ANOTHER LOOK AT COMPLEMENT SENTENCES

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A number of proposals concerning constraints on transformations are currently circulating through the Linguistics Community. In the context of one of these, the Noun Phrase Constraint (NPC) analysis (Horn 1974, Bach and Horn 1976), I will reexamine some syntactic properties of verb complement sentences in English, excluding *POSS-ING* constructions. (For discussion of these, see Horn 1975 and Schachter 1976). Throughout the discussion, I will assume that the analysis in Rosenbaum (1967) is essentially correct with three exceptions: (*a*) complementizers are introduced by the base rules and not by transformation; (*b*) the structure of complement sentences is: s̄[COMP s[...]]; and (*c*) *ACC-ING* complements (Ross 1974) are an independent complement type not derived from *POSS-ING* constructions by a rule of complementizer deletion.[1]

My purpose here is to determine what mechanisms are necessary to account for the behavior of complement sentences with respect to extractability and movement in the larger context. The paper is divided into three sections, the first devoted to a brief discussion of the NPC, the second, to extending this analysis to account for the behavior of 'non-oblique' complement sentences, and the third, to the discussion of 'oblique' constructions.

1. The Noun Phrase Constraint. The NPC provides a unified account of much of the data which led to the formulation of the Complex NP Constraint, the Sentential Subject Constraint, the Left Branch Condition, and an unformalized constraint on extraction of PPs from dominating NP's by Ross (1967), as well as an account of cases that he did not consider, such as the following:

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[1] Concerning complement sentence structure, the location of the constituent COMP is not crucial to any of my claims, and tree diagrams throughout the paper will be simplified. X notation will not be used.

(1) a. *Who did they destroy a book about
  b. *About whom did they destroy a book
  c. *Who did he lose a picutre of
  d. *What did Einstein attack a theory about
  e. *Which city did Jack search for a road into
  f. *What did Kissinger prevent a war over
  g. *What did you discuss the growth/growing of

These examples show that extraction is prohibited from non-complex NPs of the form: $_{NP}$[NP PP] as well as complex NPs.

The NPC is formulated as follows:

(2) No syntactic transformation involving X, Y as constant terms can operate on a string of the form: X... $_{NP}$[...Y...] or [...Y...]$_{NP}$ ...X

This constraint will account for the ungrammaticality of the examples in (1) as well as the following, shown with the pertinent Ross constraint in parentheses:

(3) a. *Who did you see $_{NP}$[the man who hit]   (CNPC)
  b. *Who did $_{NP}$[s[that the boss fired]] annoy Henry   (SSC)
  c. *Whose did you see $_{NP}$[employer]   (LBC)
  d. *By which Greek authors did he have $_{NP}$[books]   (PPC)

For more complete discussion of the NPC, in particular, of arguments against Chomsky's recent counterproposal (Chomsky 1976), see Bach and Horn (1976). Assuming for now the validity of the NPC, let us look at complement sentences.

2. Complement sentences. The NPC disallows extraction from a NP. It thus predicts that the complement sentences in the following examples are not NPs when wh-movement applies:

(4) a. John imagined Bill hitting Mary
  b. John intended for Bill to hit Mary
  c. Henry would prefer for Bill to hit Mary
  d. John $\begin{Bmatrix}\text{thought}\\\text{believed}\\\text{understood}\\\text{ascertained}\end{Bmatrix}$ that Bill hit Mary

The reason for this is that examples such as these freely allow extraction from their complement sentences. It was for this reason that Ross did not disallow movement from the configuration: $_{NP}$[S]$_{NP}$. This is illustrated by the grammaticality of the following examples in which the object of the complement, in each case, has been fronted by wh-movement:

(5) a. Who did John imagine Bill hitting
  b. Who did John intend for Bill to hit
  c. Who would John prefer for Bill to hit
  d. Who did John think that Bill hit

The conclusion that these complements are not NPs (at least when the rule in question applies) further predicts that they cannot move like NPs, or that transformations which move NPs but not sentences will not apply to them. One such rule is Topicalization, which fronts NPs as in the following examples:

(6) a. John, I believed
  b. Mary, John hit
  c. That story, we didn't believe
  d. That expensive gift, Bill gave me

If the rule of Topicalization is applied to the complements in (4), the resulting sentences are ungrammatical in accordance with the above predictions:

(7) a. *Bill hitting Mary, John imagined
  b. *For Bill to hit Mary, John would prefer
  c. *For Bill to hit Mary, John intended
  d. *That Bill hit Mary, John $\begin{Bmatrix}\text{believed}\\\text{imagined}\\\text{thought}\end{Bmatrix}$

If these complements were embedded in NPs at the time when Topicalization applies, examples (7) would be expected to be grammatical. It would be difficult to prevent this rule from operating on the configurations: $_{NP}$[S]$_{NP}$, while allowing it to operate on the configuration: $_{NP}$[Det N]$_{NP}$ as in examples (6). It can therefore be concluded that when Topicalization applies, the complement sentences in these examples are not embedded in NPs. This evidence is independent of and serves to confirm the conclusion that they were not NPs, which was based upon the existence of the NPC and the extraction facts shown in (5).

