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NP AND S STRUCTURES
A MULTIPLE-SPECIFIER APPROACH WITH EVIDENCE FROM ENGLISH AND POLISH

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1. Introduction[1]

In the development of generative grammar one of the most prominent quests has been to represent S and NP (especially nominalizations) using a parallel structure. The quest has been encouraged by the parallels found in the relations between elements of these two categories. As a result, the more abstract S has become a category, so has N. So much so in fact that NP has also been subsumed under a functional projection as the immediate complement of D in DP.[2] While the introduction of C and I as functional categories projecting from VP clarified the structure of S under the Government and Binding model, it has led to the creation and implementation of more abstraction and movement in generative models of grammar. Arguably, this is not good. The more abstract and removed linguistic structures become, the harder it is to trust we are moving in the right direction. The Minimalist Program in-

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[1] I would like to take the opportunity to thank the reviewer and Piotr Ruszkiewicz for reading through this article and providing helpful comments, which led to constructive changes and additions to the work.

[2] By functional category, I am referring specifically to the distinction between functional and lexical categories as used in The Minimalist Program (Chomsky 1995) and earlier. That is, lexical categories are the maximal projections of lexical items. This is in distinction to functional categories which must directly dominate specific lexical categories. In the current literature, the lexical categories are generally cited as NP (noun phrase), VP (verb phrase), AP (adjective/adverb phrase) and PP (prepositional phrase). While there is debate as to which functional categories to accept, the following are widely agreed to: IP (inflection phrase, also known as AgrP (agreement phrase) which in turn breaks down into AgrS and AgrO), TP (tense phrase), CP (complement phrase) and DP (determiner phrase).

dicates just that. In Chomsky (1995) we find a kind of return to the state of affairs found at the end of the 1970's, when phrase structure rules were discarded for the X-bar model, and transformations were reduced to move-α. It was at just this time (1980-82), when Gazdar *et al.* (1981) tried to produce a minimal structure of their own. In this paper, I would like to show that structures produced by Gazdar, Pullam, Sag (1981) and others are more simplified, less abstract and in many ways very similar to the structures produced under the Minimalist Program today. The paper will first introduce the structures proposed under the General Phrase Structure Grammar (GPSG) and what changes need to be introduced to obtain the desired effect, followed by an analysis of the approaches proposed from 1970 to 1998. The purpose is to show how the modified GPSG approach stands up to situations which cause problems for the other more *Chomskian* approaches.

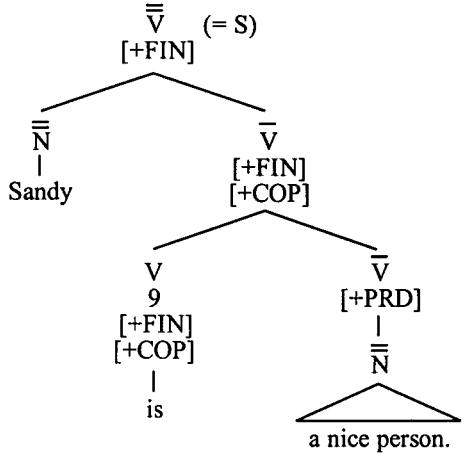
2. The GPSG Approach

In the early 1980's Gazdar (1981 and 1982) headed a new approach to syntax which came to be known as the Generalized Phrase Structure Grammar (GPSG). The goal of this approach was essentially that of Chomsky at the same time, namely reduction. While Chomsky wished to cleanse generative grammar of the transformational element and the phrase structure rules by introducing conditions on permissible structures and relations, Gazdar saw the answer in a *rich* set of phrase structure (PS) rules. Where Chomsky had seen PS rules as being too limited and ineffective without the addition of the transformational component, Gazdar saw that PS rules with the ability to *see* subcategorizational information could do away with transformations and the X-bar model. With no transformational component, there was no need for deep structure (DS). Gazdar's approach produced sentences directly from the lexicon, with no movement. In a real sense, this was a minimalist program for the 1980's.

