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ABSTRACT

Since its inception, proponents of Generalized Phrase Structure Grammar (GPSG) have claimed the superiority of the analyses that the theory makes available for certain problematic constructions in English. Two examples of such constructions are (1) rightward unbounded dependencies (including right node raising) and (2) parasitic gaps. However, as GPSG has evolved, various steps taken in its development to provide adequate explanations of central properties of English and other languages have rendered invalid previous claims concerning these two constructions, to the extent that there is no obvious way in which the resulting paradoxes can be resolved in the current therapy. (MSE)

GAPS IN GENERALISED PHRASE STRUCTURE GRAMMAR

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Proponents of Generalised Phrase Structure Grammar (GPSG) have, since its inception , made claims for the superiority of the analyses which the theory makes available for certain problematical constructions of English. In this note I will consider two particular examples:

a. Rightward Unbounded Dependencies (including Right Node Raising)

b. Parasitic Gaps

My intention will be to show that, as GPSG has evolved, various steps taken in its development with a view to providing explanatorily adequate accounts of central properties of English and other languages have rendered previous claims in respect of these two types of construction invalid - to the extent that there is no obvious way in which the resulting paradoxes can be resolved in the current theory.

Rightward Unbounded Dependencies (RUDs)

Gazdar (1981a, 1981b) sketches an analysis of RUDs intended to account for, examples of 'extraposition from NP' like (1)

1. The woman believed the man was ill who was here

He proposes that these sentences are invoked by the following rule

2. $\alpha \rightarrow \alpha/\beta \;.\; \beta$

where α ranges over clausal categories and β can be any phrasal or clausal category

This rule interacts with general principles for distributing slash categories to assign the following structure to sentences like (1) (slightly simplified)

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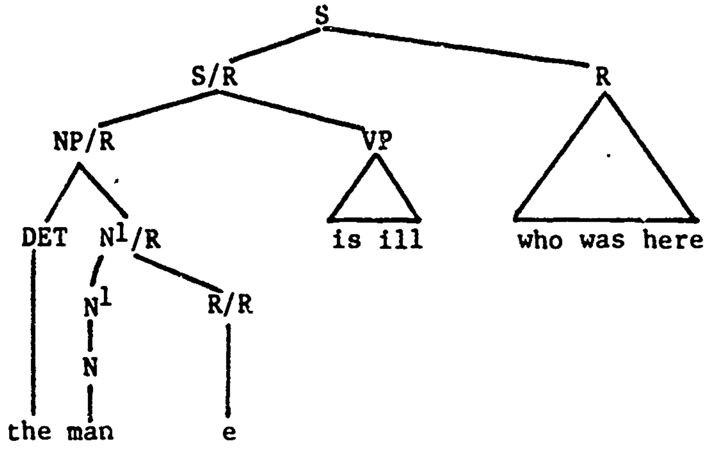

Gazdar claims further that rule 2, together with principles determining the distribution of slash categories, and the GPSG analysis of coordination together provide a successful account of Right Node Raising (RNR).

Analyses of coordination in GPSG impose a certain degree of identity on the feature composition of conjuncts in the structure. For our purposes, the relevant consideration is that if a slash feature is instantiated on a conjunct, the same instantiation is required on all the other conjuncts in the construction, and on the mother. This requirement, together with the rule in (2) will ensure that the grammar of English generates structures like (4)

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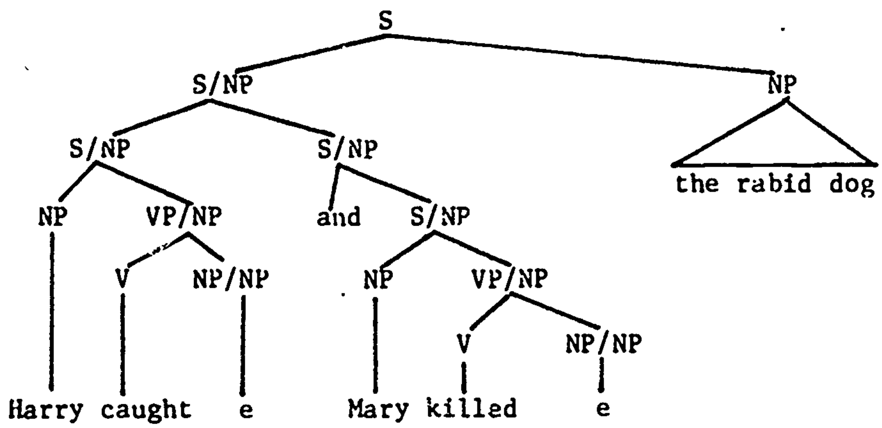

This is a striking result, since, as Gazdar points out, quoting Jackendoff (1977), 'there are no remotely coherent formulations of RNR'.