However, complement sentences such as those in (4) act like NPs earlier in the derivation. For example, the Passive rule treats them as NPs. This is illustrated by the following examples in which Passive has applied to the complement sentences as units:

(8) a. For Bill to hit Mary would be preferred by John
  b. That Bill hit Mary was believed by John
  c. Bill hitting Mary was imagined by everyone

A question that must be answered, then, is how to account for the fact that a complement sentence behaves like a NP with respect to a rule like Passive, which presumably operates early in the derivation, and does not behave like a NP later in the derivation. The Passive rule might be reformulated so that it applies to sentences as well as to NPs, but how then could the rule be blocked for verbs which Rosenbaum (1967) analyzed as VP Intransitive embedding verbs? That is, how could ungrammatical sentences like the following be blocked:

(9) a. *Taking the test was continued by John
  b. *FROM*: John continued $_S$[PRO taking the test]

These examples contrast with ones like the following:

(*10*) *a.* Taking the test was considered by everyone

b. FROM: Everyone considered NP[IT s[PRO taking the test]]

In example (9a), the complement S has been fronted by Passive, and in example (10a), NP has been fronted. If the Passive rule is generalized to apply to both NPs and sentences, it should apply in both cases.

Secondly, why doesn't the Passive rule generalize beyond NP and S to other constituent types such as PP? Finally, why should only Passive, and not a rule such as Topicalization so generalize?

It seems more reasonable to search for an alternative to modifying the Passive rule. In seeking such an alternative, notice first that when Passive applies to complement sentences in the Rosenbaum framework, they occur in branching structures such as that shown below:

(*11*) John would prefer NP[IT s[for Bill to hit Mary]]

Later in the derivation, after *It*-Deletion, they occur in non-branching NP structures such as (12):

(*12*) John would prefer NP[s[for Bill to hit Mary]]

The rule of *It*-Deletion must follow Passive in order to allow the derivation of extraposed complements which occur in examples like the following:

(*13*) It would be preferred by John for Bill to hit Mary

The fact that complements are NPs when Passive applies, but no longer NPs when Topicalization and wh-movement apply can be accounted for by extending the notion of Pruning which was formulated in Ross (1967). Ross introduced this notion of S-pruning to delete non-branching S nodes. An extended version of Pruning is found in Stockwell, Schachter and Partee (1973), in which a constituent X_1 is pruned in the configuration: $x_1[X_2]x_1$ where X_1 and X_2 are nodes of the same category. If the pruning convention is extended so that it applies to non-branching nodes in general, the behavior of the complement sentences in the previous examples can be accounted for. Pruning so extended will apply to the following configuration to prune the NP node:

(*14*) NP[S]NP

The Pruning convention is stated as follows:

(*15*) In the configuration: x[Y], where X is non-branching, and where X, Y are non-terminal categories, prune X.

This convention will apply whenever these conditions are met.

I now return to examples like the following:

(*16*) John would prefer for Bill to hit Mary

This example has the following deep structure:

(*17*) John would prefer NP[it s[for Bill to hit Mary]]

At this stage, Passive can apply to derive the following:

(*18*) For Bill to hit Mary would be preferred by John

(Actually, Passive and *It*-Deletion apply here.) If, on the other hand, Passive

is not applied to structure (17), then *It*-Deletion applies to yield structure (19):

(*19*) John would prefer NP[s[for Bill to hit Mary]]

Now, NP no longer branches, and dominates a non-terminal node, S. The conditions are met for the Pruning convention, which applies to prune NP resulting in the following structure:

(*20*) John would prefer s[for Bill to hit Mary]

At this stage in the derivation, when the complement sentence is no longer embedded in a NP, wh-movement, Topicalization and so on can extract constituents from it to yield examples like the following:

(*21*) *a.* Who would John prefer for Bill to hit

b. Mary, John would prefer for Bill to hit

The complement sentence, as before, cannot move as a unit NP:

(*22*) *For Bill to hit Mary, John would prefer

This Pruning analysis makes a further prediction which is not made by modifying the Passive rule: if *It*-Deletion is optional, and does not apply, then Pruning will not apply, and no movement will be permitted from the complement sentence by the NPC. That this is correct is shown by the following examples:

(*23*) *a.* We would prefer it for John to see Mary

b. We would prefer for John to see Mary

(*24*) *a.* *Who would we prefer it for John to see

b. Who would we prefer for John to see

Sentences (23a) and (23b) show that *It*-Deletion is optional for the verb *prefer.* Sentences (24a) and (24b) show that movement out of the complement sentence can only apply if *It*-Deletion has taken place. This would be an isolated fact without the existence of the NPC and NP Pruning. These facts can be accounted for as follows: The deep structure for (24a) and (24b) contains the complement sentence embedded in the configuration: NP[N[IT]N s[for John to see WHO]s]NP. In deriving (24a) *It*-Deletion does not apply. The conditions for pruning the NP node are not met, and consequently the pruning of this node cannot take place. Thus movement of WHO by wh-movement constitutes a violation of the NPC and example (24a) is ungrammatical. For example (24b), *It*-Deletion applies, resulting in the configuration: NP[s[for John to see WHO]s]NP. This substructure meets the conditions for Pruning, and the NP is pruned. Now the wh-word can be moved, and the example is grammatical. This analysis assumes that there is no vacuous extraposition. Extraposition from the object NP can occur in examples like (25):

(*25*) You would prefer it very much for John to see Mary

Extraposition yields the following structure:

(*26*) You would prefer it very much s[for John to see WHO]

It is now possible to extract an element from the complement sentence, S, as shown below:

(27) Who would you prefer it very much for John to see

The proposed Pruning convention thus accounts not only for the behavior of complement sentences like NPs early in the derivation and like non-NPs later in the derivation, but also accounts for the *prefer* facts just discussed. Notice too that in this analysis it is no longer necessary to distinguish between a so-called Complex NP which has a lexical head, and a NP of the form: NP[IT S]. For Ross (1967), the former disallowed extraction while the latter did not. I have shown that in fact both types disallow extraction.

Having discussed *THAT* and *FOR...TO* complement sentences, I turn to complement remnants that result from application of Equi-NP Deletion and which contain *-ING* complementizers on the verbs. I assume that such complement remnants are derived from *ACC-ING* complements. For justification of this assumption, see Horn (1974).[2] *ACC-ING* complement sentences, of course, display the same behavior with respect to extraction and movement as a unit as do *THAT* and *FOR...TO* complements. They can be moved like NPs by Passive, as shown below:

(28) *a.* Everyone imagined Bill kissing Raquel Welch

b. Bill kissing Raquel Welch was imagined by everyone

They allow extraction by such rules as wh-movement:

(29) Who did they imagine Bill kissing

But at this stage in the derivation, they no longer move as units like NPs:

(30) *Bill kissing Raquel Welch everyone imagined

Equi-ING remnants display the same syntactic behavior as full complement sentences. They can be moved by Passive, as shown in (31b):

(31) *a.* John imagined killing himself

b. Killing himself was imagined by John

Wh-movement and Topicalization can apply to extract the object of the *Equi-ING* remnant as shown below:

(32) *a.* Who did John imagine killing

b. Himself, John imagined killing

Cleft Movement can also apply:

(33) *a.* It was himself that John imagined killing

b. IT BE NP[Δ] S[John imagined S[killing himself]]

However, Topicalization and Cleft Movement cannot apply to the entire *Equi-ING* remnant, which at this stage in the derivation is no longer embedded in a NP. This is illustrated by the ungrammaticality of the following examples:

(34) *a.* *Killing himself John imagined

b. *It was killing himself that John imagined

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These facts can also be accounted for by the proposed analysis with no modification.

I have shown that complement sentences, early in the derivation, behave like NPs, and later in the derivation do not. The NPC predicts that if a construction allows extraction of its internal constituents, then that construction is not a NP. It thus correctly predicts the following correlation for complement sentences: if a complement sentence allows extraction, it will not behave like a NP in other ways (e.g. it will not move like a NP). Since no previous analysis disallowed extraction from complement sentences, except in subject position, only the proposed analysis can account for this correlation. The Pruning convention enables an account to be given for the fact that complements behave like NPs at one stage in the derivation, but not at some later stage. Furthermore, it correlates this change in behavior with the elimination of branching structure which occurs for independent reasons such as the application for Pruning was provided by its ability to account for the *prefer* facts.