One of the most important assumptions made under GPSG is that S=VP. That is to say, the sentence is a projection of the verb, and also the verb is the head of the sentence. Gazdar was not the only one to make this assumption: Jackendoff (1977) and Selkirk (1977), among others, had proposed similar structures.

The next important modification to the standard presentation was the multiple V' construction. In GPSG, V' can directly dominate V'. In fact, throughout Gazdar's works, VP and V' can dominate V, V' and VP. Their expansion depends on the features attached to the maximal VP. For a more detailed discussion, see Gazdar (1981, 1982), Gazdar and Pullum (1982) and Gazdar, Pullum and Sag (1981). Such expansion rules allowed for the production of structures like the following:

(1)



(Gazdar 1981: 16)[3]

This construction allows Gazdar to account for auxiliary verbs, modals, infinitives etc. by simply stringing V' down the structure. The feature marking which is assigned *at the top of the structure at V"* is carried down to the Subject and Predicate by the following rules:

(2a) HFC (Head Feature Convention): in a rule of the form D → ...δ... where δ is the head of *D*, δ carries all the features associated with *D*.

(2b) $\left[\bar{\bar{V}}\ \bar{\bar{N}}\ \bar{\bar{V}}\right]$ (Which Gazdar proposes as a replacement for: $\bar{\bar{V}} \rightarrow \bar{\bar{N}}\ \bar{V}$ [4])

(2c) $\underset{[+FIN]}{\bar{\bar{V}}} \rightarrow \underset{[\alpha]}{\bar{\bar{N}}}\ \underset{[\alpha]}{\bar{\bar{V}}}$, where α ranges over permissible combinations of agreement features.

(Gazdar 1982: 135, 140)

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[3] The number (9) directly above the [+FIN] and [+COP] in V in (1) is a reference to the verb expansion rule which applies. In this case, rule (9) split the original [+FIN], [+COP] $\bar{V}$ into a [+FIN], [+COP] V (*is*) and a [+PRD] $\bar{V}$. For more details, see Gazdar (1981, section 2).

[4] There seems to be a discrepancy between the rules which Gazdar represents here as equivalent; one would expect Gazdar's proposal to replace a rule such as: $\bar{\bar{V}} \rightarrow \bar{\bar{N}}\ \bar{\bar{V}}$. However, Gazdar explains that his notation is supposed to do away with several of the shortcomings of the X-bar model, one of which is that traditionally $\bar{V}$ is not allowed to directly dominate $\bar{\bar{V}}$. In GPSG, "the familiar rewrite arrow for PS rules will not be used, but instead a notation which reflects more directly the relation such rules bear to the (sub)trees that they admit" (Gazdar 1982:140). However, as we shall see later, despite the notation used in Gazdar's rules, $\bar{\bar{V}}$ does not ever directly dominate $\bar{\bar{V}}$ in any of the structures produced by GPSG. It is difficult to tell if this is not, in fact, a printing error, and that the rule in (2b) should not actually read: $\left[\bar{\bar{V}}\ \bar{\bar{N}}\ \bar{\bar{V}}\right]$ The same also holds for (2c).

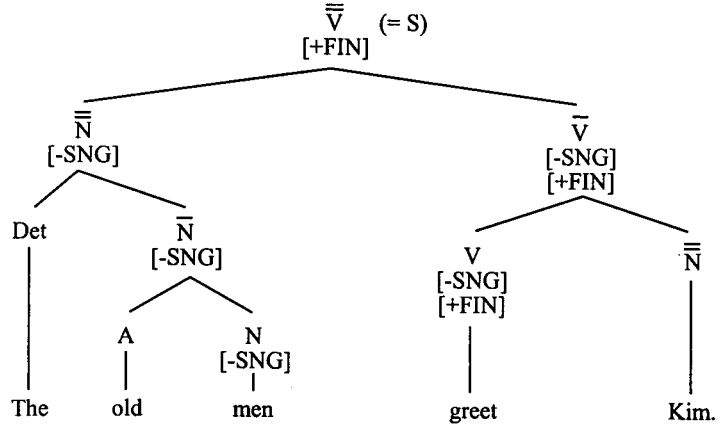
Further, this allows Gazdar to do away with functional categories such as I and C.[5] S, which is now a maximal V ($=\bar{\bar{V}}$) receives all the necessary feature markings about tense, number etc., at the beginning of the speech process, and these features are transferred directly to the dominated NP and VP (Subject and Predicate). As a final formulation, Gazdar proposes the following rule to replace the 'celebrated' S→ NP VP rule:

