

Threshing the Verb Phrase

This squib investigates the internal structure of the verb phrase. We have already abandoned the flat VP rule in which there is one VP node per sentence. For instance, facts involving the behavior of VP Deletion with respect to Auxiliary Verbs motivate a right-recursive VP rule [VP --> V VP] that produces nested VPs. I propose adding a left-recursive VP rule [VP --> VP PP] as well. We will thrash verb phrases with the two transformational flails of Tough Movement and WH-Clefting; some constituents will move, and some will not. The new VP rule will enable us to predict which of the constituents can move, that is, which will prove to be wheat, and which chaff.

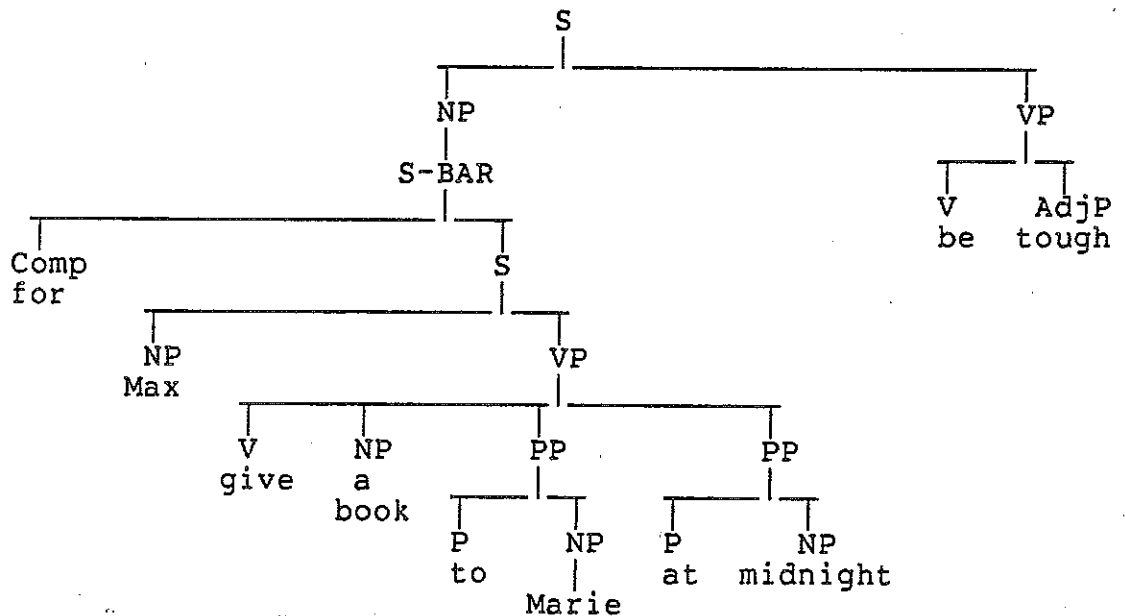
Tough Movement: Separating the Wheat from the Chaff

Consider the following grammatical sentence:

1. Max gave a book to Marie at midnight.

If we insert (1) into an appropriate structure, then Object-to-Subject Raising (Tough Movement) permits us to raise a noun phrase from (1) into matrix subject position.

Here is an appropriate structure:



Squib (skwib), n. (From O.E. squippe, for swippe (comp. squeamish for similar letter change), to move along swiftly, to sweep along; Icel. svipa, to flash, to dart, svipr, a swift movement; allied to sweep and swoop. Skeat.) 1. A little pipe or hollow cylinder of paper filled with gunpowder or other combustible matter which being ignited it flies along, throwing out a train of fiery sparks, and bursting with a crack. 'Hung up by the heels like meteors, with squibs in their tails.' B. Jonson.

Lampoons, like squibs, may make a present blaze.
Waller.

2. A sarcastic speech or little censorious writing published; a petty lampoon; as, an election squib; a squib upon a rival. --3. A petty satirist.

The squibs are those who, in the common phrase of the word, are called libellers, lampooners, and pamphleteers.
Steele.