As seen previously, complement sentences can be moved into subject position by Passive. They can also be generated in this position with some verbs. Examples of both cases are shown below:

(35) *a.* For Bill to hit Mary would be preferred by John

b. Bill kissing Mary was imagined by everyone

c. That Bill hit Mary was believed by John

d. That Bill kissed Mary annoyed us

e. Henry hitting Mary like that surprised us

In all cases, when complement sentences function as subjects, extraction from them is forbidden. Thus, the following examples are ungrammatical:

(36) *a.* *Who would for Bill to kiss be preferred by John

b. *Who was Bill kissing imagined by everyone

c. *Who did that Bill kissed annoy us

d. *Who did Henry hitting like that surprise us

The Sentential Subject Constraint can account for this data. It cannot, however, account for the following correlation: when complement sentences are the subjects of their clauses, they not only disallow extraction, but also move as units like NPs. To illustrate the movement facts, the rule of Topicalization is applied to the following sentences. In the (*a*) sentences, the complement begins in postverbal complement position (where extraction is allowed). In (*b*) sentences, the complement is moved from subject position (where extraction is disallowed). The (*a*) sentences are ungrammatical and the (*b*) sentences are grammatical:

(37) *a.* *For Bill to hit Mary we know that John would prefer

b. For Bill to hit Mary we know would be preferred by John

(38) *a.* *Bill kissing Mary we know that Frank imagined

b. Bill kissing Mary we know was imagined by Frank

(39) a. *That Bill hit Mary we know that John believed

b.   That Bill hit Mary we know was believed by John

Topicalization can also apply to the following, in which the complement sentences were generated in subject position in the base:

(40) a. That Bill kissed Mary we know bothered them

b. John hitting Mary like that we knew surprised them

I have already shown that permissibility of extraction correlates with inability to move like a NP (as illustrated again by (37a), (38a) and (39a)). It can now be seen that non-extractability correlates with ability to move like a NP.

In subject position, however, at the stage in the derivation when wh-movement and Topicalization apply, *It*-Deletion has already applied and the structures containing the complement sentences are non-branching as illustrated below:

(41) a. $_{NP}[s[\text{for Bill to hit Mary}]s]_{NP}$ would be preferred by John

b. $_{NP}[s[\text{John hitting Mary like that}]s]_{NP}$ annoyed us

Therefore, according to the Pruning convention, the subject NP node, in each case, will prune. After this, the complement sentences should allow extraction and not move like NPs, contrary to the facts.

It would be *ad hoc* simply to prohibit pruning in subject position. Furthermore, to do this, or to remove pruning from the analysis would prevent us from accounting for the following correlation:

(42) NP Pruning does not take place in subject position; in this position, there is no Phrase Structure rule that introduces the category S, only the category NP. (That is, there is no PS rule of the form: S → S VP, only one of the form: S → NP VP).

If NP pruning took place in structures (41a) and (41b), in each case, the resulting structure would not be generable by the base. One might assume that this is an accidental fact about the subject position. However, this is not true. The same situation obtains in Raised Object position. Consider the following examples:

(43) We $\begin{Bmatrix}\text{imagined}\\\text{considered}\end{Bmatrix}$ John failing the test to be $\begin{Bmatrix}\text{unthinkable}\\\text{horrible}\\\text{unnecessary}\end{Bmatrix}$

As in subject position, extraction from the complement sentence is disallowed. Thus example (44) is ungrammatical:

(44) *Which test did we $\begin{Bmatrix}\text{imagine}\\\text{consider}\end{Bmatrix}$ John failing to be unthinkable

Note too that the entire complement sentence in (43) can be moved by Topicalization:

(45) John failing the test, we $\begin{Bmatrix}\text{imagined}\\\text{considered}\end{Bmatrix}$ to be $\begin{Bmatrix}\text{unthinkable}\\\text{horrible}\end{Bmatrix}$

In raised object position, like subject position, it is clear that the complement

sentence occurs in a non-branching structure, something like the following, when wh-movement and Topicalization take place:

(46) We imagined $_{NP}[s[\text{John failing the test}]]$ to be horrible

Pruning should apply to the subtree: $_{NP}[s[\text{John failing the test}]]$. It does not, however, as evidenced by the extraction and movement facts above, and moreover, if it did apply, the resulting structure would not be generable by the base. There is no PS rule of the form: VP→V S S, but rather, one of the form: VP→V NP S (needed for verbs like *force*). Thus the correlation stated in (42) can no longer be accidental, but is rather part of a wider generalization: that Pruning may not create structures that are not generable by the base rules.

Equi-ING complement remnants also occur in subject and raised object positions. Under these circumstances they too disallow extraction and move like NPs:

(47) a.   We considered killing ourselves to be unnecessary

b. *Who did we consider killing to be unnecessary

(48) a.   Killing ourselves we considered to be unnecessary

b.   It was killing ourselves that we considered to be unnecessary

These contrast with the following in which the complement remnant is moved from a prunable position:

(49) a. *Killing ourselves we considered

b. *It was killing ourselves that we considered

The following example shows that when an *Equi-ING* remnant originates in subject position, it disallows extraction and moves like an NP:

(50) a.   Washing himself bothered Henry

b. *Who did washing bother Henry

c.   Washing himself we knew bothered Henry

d.   It was washing himself that bothered Henry

The generalization on constraining pruning may be stated as follows:

(51) Do not apply the pruning convention if the resulting structure is not generable by the base.