(3) $\left\langle 1, \left[_{\_\ v}\ \bar{\bar{N}}\ \bar{V}\right], V'\left(\bar{\bar{N}}''\right)\right\rangle$ (Gazdar 1982: 141).

It is somewhat surprising to see $\bar{\bar{V}}$ dominating $\bar{\bar{N}}$ and $\bar{V}$ in (3), since earlier examples (such as (2b, c)) would seem to suggest it should dominate $\bar{\bar{N}}$ and $\bar{\bar{V}}$. The original literature indicates that (2b, c) are to be taken as more symbolic rules showing that S is, in fact, not a separate category but the maximal projection of V. The rule shown in (3) depicts a more standard state of events as found in linguistic structures. Nevertheless, Gazdar's GSPG does call for structures in which strings of multiple occurrences of V' are used.

Gazdar has little to say about noun phrases and the similarities between NP and S. He allows for a determiner, and provides a place for AdjP, but does not go much beyond that in his analysis. His structures are as follows:

(4)



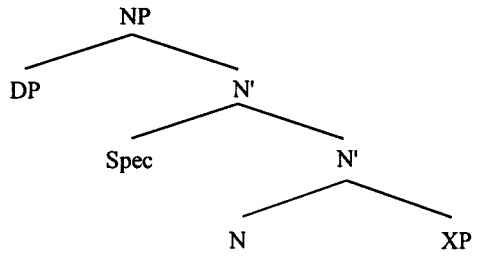
(Gazdar 1982: 136)

The problems which arise in this model become visible when we try to work with a more complex sentence or phrase. If we wanted to analyze "all the old men" or "each of the old men" we would have trouble locating a place for the additional

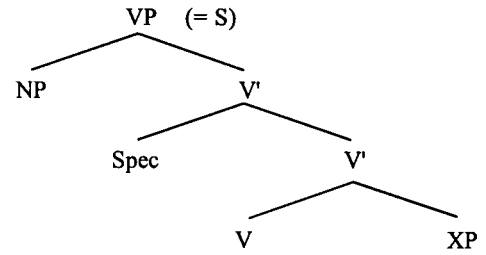
[5] C was incorporated as a feature on VP, which was further expanded using the appropriate PS rules.

quantifier phrases. If we were to move Det down one level, and insert QP in its place, we would lose the Subject relation between the Specifier of NP and the head. Similar problems are also true of Gazdar's VP structure. Under GPSG, the predicate is no longer [VP, S], but [$\bar{V}$, $\bar{\bar{V}}$]. I would like to propose a new structure, which will keep much of the "simplicity" of Gazdar's structure but retain the original Grammatical Relations as proposed by Chomsky (1965). The basic structures I would like to propose for NP and S are:

(5a)



(5b)



While adopting the DP node as necessary, this model does not give it the dominant position acquired under the Minimalist Program.[6] It allows for 'possessive noun phrases' (which are actually interpreted on this theory as determiner phrases) to act as subjects in NP and for nominalized noun phrases to act as subject within VP keeping a parallel position. Analysis will show that this model also provides solutions for other problematic categories such as number nominals, modals, auxiliary verbs etc.