Squib (skwib), v.i. pret. & pp. squibbed; ppr. squibbing. To use squibs or sarcastic or severe reflections; to contend in petty dispute; as, two members of a society squib a little in debate. (Colloq. United States.)

Squid (skwid), n. (Probably from squib, from its squirting out black matter.) A popular name of certain cuttle-fishes belonging to the dibranchiate group of the class Cephalopoda, and included in several genera, of which the most familiar is that of the calamaries. See CALAMARY.

And here is our formulation of Raising:

[... 1	NP 2	... 3]S-BAR 4	... 5
--	--	--	2	5 + [4/2]

This rule says to find a clause that contains an S-BAR that contains a noun phrase, to replace the S-BAR with the noun phrase, and to move the S-BAR minus (in our notation, slash) the noun phrase to the right.

The subcategorizations for 'be' and 'tough' specify that the S-BAR must appear in subject position and that the moved noun phrase must begin in any position except embedded subject position. These conditions permit Raising to promote "Marie" to the subject position in the matrix sentence to get (2):

2. Marie is tough for Max to give a book to at midnight.
3. *Midnight is tough for Max to give a book to Marie at.

But the conditions as they stand also permit Raising to move "midnight". Unlike (2), the result in (3) is ungrammatical. Apparently, "any noun phrase not in subject position" will not suffice as a restriction upon the noun phrases that Tough Movement can move.

One obvious explanation for these facts would be that "Marie" is the indirect object of 'give', and "midnight" is not. If our grammar could tell what an indirect object was, we could then try the following restriction: the moved noun phrase must be either a direct or an indirect object.

Unfortunately, Tough Movement contrasts occur for objects that are not indirect objects at all:

4. Max bought a book for five dollars.
*Max bought five dollars a book.
Five dollars is tough for Max to buy a book for.
5. Max bought a book for fun.
*Max bought fun a book.
*Fun is tough for Max to buy a book for.

If an example contains more than one sentence, then the first sentence will correspond to a deep structure, and subsequent sentences will represent the effect of a the application of a single transformation to that deep structure. Thus the second sentences in (4) and (5) demonstrate that the result of Dative Movement, when applied to the first sentence is ungrammatical.

Furthermore, we can insert a prepositional phrase containing a genuine indirect object, such as "for Marie", immediately after the direct object in (4) and (5) without disturbing the grammaticality of the sentences. Unless 'bought' can take more than one indirect object, the moved noun phrases cannot be indirect objects.

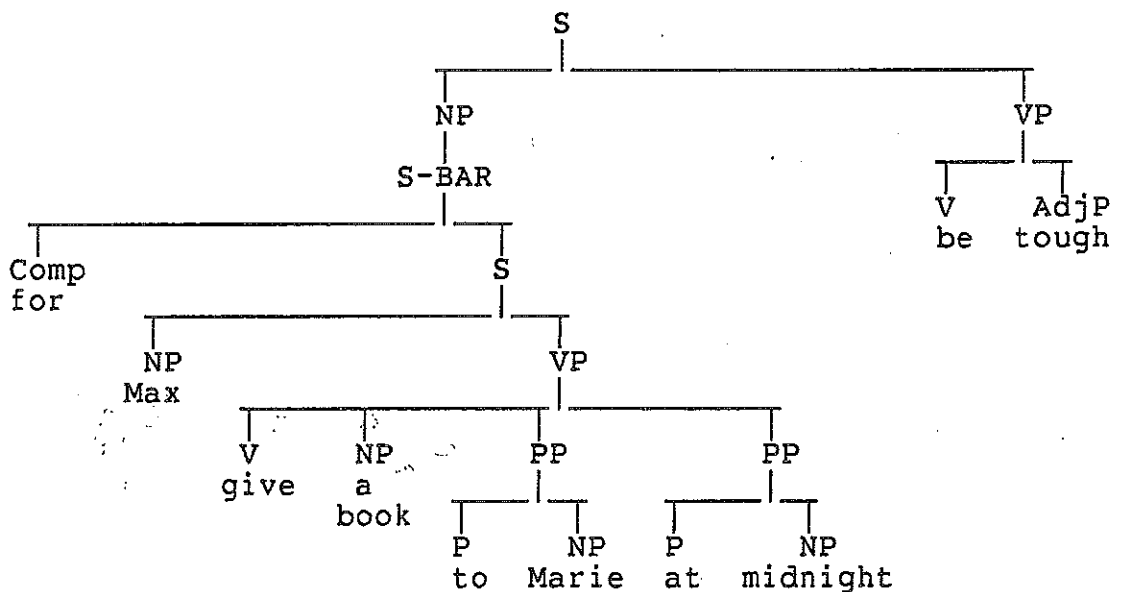
The pair of third sentences in (4) and (5) demonstrate that Tough Movement is possible for (4), but not for (5).