My claim here is that, given recent developments, GPSG itself now has no coherent analysis of RNR (or other RUDs) either. The two aspects of recent GPSG which lead to this conclusion are the following

a. the Lexical Head Constraint on metarule application

b. the role of the Head Feature Convention in constraining the instantiation of slash features

The Lexical Head Constraint (LHC)

The LHC is concisely stated in GKPS (59) as:

'metarules map from lexical ID rules to lexical ID rules'

Lexical ID rules are defined (54) as follows,

'A rule is lexical only if it has a head which is an extension of a SUBCAT category.'

(Categories defined for the feature SUBCAT are effectively those which immediately dominate lexical items.)

What this entails is that only those rules which have a lexical head can serve as the input and output of metarules. This is relevant to the examples we are considering because (for reasons given in Sag, 1982) the rules which terminate unbounded dependencies (Slash Termination Metarules, STMs) are (necessarily?) introduced by metarules. The LHC thus ensures that UDs must terminate in a subtree that contains a lexical daughter (a condition which has similar effects to part of the Empty Category Principle in Government Binding Theory, as Horrocks, 1984, points out).

The imposition of the LHC has at least two different motivations

a. it imposes constraints on the strong generative capacity of GPSG

b. in the case of UDs, it provides an explanation for a number of empirical observations concerning the impossibility of extraction from various positions.

It accounts, for example, for the ungrammaticality of the following (taken from Flickinger, 1981, which should be consulted for further discussion of the motivation for the LHC)

5. *Who did you say that ___ went?

6. *Whose did John borrow ___ book?

7. *By whom did John think (that) Bill lost six books ___?

8. *Afraid of heights, we kept every child ____ inside.

These sentences will not be admitted by a grammar respecting the LHC since none of the rules required for the termination of the UD are lexical:

(5) involves either (5.a) or (5.b)

5.a. S --> NP, H[-SUBJ][1]

5.b. S[COMP that] --> {[SUBCAT that]}, H[NIL]

((5) is relevant if Slash Termination Metarule 1 (STM1) (GKPS:143) is invoked, (5b) if Slash Termination Metarule 2 (STM2) is (GKPS:161). Note that, even though (5.b) contains a SUBCAT category, this category is not the head of the rule, and the rule therefore fails to satisfy the LHC)

(6) involves

6.a. NP --> NP, H[BAR 1]

(7) involves

7.a. N1 --> H, PP[by]

and (8) involves

8.a. N1 --> H, AP

Note now that Gazdar's analysis of (1) requires a violation of the LHC. The relevant subtree is

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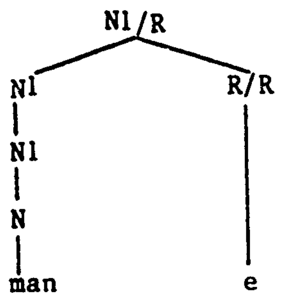

which assumes the analysis of relative clauses given in GKPS (155), in which they are analysed as sisters of N1:

9.a N1 --> H, S[+R]

Since the head in this rule is not defined for SUBCAT is not within the domain of the STMs and (9) will not be admitted by the grammar.

A second example, involving RNR, also comes from Gazdar (1981b), after Bresnan (1974),

10. I've been wondering whether ___, but I wouldn't positively like to state that ___, your theory is correct.

Here, the subtree required at the extraction site is (11)

11. S/S

[{SUBCAT whether}] S[+NULL]/S

Observe that the input ID rule required for this tree is (5b), modulo the different value for SUBCAT. However, to handle leftward UDs correctly and to get the 'that-trace' facts exemplified in (5) right, this rule must not be a possible input to the STMs, whereas, to get (10), it must. This example presents the paradox in its sharpest form.

A final example makes the same point:

12. I think that Max ___, and I know that Oscar ___, will be going to the party.

Here, the rule required for slash termination (presumably by STM2 in this case) is

13. S --> NP, H[-SUBJ]

This also is not a lexical rule.[2]

In the face of these problems, one might consider tinkering with the definition of Lexical Rule, and reformulating the way GPSG should handle the 'that-trace' phenomenon. There are however further problems associated with the GPSG analysis of these constructions which preclude a solution along these lines, to which I turn next.