3. The Question of Structure

Before moving on to an analysis of the model proposed above, let us briefly inspect the models proposed before. As examples, I will analyze Chomsky (1970), Siegel (1974), Jackendoff (1977), Selkirk (1977), Abney (1987) and the Minimalist Pro-

[6] In the Minimalist Program, the DP-Hypothesis (Abney 1987) is regularly adopted.

gram approach (Chomsky 1995). The purpose of this section is to show the benefits brought to generative analyses by various approaches and also to show what problems theses approaches continue to have. In some cases even significant modifications are not able to rectify the shortcomings of a given approach.

The first work to really come to grips with nominal structures was Lees' (1960) *The Grammar of English Nominalizations*. This work analyzes the broad range of similarities that exist between verbal and nominal structures. The analysis is based on the assumption that these structures are all produced through transformations on kernel sentences, thus accounting for their semantic correlations. Thus in the following example, (6b, c) are understood as having been derived from the kernel sentence (6a):

(6a) The committee appoints John. (Source sentence)
(6b) The committee's appointment of John. (1st nominal)
(6c) John's appointment by the committee. (Genitive periphrase)
(Lees 1963: 67)

The purpose of the work was to try to understand why some sentences seem to be able to undergo transformations to produce a range of nominal structures, while others with the same underlying structure cannot. Lees offered the following two structures to exemplify:

(7a) John draws the picture. (Source sentence)
(7b) John's drawing the picture. (2nd nominal)
(7c) *The picture's drawing by John. (Genitive periphrase)

and

(7d) The committee objects to John. (Source sentence)
(7e) The committee's objection to John. (1st nominal)
(7f) *John's objection (to) by the committee... (Genitive periphrase)
(Lees 1963: 67)

Even if we do not see these constructions to be linked by transformations today, Lees introduced and formalized the idea that noun phrases and clauses hold some very strong structural parallels.

Chomsky (1965) defined the structural relations for the domain S as the so called *grammatical relations:*

(8a) Thus Subject-Verb can be defined as the relation between the Subject-of a Sentence and Main-Verb-of the Predicate-of the Sentence, where Subject-of, Main-Verb-of and Predicate-of are the notions of [8b]; and Verb-Object can be defined as the relation between the Main-Verb-of and the Direct-Object-of a VP (Chomsky 1965: 73).

(8b) (i) *Subject-of: [NP, S]*
(ii) *Predicate-of: [VP, S]*
(iii) *Direct-Object-of: [NP, VP]*
(iv) *Main-Verb-of: [V, VP]* (Chomsky 1965: 71).

Within S, the *grammatical relations* define the relations between a phrasal category or a lexical item and the category which directly contains it. Such relations, however could not be dealt with by the phrase structure component, which only dealt with the *re-writing* of categories into further, more precise, items in a linear order. The phrase structure component was not able to see the structural relations described by the *grammatical relations* because they had no depth, taking one element at a time and breaking it into smaller ones. It was not able to analyze a structure beyond one level of analysis. The *grammatical relations* all require a structural analysis and not a simple linear analysis. Transformations also had trouble dealing with the *grammatical relations*, because they too depended on the linear order of the items being transformed.

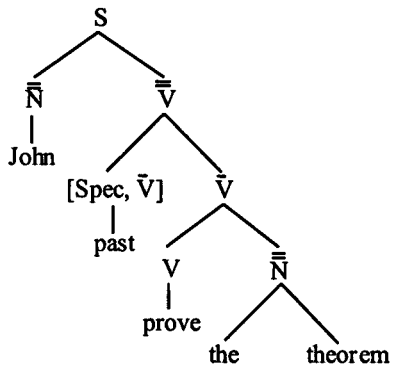
By the 1970's, the belief in the ability to derive nominal structures from verbal structures (kernel sentences) through transformations had waned. The similarities between verbal and nominal structures, however, were still at the center of attention. In Chomsky (1970) we can find the following example of noun phrase versus clausal similarities:

(9a) John proved the theorem.
(9b) Several of John's proofs of the theorem.

In both (9a) and (9b), Chomsky observed that we can establish the *grammatical relations* such as Subject(-of) (*John/John's*), Predicate (*prove/proof*), and Object (*the theorem*). Fitting this observation into a convincing structure, however, has turned out to be more difficult than expected. In order to fully understand the controversy, let us briefly go through the development of parallel NP or S structures as they have been proposed.