These tests for indirect-object-hood are not conclusive, but they are the only syntactic arguments available to us, and they do support the claim that the moved noun phrases in (4) and (5) are not indirect objects. In any case, the possibility of predicting the grammaticality of the result of Tough Movement as a function of whether or not the moved item is an indirect objects does not look promising.

Also, notice that (4) and (5) both involve the preposition 'in'. this means that whatever restriction we develop cannot depend merely upon discriminating against specific prepositions.

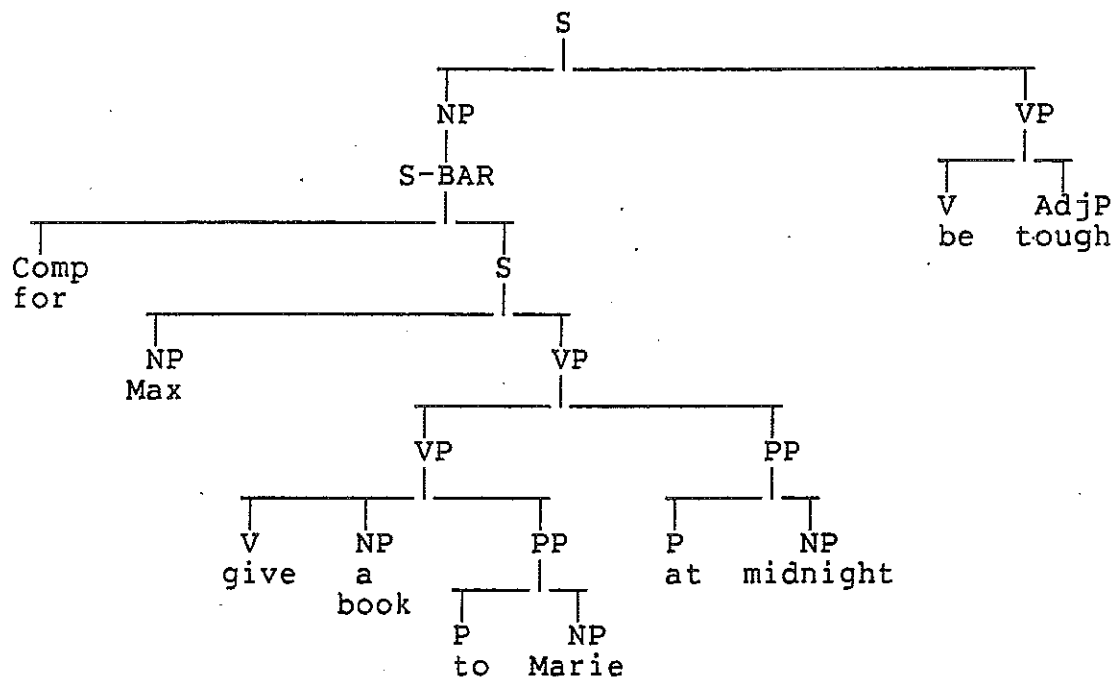
I propose instead that the input structure for (2) differs from (3) in some crucial way, and that this structural difference prevents Tough Movement from producing (3). Imagine the following internal structure for the verb phrase, which would provide two alternatives for our Tough Movement Structure:

VP --> VP PP
 VP --> V (AdjP) (NP)2 (PP)0 (S-BAR)



New VP Rules, Alternative I

This structure is exactly the same as the structure above, and has been redrawn here for convenience. Notice that the two PP nodes both hang as sisters to the V node.