Slash Feature Propagation

In GKPS, the propagation of slash features is effected by feature instantiation, constrained be the HFC and FFP. A local tree is admitted by a rule only if every category in the tree is a legitimate extension of the corresponding category in the rule. SLASH is stipulated to be a member of the set of HEAD features. This means that when slash features are instantiated, the mother and the head of the rule must bear identical slash feature specifications. (Unless the head is a SUBCAT category, in which case at least one of the non-lexical daughters must be extended which the same slash feature specification as the mother.) It is this requirement, that instantiated slash features must occur on non-lexical HEADs, which is responsible for incorrect predictions with respect to RUDs.

This restriction on the instantiation of slash features is imposed for a number of reasons. It is central to the GPSG account of parasitic gaps (about which more below) and it also provides a way of accounting for the ungrammaticality of examples like (14), as pointed out by Flickinger (1983)

14. *Which enemy did John mourn the destruction of the city by ___?

Flickinger argues that passive by-phrases in NPs are sisters of N1, not of N. Since N1 is a non-lexical head, this means that the HFC will only allow a slash feature to be instantiated on a sister PP if it is also instantiated on the N1 itself. Since the N1 which dominates 'city' in (14) does not contain a gap, it violates the HFC.

Once we turn our attention to RUDs, however, we find that the theory make the wrong predictions. From Flickinger's example (=(14)), we would expect the following to be ungrammatical, but it isn't, even thought it has an NP extraction site in precisely the same location as the one in (14)

15. The export of raw materials by ___ and import of finished goods to ___, third world countries, is a matter which has been receiving much attention

To return to some of the examples used earlier, it turns out that we not only find violations of the LHC, but also simultaneous violations of the HFC. (3), for example, repeated here

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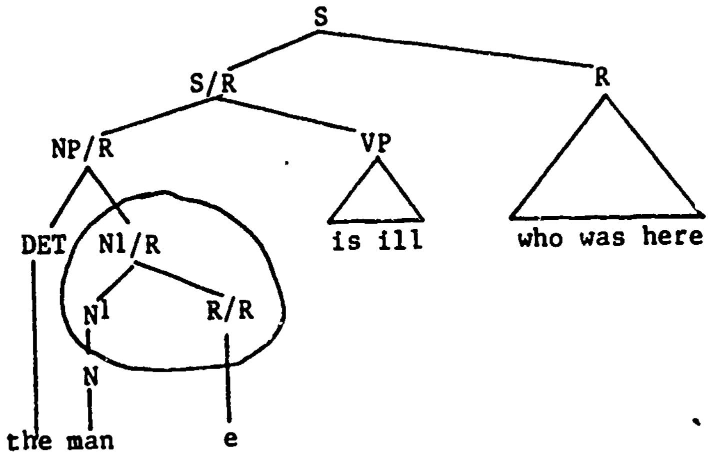

contains a subtree (circled) which violates the HFC, since the non-lexical head, N1, does not contain [SLASH R].

It is clear from the above discussion that GPSG can no longer claim to have a viable analysis of RNR, or RUDs generally. One possible conclusion from the above, suggested by McCloskey (1986), is that these constructions do not involve slash categories at all. Nonetheless, the problems that we have been discussing in connection with RUDs crop up in a similar fashion in the GPSG analysis of a construction which seems to present an uncontentious instance of a slash category analysis – parasitic gaps.

Parasitic Gaps

GKPS (162-7) present an analysis of parasitic gaps which they claim is 'as close to optimal as any we know of' (166) and in which the properties of parasitic gap constructions require no special stipulations, but arise as 'a consequence of the general character of our treatment of unbounded dependencies' (167).

Recall from the discussion above that instantiated slash features are constrained by the HFC to appear on non-lexical heads. Parasitic gaps arise as a function of the FFP, which permits FOOT features (including SLASH) to be instantiated on any non-lexical daughter in a tree. Thus, the combination of the HFC and FFP will admit local trees such as (16a), in which the <SLASH,NP> on the VP is required by the HFC while <SLASH,NP> on the subject NP is permitted (but not required) by the FFP, and hence the grammar will admit sentences containing such structures as (16b). (GKPS:164)

16.a. S/NP

NP/NP VP/NP

16.b. Kim wondered which authors [S/NP [NP/NP reviewers of ___] [VP/NP always detest ___]]

Note that (17a) is not allowed by the theory. [SLASH NP] has not been instantiated on the head, resulting in a violation of the HFC, and sentences with this structure, such as (17b) are, indeed, ungrammatical.