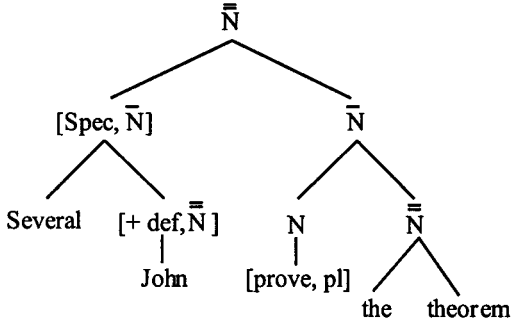
Continuing with the example above, let us start with Chomsky (1970). In this paper, Chomsky proposed the X-bar model as a way to expose the underlying structure for maximal categories, reducing the role of transformations. He proposed the following structures for S and the corresponding nominalized NP:

(10a)



John proved the theorem.

(10b)



Several of John's proofs of the theorem.

(Chomsky 1970: 53)

As indicated, this proposal closely preserves the grammatical relations (as defined in Chomsky 1965) in a parallel structure. That is, Subject is the uppermost left branch of the maximal projection (S or NP); the predicate is the sister to the Subject under the topmost maximal position; and the object is the complement to the predicate. Closer analysis, however, reveals several discrepancies. First, the Subject position is the specifier of the NP, but it is not in S. Chomsky (1970) defines specifier as the sister position to N', A' and V' (Chomsky 1970: 53), which means that while the subject in NP and S are both dominated by a maximal projection, they do not occupy a parallel structural position, and have different structural domains. Second, the predicate position in S is [VP, S] while the parallel position in a nominalization is [N',NP]. That is, in S the predicate is a maximal category, while in NP it is a non-maximal phrasal category. Thus, in NP, the predicate is also the *head* of the structure, while in S the *head* position is not defined. Similar observations can be made regarding the Subject-of relation. In S, the Subject is a maximal category

(NP). In NP, however, the Subject is an unspecified category [Spec, X'], which was at that time labeled Determiner, but did not have the status of an independent category.

The situation gets worse when one tries to use this form of the X-bar model to display noun phrases with modifying adjectives. Where should they be placed? There is no room for them in the 'determiner' and there is no room for them at the N' position. Safely, Chomsky does not delve into the matter, eliminating the need to make suggestions.

In 1974, Siegel picked up where Chomsky left off, developing the idea of the Determiner in more detail, as well as assessing the problem of Case. Siegel develops a model in which maximal N is N'''', which breaks down into N''' + Case and further into N'' which breaks down into Det + N'. Unfortunately, she does not concentrate on the structure of S as much as that of the NP, but we are able to sketch out what is not directly present in her work.

Given her list of phrase structure rules for English, we are able to construct and compare S and NP structures ourselves. Following are the phrase structure rules she proposed (Siegel 1974: 62):

(11a) $S' \rightarrow \text{COMP } S$

(11b) $S \rightarrow N'''' \ V''$

(11c) $V'' \rightarrow \text{Aux } V'$

(11d) $\text{Aux} \rightarrow \left\{ \begin{matrix} \text{to} \\ \text{tense} \end{matrix} \right\} (\text{modal})$

(11e) $V' \rightarrow (\text{have} + \text{en})(\text{be} + \text{ing})(\text{be} + \text{en})V \ldots$

(11f) $N'''' \rightarrow N''' \text{ CASE}$

(11g) $N''' \rightarrow \left(\left\{ \begin{matrix} QP' \\ AP' \end{matrix} \right\} \right) N''$

