

II. CRITERION FOR VERB PHRASE CONSTITUENCY

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A. Background

Words and phrases like often, at five o'clock, for 2 hours, without breaking anything, carefully, with a hammer, there, etc. have traditionally been called adverbs. Traditional grammarians considered adverbs to be modifiers of verbs, just as they considered prenominal 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 (Lees, 1960, 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 occurs 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 which are dominated by the node VP. Chomsky states the following set of rules to illustrate this claim for English (Chomsky, 1965, p. 102).

- (i) $S \rightarrow NP \widehat{\text{Predicate - Phrase}}$
- (ii) $\text{Predicate - Phrase} \rightarrow \text{AUX} \widehat{\text{VP(Place)(Time)}}$
- (iii)
$$\text{VP} \rightarrow \left\{ \begin{array}{l} \text{be Predicate} \\ \left\{ \begin{array}{l} (\text{NP})(\text{Prep-Phrase})(\text{Prep-Phrase})(\text{Manner}) \\ \text{V} \left\{ \begin{array}{l} \text{Adj} \\ \text{S}' \\ (\text{like}) \text{Predicate-Nominal} \end{array} \right. \end{array} \right. \end{array} \right\}$$
- (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 which Chomsky introduces in (ii) are, in fact, restricted in occurrence with certain VP's. 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 (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.

B. A Test

The phrase "do so" is a pro-form which 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 non-stative verb¹. 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. (non-stative)

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 suprisingly, 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.

¹For an account of the distinction between stative and non-stative adjectives and verbs, see (Lakoff, 1965) and Section I of this report

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 cases³. 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 which this test yields is that most of the adverbs which 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.

³ Although 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" a direct object.

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:

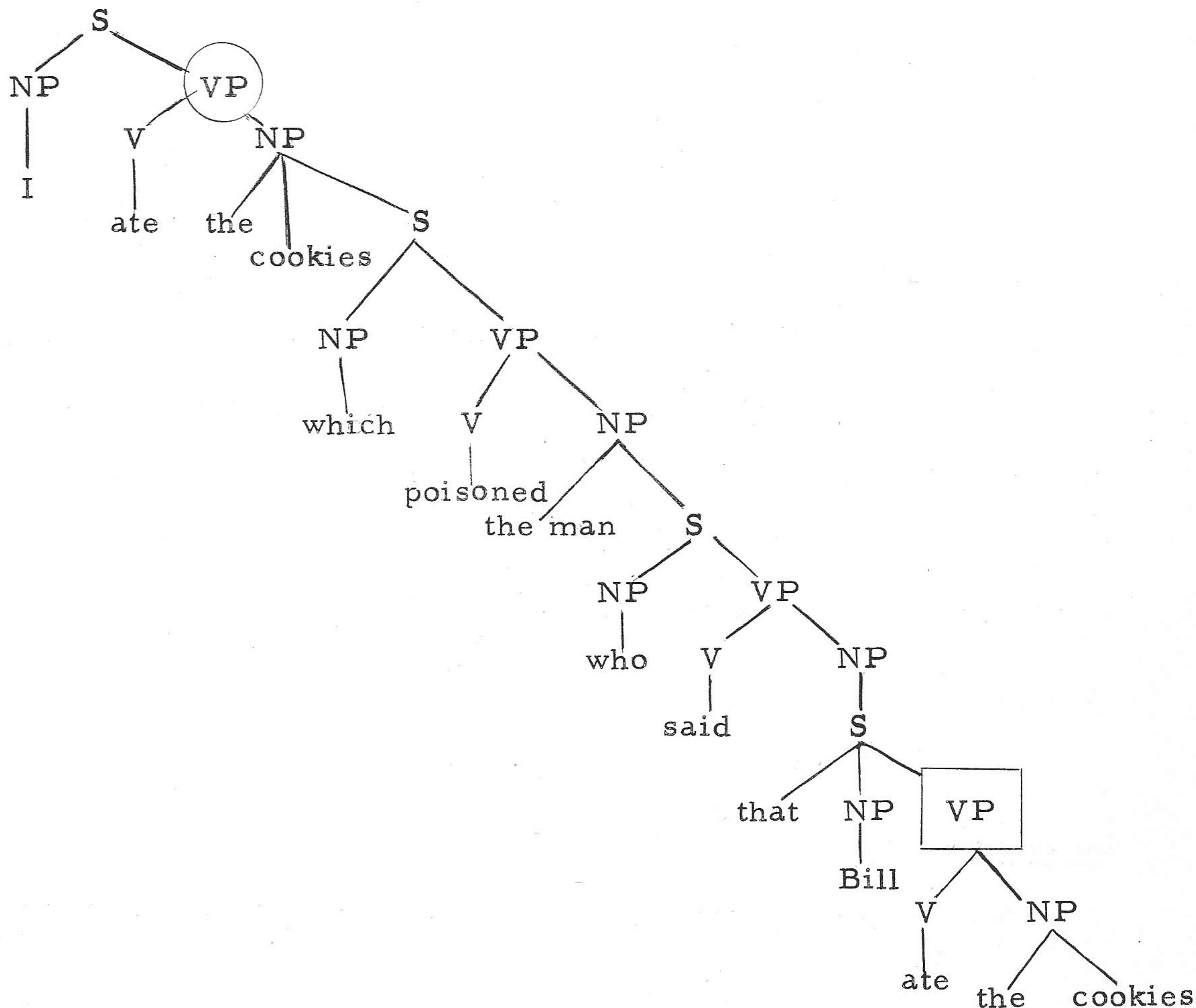
2 = 4 and 2 begins with a non-stative verb

Notice that the structural index of (36) can be met only if neither VP is contained within the other. This has as a 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 which we do not yet understand and which we have not included in this paper. We hope to be able to present a more nearly complete analysis in a later progress report.

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