17.a. S/NP

NP/NP VP

17.b. *Kim wondered which authors [S/NP [NP/NP reviewers of ___] [VP always detest Shakespeare]]

(16) is an example of a parasitic gap in a subject NP. It also incidentally happens to involve an extraction site which is inside a subordinate clause. As it happens this latter property is rather critical for the adequacy of GKPS's claims. If we modify the example so that the clause involved is a root clause, GKPS's analysis fails to make the correct predictions. (18) exemplifies one possibility, which is indeed consonant with GKPS's

analysis.

18. Which authors did [NP/NP reviewers of ___] [VP/NP always detest ___]

Unfortunately, their analysis also admits (19).

19. Which authors did [NP/NP reviewers of ___] [VP always detest Shakespeare]

The reason for the difference in predictions between (17b) and (19) is GKPS's analysis of Subject Auxiliary Inversion. The structure they assign to examples like (19) is the flat one in (20).

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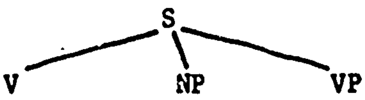
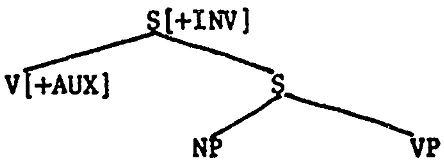


The problem here is that VP is not the head of S, instead V is.3

Since the head of (20) is lexical, the HFC is here irrelevant to slash feature instantiation and the only relevant feature instantiation principle is the FFP, which only requires that SLASH be instantiated on at least one non-lexical daughter.

This problem would of course disappear if one were to revert to the binary branching analysis of SAI advocated in Gazdar et al (1982), since the HFC would force the VP (the head of S) to contain any instantiated slash feature specification in

21.



But this is an option which is not open to GKPS. They point out that they reject this earlier analysis on empirical grounds:

> 'it exacerbates the problem of correctly assigning nominative case, it entails a very artificial analysis of copula constructions, and it provides no way at all of handling such British English examples as "Have you a match?"' (73.fn3)

Furthermore, they also point out (69) that the version of the SAI metarule required by the earlier treatment violates a further constraint which they impose on metarules, namely that there be a maximum of ONE category expression on the right hand side of a metarule pattern. There is also a further problem with the binary branching analysis which they don't comment on. The CAP as defined in GKPS will not enforce agreement between the subject NP and the V[+AUX] in structures like (21), as is required:4

22. Is he going?

23. *Are he going?

I conclude that the theory proposed by GKPS, does not offer an analysis of these constructions which is 'close to optimal', and that, in fact, these constructions raise problems which strike at the heart of some of the central principles of GKPS' version of GPSG.

FOOTNOTES

1 In GKPS, one or more categories on the right-hand side of a rule are stipulated to be the head(s) of the rule. The Head Feature Convention (GKPS:97) requires that, if no specification of the bar level of the head is given in the rule, the instantiated value of BAR will be identical to the that of the mother. Therefore, the head in (5) will receive the instantiated feature specification <BAR, 2>, and the head in (7) and (8) <BAR, 1>. A Feature Coocurrence Restriction stipulates that SUBCAT is only defined for categories of <BAR,0>, so none of these rules satisfies the definition of a lexical rule.

2 Although RUDs are much less constrained than LUDs with respect to possible extraction sites, there is a least one situation in which they are more restricted. LUDs are subject to the 'that-trace' effect, as (5) illustrates, but, as is well-known, leftward extraction of subject NPs is OK provided the complementiser is not present.

i. Who did you say ___ went?

RUDs on the other hand are impossible from subject position, irrespective of the presence of a complementiser.

ii. *I think (that) ___ may be going tomorrow, and know (that) ___ will certainly be there next week, that man I was telling you about.

In this respect, the LHC is actually too liberal.

3 This is clear from the rules used to define structures like (20). They are derived by metarule from VP rules (GKPS:63-5).

i. VP --> W ==> S[+INV] --> W, NP

All rules contain stipulations as to which daughter is the head, and the application of (i) to

ii. VP[+AUX] --> H[n], VP

gives the rule

iii. S[+INV] --> H[n], VP, NP

which is ultimately responsible for (20).

4 But, since it won't handle agreement in structures like (20) either (cf Borsley, 1984), perhaps this is not a significant count against (21).

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