New VP Rules, Alternative II

This structure takes advantage of the new PS rule that permits a VP node to dominate a VP node and a PP node: the prepositional phrase "at midnight" no longer hangs as a sister to the verb.

Let "the minimal VP node" denote the minimal VP node dominating the main verb. Now we can state a second attempt at a restriction on Tough Movement: the minimal VP node must dominate the moved noun phrase.

In both of the structures above, the minimal VP node dominates "Marie". The criterion predicts that Tough Movement should be able to move "Marie" to produce (2), which is indeed grammatical.

But if we apply the criterion to "midnight", we discover that it accepts Structure I, but not Structure II. In order to explain the ungrammaticality of (3), we need only find some way of blocking the generation of Structure I.

Assume that the difference between Structure I and Structure II corresponds to a difference in meaning. Our theory does

not guarantee that different Deep Structures necessarily correspond to different meanings, but we have always found that different internal structure for the same string of words always results in different meanings. We should expect, then, that (1) has an alternative reading.

Strictly speaking, our grammar would not predict a grammaticality contrast between (2) and (3), since it can generate Structure I just as easily as Structure II; nor is it possible to imagine an alternative reading for (1). But perhaps the meaning determined by Structure I is somehow semantically impossible; and perhaps its semantic ill-formedness accounts for the contrast in the acceptability between (2) and (3).

It will help to consider an example in which the ambiguous reading predicted by the new VP rule does make sense:

6. Max wrote a letter about midnight.

This sentence can mean either "Max wrote a letter that expressed his opinions concerning a particular time of day," or "Max wrote a letter in the middle of the night." The proposed analysis accounts for this ambiguity nicely: the first reading corresponds to a structure like Structure I, in which "about midnight" hangs within the same minimal VP node as the main verb; and the second reading corresponds to a structure like Structure II, in which it hangs as a sister to the minimal VP node containing the main verb.

According to our criterion, Tough Movement should be able to accept only one of the structures. The result of Tough Movement, therefore, should admit only the first reading:

7. Midnight is tough for Max to write a letter about.

Notice that (7) is not ambiguous: it does not give us any hints about when Max writes letters. Thus the proposed analysis correctly predicts that the application of Tough Movement disambiguates the sentence.

There are other advantages to the new VP rule. We have previously noticed that Tough Movement becomes impossible after Passive has applied:

8. A book was given to Marie by Max.
*Max is tough for a book to be given to Marie by.

When we first encountered this problem, we merely stipulated that Passive blocks Tough Movement. But this fact follows immediately from our formulation of Passive and the new restriction on the noun phrases moved by Tough Movement. Passive hangs the 'by' phrase as the rightmost daughter of the

VP node. Since we can insert "at midnight" in front of the 'by' phrase to get "A book was given to Marie at midnight by Max", and we believe that "at midnight" must hang outside the minimal VP node, we would expect the 'by' phrase to also hang up high where Tough Movement can't get to it.

WH-Cleft: Separating the Chaff from the Wheat

WH-Cleft can also move the objects of prepositions, just as Tough Movement can. We discovered that Tough Movement can move the object of a preposition only if it is dominated by the minimal VP node. WH-Cleft seems to behave in the same way:

9. Max shaved himself at midnight.
 Who Max shaved at midnight was himself.
 *What Max shaved himself at was midnight.
10. Max wrote a poem about midnight.
 What Max wrote a poem about was midnight.

'Himself' is a direct object; therefore it hangs inside the minimal VP node, and can move without mishap. But, as before, "at midnight" must hang outside the minimal VP node, and the result of WH-Cleft when we attempt to move 'midnight' in the third item in (9) is ungrammatical.

Also as before, the two readings for (10) correspond to two structures, one with "about midnight" within the minimal VP node, and one with "about midnight" outside the minimal VP node; only one of the structures would be able to undergo WH-Cleft, which correctly predicts that the WH-Cleft version loses the ambiguous reading.