(11h) $N'' \rightarrow \text{Det } N' \ldots$

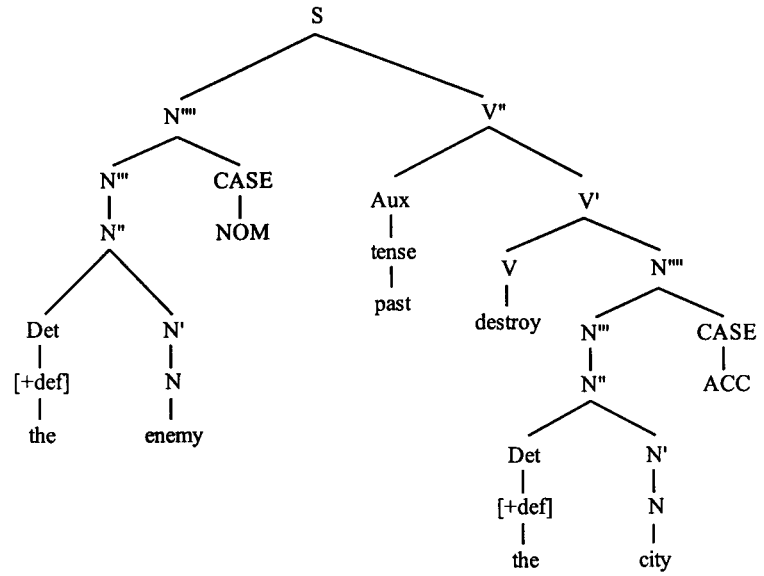
(11i) $\text{Det} \rightarrow [\pm \text{def}, (N'''')]$

(11j) $N' \rightarrow \left\{ \begin{matrix} N \ldots \\ \text{- ing } V' \ldots \end{matrix} \right\}$

(11k) $N \rightarrow \left\{ \begin{matrix} N \\ [+\text{sing}] \\ \\ N \\ [-\text{sing}] \end{matrix} \right\}$

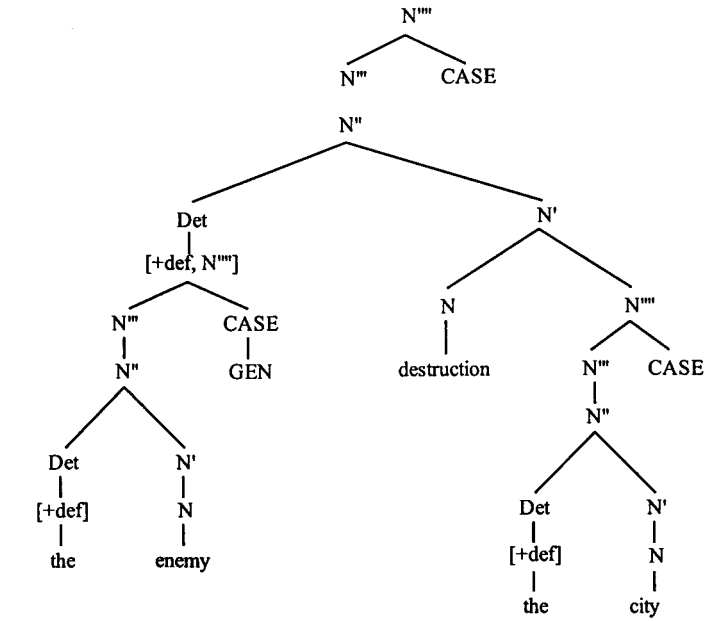
If we wanted to compare the internal structures of an S and a corresponding NP, these rules would produce the following structures:

(12a)



The enemy destroyed the city (derived using Siegel's PS rules)[7]

(b)



The enemy's destruction of the city (originally (82) in Siegel 1974: 77)

[7] Although Siegel does not talk about Accusative case, I have included it in this structure for clarity.

The advantage to Siegel's approach is that there is room for everything. Further, determiners have been established with their own phrase structure rule which introduces the Det node into a structure. Case has been structurally defined. Quantifier and adjective phrases can be inserted under N'''. Siegel's system seems to work fine for the derivation of S. However, when one tries to use her PS rules to derive NP structures, two problems immediately become evident, as can be seen in (12) above.