This in turn allows a distinction to be made between those positions in which a complement sentence displays NP-like behavior and those in which it does not:

(52) Those positions in which a complement sentence displays NP-like behavior (i.e. non-extractability and movability) correspond to positions for which the PS rules generate the category NP but not the category S; those positions in which complement sentences do not display NP-like behavior (i.e. extractability and non-movability) correspond to positions for which the PS rules generate the category S.

Without the NPC, complement sentences would not be expected to disallow extraction in non-subject positions, even if they were embedded in NPs, so being a NP would not be correlated with non-extractability, and extractability could

not be correlated with non-movability as a NP. Without the condition on pruning stated in (51), the positions in which complement sentences display NP-like behavior could not be differentiated syntactically, in a general way, from those in which they do not.

The sentential subject constraint cannot account for the prohibition on extraction from the non-subject positions described above, nor can it account for the movement/extraction correlation. This constraint is in fact not necessary in the proposed analysis with the NPC and constrained pruning convention.

The proposed analysis makes two claims: (*1*) that every structure to which pruning has applied is generable by the base; (2) that a complement sentence occurring in any position for which the PS rules generate the category NP, but not the category S, will disallow movement of its internal constitutents (as predicted by the NPC) and can be moved as a unit by transformations that operate on NPs. In the remainder of this section, I will examine both claims in more detail.

Consider example (53a) which has the deep structure shown in (53b):

(*53*) *a.* We believed that Nixon was a liar.

b. We believed $_{NP}$[it $_S$[THAT Nixon was a liar]]

It-deletion and pruning of NP produce the following structure:

(*54*) We believed $_S$[THAT Nixon was a liar]

This structure is identical to that needed for verbs which Rosenbaum (1967) categorized as intransitive VP embedding verbs, two examples of which are shown below with their deep structures:

(*55*) *a.* We completed filling out the forms

b. We continued taking the exam

(*56*) We completed $_S$[PRO filling out the forms]

Likewise, the following example involving raising has the structure shown after raising has applied:

(*57*) *a.* We believed Nixon to be a fool.

b. We believed $_{NP}$[Nixon] $_S$[to be a fool]

This structure is identical to that needed as a deep structure by such verbs as *force* in the following example:

(*58*) *a.* Jim forced Bill to take the test

b. Jim forced $_{NP}$[Bill] $_S$[PRO to take the test]

For more discussion of this claim, see Horn (1974).

Now I take up the second claim. Consider the following examples:

(*59*) *a.* We took a picture of John killing Fred

b. Ralph wrote a book about Jake kissing Mary

c. Andy wrote about kissing Mary

As I have argued in Horn (1974) and Bach and Horn (1976), the prepositional phrases in these examples can be located either in the object NP, or directly under the VP node.

These possibilities are illustrated in the following diagrams:

(*60*) *a.* We $_{VP}$[took $_{NP}$[a picture of John killing Fred]$_{NP}$]$_{VP}$

b. We $_{VP}$[took $_{NP}$[a picture]$_{NP}$ $_{PP}$[of John killing Fred]$_{PP}$]$_{VP}$

Structure (60a), of course, precludes movement of any element out of the NP object. Structure (60b), however, provides another case where it might be expected that extractability is allowed from the complement sentence, since the conditions for pruning are met by the structure: $_{NP}$[$_S$[John killing Fred]$_S$]$_{NP}$. The complement sentence displays NP-like behavior in that it disallows extraction, as shown below:

(*61*) *Who did we take a picture of John killing

Extraction is disallowed from the complements in all of examples (59), as shown by the ungrammaticality of the following:

(*62*) *a.* *Who did Ralph write a book about Bill killing

b. *Who did Bill write about Jake kissing

c. *Who did Andy write about kissing

As with the subject and raised object positions, if the NP nodes in structures like the following (in which the complement sentences in the above examples occur) were pruned, the resulting structures would not be generable by the base:

(*63*) $_{PP}$[$_P$[about/of]$_P$ $_{NP}$[$_S$[Bill killing the president]]

Pruning would result in structures like the following:

(*64*) $_{PP}$[$_P$[about/of]$_P$ $_S$[Bill killing the president]]

The condition on pruning will prevent this from occurring because there is no PS rule of the form: PP→P S, but rather one of the form: PP→P NP. Thus the condition, which was formulated to account for subject and raised object positions, extends to the object position in prepositional phrases. It, along with the NPC, predicts that complement sentences which are the objects of prepositional phrases cannot be extracted from, which was shown to be the case. It can further be argued that the addition of a PS rule of the form: PP→P S, which would add complexity to the grammar, is unnecessary. There is already a motivated rule rewriting PP as P NP, and a motivated rule rewriting NP as N S. With these rules it is possible to generate the range of possible prepositional phrases in English, including those with complement sentence objects. There is thus no independent evidence for an additional PP rewrite rule.