Notice that the recursive VP analysis predicts that the ambiguous reading that disappears in (10) is the same reading lost through Tough Movement. If we were to choose to explain the ambiguity as a result of multiple lexical entries for some preposition, it would be entirely accidental that the same ambiguous reading disappears for Tough Movement and WH-Cleft.

The transformations discussed above both discriminate against prepositional phrases that hang outside the minimal VP node. But a second variety of WH-Cleft reverses the discrimination; it separates the chaff from the wheat rather than the wheat from the chaff. This other WH-Cleft moves whole verb phrases instead of noun phrases:

11. Max shaved himself in a hurry.
 What Max did was [shave himself in a hurry].

The bracketed phrase seems to be a verb phrase.

Furthermore, WH-Cleft can move a part of a verb phrase and leave another part behind:

12. Max shaved himself in a hurry.
 What Max did [in a hurry] was shave himself.

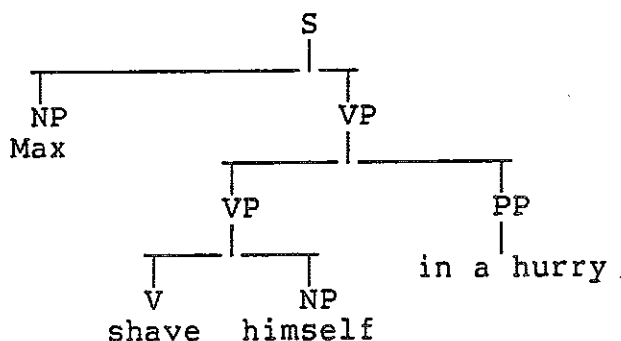
The bracketed phrase has been left behind when the verb phrase moved to the right.

But WH-Cleft cares deeply about which parts of verb phrases get left behind:

13. Max gave a book to Marie.
 *What Max did to Marie was give a book.

Apparently, when the wrong thing accidentally gets left behind, the sentence becomes ungrammatical.

But these facts follow from our new structure for the verb phrase. Clearly, WH-Cleft can move the topmost VP node, as in (11). "In a hurry" in (15) can modify the meaning of an entire verb phrase, and we expect it to hang outside the VP node:



Therefore WH-Cleft can move the minimal VP node. Everything in the minimal VP node would be moved, which means that "in a hurry" gets left behind.

But in (13), "to Marie" is the indirect object of 'give'. Assume that since indirect objects are bound so closely to the verbs that they modify that they always hang in the minimal VP. If WH-Cleft moves VP phrases, then it must always move the entire matched verb phrase; therefore, if we try to leave the indirect object behind, the result should be ungrammatical.

If our analysis is right, then Tough Movement and WH-Cleft constitute positive and negative tests for the function of a prepositional phrase in the verb phrase. The most dramatic

illustration of this complementary relationship involves the synonymy facts described above. The analysis predicts that for some two-ways-ambiguous sentences, Tough Movement will discard one of the readings, and WH-Cleft will discard the other:

14. Max wrote a poem about midnight.
Midnight is tough for Max to write a poem about.
What Max did about midnight was write a poem.
15. Max yelled at the top of his lungs.
The top of his lungs is tough for Max to yell at.
What Max did at the top of his lungs was yell.

The two readings for (14) and the explanation of the unambiguous readings of the two transforms appears above.

(15) displays the same pattern. The original structure has two meanings: "Max tried to communicate with the inside of his chest," which corresponds to Structure I, and "Max cried out in a loud voice," which corresponds to Structure II. If Tough Movement can only move noun phrases out of the minimal VP phrase, only the first reading will survive Tough Movement. Sure enough, the second sentence in (15) means the same thing as the first reading and cannot be interpreted to mean the same thing as the second reading. And if WH-Cleft can leave a prepositional phrase behind only if hangs outside the minimal VP, then our analysis correctly predicts that the third sentence in (15) will admit of the second reading but not the first.

In return for a recursive verb phrase rule [VP --> VP PP] we get an elegant explanation not only for grammaticality facts related to Tough Movement and WH-Clefting, but a prediction of the regularities and symmetries of those facts.