England* as a place adverbial in *remain in England*, it may be the case that *remain in* is a transitive verb and *England* its direct object.