The next position I will consider is that which is underlined in example (65) below:

(*65*) We thought of *that coincidence* as $\begin{Bmatrix} \text{unlikely} \\ \text{unfortunate} \end{Bmatrix}$

(I argue in Horn (1974) that NPs and complement sentences in such positions are not structurally the objects of prepositions such as *of* at the stage when wh-movement and Topicalization apply due to the prior application of a rule that breaks up prepositional phrases under certain conditions. I will take this

up briefly in Section 3. Thus this position is not another case of the previous one.)

Complement sentences and *-ING* remnants can occur in this position as shown below:

(66) We thought of $\begin{Bmatrix} \text{John failing the test} \\ \text{killing ourselves} \end{Bmatrix}$ as unlikely

Such examples do not involve Raising. If they did, their sources would have to be something like the following:

(67) We thought ${}_s[$John failing the test BE unlikely$]_s$

Some rule would have to apply to change BE to AS. Such a process does not usually accompany raising. Thus the following examples, which we derived in part from Raising, do not undergo the BE→AS process:

(68)   *a.* We believed John to be vigorous
     b. We understood Bill to be intelligent
     c. We imagined John being hard to please

This is shown by the ungrammaticality of (69) below:

(69)   *a.* *We believed John (to) as vigorous
     b. *We understood Bill (to) as intelligent
     c. *We imagined John as hard to please

This position is therefore distinct from raised object position.

Both of the examples in (66) can be generated (in part) by applying the following PS rules:

(70)   *a.* VP→V NP as ADJ
     b. NP→N S

An additional rule like the following is not needed:

(71) VP→V S as ADJ

This, however, is exactly the structure that would result if pruning occurred in (66). After *It*-Deletion, these examples have the following structure:

(72) We think of ${}_{NP}[{}_s[$John failing the test$]]$ as unlikely

If the NP node was pruned, the resulting structure would not be generable by the (simplest) set of PS rules. Pruning is therefore blocked and the complement sentence should display NP-like behavior. That this is true is seen in the following examples. Example (73) is ungrammatical and shows that extraction is forbidden from the complement sentence (according to the NPC):

(73) *Which test did we think of John failing as unlikely

Example (74) is grammatical and shows that the complement sentence can move like a NP when Topicalization is applied:

(74) John failing the test we thought of as unlikely

The final position that I will consider is the postcopular position in examples such as the following:

(75)   *a.* My hope is that Nixon will fire St. Clair
     b. My hope is for John to kiss Sue

    c. His expectation is that John will pass the test
    d. That noise is John kissing Mary

These sentences have structures like that shown below:

(76) My hope BE ${}_{NP}[$it ${}_s[$THAT Nixon will fire St. Clair$]]$

They are generated in part by the following PS rule:

(77) VP→BE $\begin{Bmatrix} \text{ADJ} \\ \text{NP} \\ \dots \end{Bmatrix}$

Again, since there is a rule rewriting NP as the sequence: N S, in the absence of further evidence, it is not necessary to add the category S to this VP rule. Therefore if NP in the above structure pruned after *It*-Deletion, the resulting structure would not be generable by the simplest set of PS rules. The proposed analysis thus prevents pruning, and the NPC predicts that extraction from the complement sentence is disallowed.[3] The following ungrammatical sentences bear out this prediction:

(78)   *a.* *Who is my hope that Nixon will fire
     b. *Which test is his expectation that John will pass
     c. *Who is that noise John kissing

To summarize, I have shown that by adding a constraint on extraction from NPs and an extended Pruning convention to the grammar, certain aspects of the syntactic behavior of complement sentences that have not previously been given an explanation can be accounted for. In the next section, I will look at some cases of *oblique complementation*.

3. Oblique complementation. In this section, I will consider examples like those shown below:

(79)   *a.* You $\begin{Bmatrix} \text{approved} \\ \text{conceived} \end{Bmatrix}$ of $\begin{Bmatrix} \text{John killing Mary} \\ \text{killing Mary} \end{Bmatrix}$
     b. You $\begin{Bmatrix} \text{banked} \\ \text{gambled} \end{Bmatrix}$ on $\begin{Bmatrix} \text{John passing the test} \\ \text{passing the test} \end{Bmatrix}$
     c. You gloated over $\begin{Bmatrix} \text{John kissing Mary} \\ \text{kissing the gorilla} \end{Bmatrix}$

In these examples, the complement sentences are embedded in prepositional phrases. With *ACC-ING* complements the preposition is not deleted. Such examples have the following deep structures:

(80)   *a.* You approve ${}_{PP}[$of ${}_{NP}[$IT ${}_s[$John/PRO killing Mary$]]]$
     b. You bank ${}_{PP}[$on ${}_{NP}[$IT ${}_s[$John/PRO passing the test$]]]$

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[3] Regarding rule (77), it might be argued that BE is a verb, V, and since there is a PS rule of the form: VP→V S, the condition will not block NP pruning in these cases. The crucial question here is the status of BE. I assume that it is not a V, and that it is introduced by a separate PS rule, or subpart of the VP rule, by a rule like that in (77).

Elements can be extracted from the complement sentences in each case, as shown by the grammaticality of the following:

(81) a. Who did you approve of (John) killing
       b. Which test did you bank on (John) passing

Therefore the NPC predicts that the complement sentence in each case is not embedded in a NP. The structure preserving condition on Pruning, if correct, predicts that the sequences *of John killing WHO* and *on John passing WH-test* are not Prepositional Phrases, as they were in the previous section, when extraction occurs, since pruning of the NP node in these structures would then create subtrees like that shown below:

(82) $_{PP}[_P[on]_P$ $_S[$John passing WH-test$]]$

and there is no PP rewrite rule of the form: PP→P S.

I will therefore assume that some transformation applies to destroy the PP structure before extraction applies. This will allow account to be given of the extraction facts seen above. Before formulating such a rule, however, let us look at some other ways in which sentences of this type contrast both syntactically and semantically with other sentences containing prepositional phrases. It will be shown that such a rule will also account for these contrasts.

First of all, the prepositions which appear in these examples are predictable from the choice of the verb. The only preposition that can occur with the verb *bank* is *on* and so forth. This is illustrated in example (83) below:

(83) a. We approved $\left\{\begin{array}{l} \text{of} \\ \text{*on} \\ \text{*over} \\ \text{*in} \\ \text{etc.} \end{array}\right\}$ the plan

       b. We banked $\left\{\begin{array}{l} \text{on} \\ \text{*of} \\ \text{*over} \\ \text{*in} \\ \text{etc.} \end{array}\right\}$ John

The same holds true of Rosenbaum's transitive oblique complementation verbs such as the following:

(84) We bullied John $\left\{\begin{array}{l} \text{into} \\ \text{*on} \\ \text{*at} \\ \text{etc.} \end{array}\right\}$ killing Fred

This is not generally true of other intransitive or transitive verbs. Most take a wide range of prepositions. We see this in the following examples:

(85) a. John walked $\left\{\begin{array}{l} \left.\begin{array}{l} \text{over} \\ \text{under} \end{array}\right\} \text{the bridge} \\ \text{down the street} \end{array}\right\}$

       b. John hit Bill $\left\{\begin{array}{l} \text{in the park} \\ \text{on the lawn} \\ \text{at the ballgame} \end{array}\right\}$

Furthermore, the prepositions in sentences like (79) and (83) are non-spatial in meaning, even when the same preposition can have a spatial reading in other contexts. Thus example (83b) does not mean that we did anything on top of John, nor does example (86) below mean that we did anything above the answer:

(86) We gloated over the answer

Syntactically, these sentences behave differently from sentences like (85) which contain true prepositional phrases. For example, prepositional phrase fronting, which can take place freely with examples like (85), gives odd or ungrammatical results when applied to sentences like (83) and (86):

(87) a. $\left\{\begin{array}{l} \text{Over the bridge} \\ \text{Down the street} \end{array}\right\}$ John walked

       b. In the park John hit Bill

but

(88) a. *Of the plan we approve
       b. *On John we banked
       c. *Over the answer we gloated

If wh-movement with Pied Piping is applied to these sentences, similar ungrammatical sentences are produced:

(89) a. *Of what did you approve
       b. *On whom did we bank
       c. *Over which answer did we gloat

Wh-movement with Pied Piping is permissible in sentences like those in (87), as shown below:

(90) a. $\left\{\begin{array}{l} \text{Over which bridge} \\ \text{Down which street} \end{array}\right\}$ did John walk

       b. In which park did John hit Bill

It appears then that the prepositions in sentences like (79), (84) and (86) are much more closely related to the verbs, both syntactically and semantically, than are true prepositions such as those shown in (85). They seem, in fact, to be midway between true prepositions and particles such as *up* in the following example:

(91) John looked up the number

They differ from these particles only in that the *prepositions* cannot postpose. Thus a variant of (91) is (92):

(92) John looked the number up

while no such variant occurs for the following example:

(93) *a.* Fred banked on Bill

    b. *Fred banked Bill on

In all other respects, both sentence types behave in the same way: wh-movement and PP-fronting produce bad sentences when applied to those like (91):

(94) *a.* *Up the number John looked

    b. *Up which number did John look

In both sentence types, the NP can be fronted:

(95) *a.* Which number did John look up

    b. Who did we bank on

    c. What did you approve of

    d. Which answer did we gloat over

This similarity, as well as the behavior of sentences like (79), (83), (84) and (86), can be accounted for by positing a rule of preposition raising which has the effect of converting a structure like the one shown in (96) into one like that shown in (97):

(96) We gloated $_{PP}[_P[over]$ $_{NP}[the answer]]$

(97) We gloated $_P[over$ $_{NP}[the answer]]$

These sentences thus have a derived structure which is similar to the structures of sentences with particles like example (91), which has the following structure:

(98) John looked $_{PRT}[up]$ $_{NP}[the answer]$

Structures (97) and (98) would be identical if particles were a type of preposition.

If structures like (97) are the derived structures of sentences like (79), (83) and (86), then we can also explain why clefts such as the following are bad:

(99) *a.* *It was of the plan that we approved

    b. *It was on the money that we banked

    c. *It was over the answer that we gloated

In this respect also, these sentences are like (91):

(100) *It was up the number that John looked

In all cases, when the preposition or particle is not separated from the verb, the cleft sentences are good:

(101) *a.* It was the plan that we approved of

    b. It was the money that we banked on

    c. It was the answer that we gloated over

    d. It was the number that John looked up

Sentences containing normal prepositional phrases can form either pattern of cleft sentence:

(102) *a.* It was over the bridge that John walked

    b. It was in the park that John hit Bill

(103) *a.* It was the bridge that John walked over

    b. It was the park that John hit Bill in

The ungrammaticality of (99) and (100) can be accounted for structurally by assuming that the preposition and NP in examples like (79), (83) and (86) do not constitute a single constituent at the time of clefting, whereas true prepositional phrases do. In the same way, the ungrammaticality of examples (88), involving PP-fronting, and (89), involving wh-movement with Pied Piping, can be accounted for if these rules, too, apply after the constituency of the PP has been destroyed. Moreover, if preposition raising is ordered after particle movement, sentences like (93b) can be blocked.

In addition to the syntactic facts discussed above, preposition raising will account for the extraction facts in examples like (81) above. The (a) example is repeated here:

(81) *a.* Who did you approve of John killing

Examples like this are derived as follows: beginning with the deep structure shown in (104):

(104) COMP you approve $_{PP}[_P$ of $_{NP}[it$ $_S[John killing WHO]]]$

the rule of preposition raising creates the following structure:

(105) COMP you approve $_P[of]$ $_{PP}[_{NP}[it$ $_S[John killing WHO]]]$

Now the PP node, which is non-branching, can prune. After *It*-Deletion the NP node, which no longer branches and is no longer the object of a preposition, can also prune. The resulting structure is shown below and extraction is allowed from S:

(106) COMP you approve $_P[of]$ $_S[John killing WHO]$

This structure must be generable by the PS rules in order to generate sentences like the following:

(107) Bill made out (pretended) that he was the King of France

In such sentences the verb must take a sentential complement which never acts like a NP.

Transitive oblique complementation sentences such as the following are derived in a similar manner:

(108) Who did you bully John into killing

Its deep structure is (109):

(109) COMP you bully John $_{PP}[into$ $_{NP}[it$ $_S[PRO killing WHO]]]$

First, preposition raising, pruning of the PP node, *It*-Deletion and pruning of the NP node apply, resulting in a structure like the following:

(110) COMP you bully John $_P[into]$ $_S[killing WHO]$

Now, the wh-word can be freely fronted to derive example (108). Notice that structure (110) is identical to that needed for examples like (111), whose structure is shown in (112):

(111) The police worked Bill over for not confessing

(112) The police worked Bill $_{PRT}[over]$ $_S[for PRO not confessing]$

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I have shown that the analysis developed in Section 2 can be extended to oblique complementation cases with the addition of a rule of preposition raising, which is independently motivated in any case. I conclude that the extraction and movement facts under investigation here can best be accounted for by augmenting Rosenbaum's analysis with the NPC and extended pruning convention, along with the three modifications stated in the introduction. This analysis differs from some more recent ones, for example that in Emonds (1970), which has been adopted by Chomsky (1973), (1976). For arguments against Emonds' analysis see Horn (1974), (1975), and Higgins (1973).

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