First, the only available position for the subject of NP is the Det directly dominated by N'' according to (11h). However, Siegel's rule (11i) is problematic. It specifies that Det must dominate either a [±def] feature, which may be realized as a lexical item(such as *the*) or [±def] together with an entire NP (N'''') (as illustrated in (12) above). This means, however, that the PS rules create a category (Det) with a non-uniform path, where a uniform path is one which is made up of nodes that are identical with regard to syntactic features but which may differ in terms of bar levels. That is, Det is introduced directly under N'' as the sister to N' but it is separated from its head (*the*) by an entire N''''. It is difficult to see how this could function under the X-bar approach, where the definition of head relies on a uniform path between the head of a phrase and its maximal projection.

Second, inserting AP and QP as the specifier to N''' creates the incorrect word order for English.[8] A simple modification of the phrase structure rules to improve the output would be to switch the Determiner position with the QP/AP position, so that Determiners are inserted under N''' and AP/QP under N''. This would provide a uniform path for Det, and would also produce the correct word order for English. The following changes to Siegel's rules would thus need to be made:

(13a) (=11g) $N''' \rightarrow \left(\left\{ \begin{matrix} QP' \\ AP' \end{matrix} \right\} \right) N''$ would be changed to: $N''' \rightarrow \text{Det } N''$

and

(13b) (=11h) $N'' \rightarrow \text{Det } N' \ldots$ would be changed to: $N'' \rightarrow \left(\left\{ \begin{matrix} QP' \\ AP' \end{matrix} \right\} \right) N' \ldots$

A further modification to (13a) would need to be made to allow for the Subject of a NP to be inserted in a more traditional position:

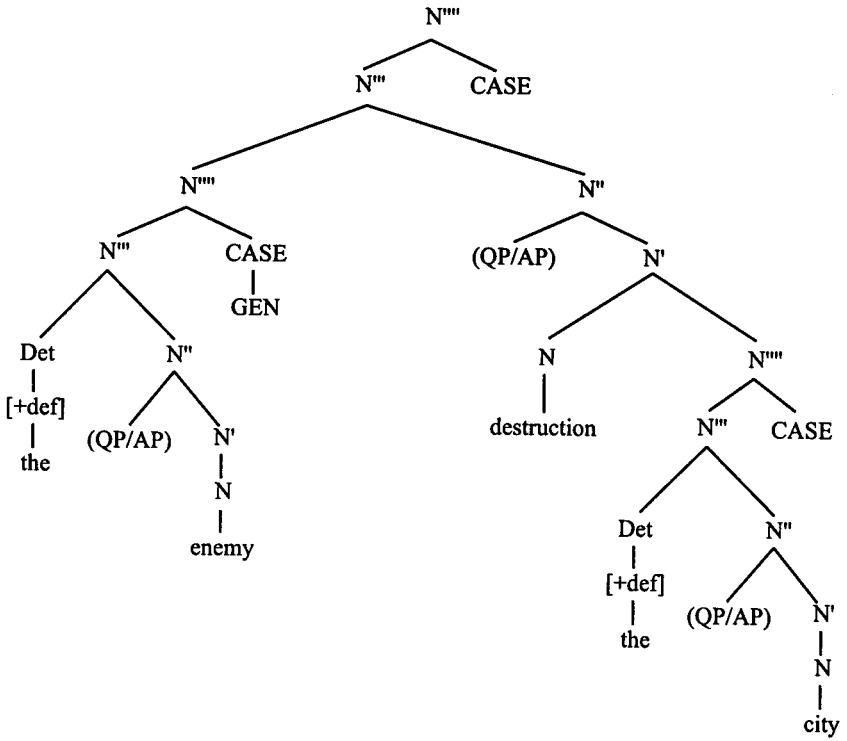
(14) $N''' \rightarrow \text{Det } N''$ would be changed to: $N''' \rightarrow \left\{ \begin{matrix} N'''' \\ \text{Det} \end{matrix} \right\} N''$

(where the curly brackets indicate that either one or the other element must appear but not both).

[8] In (12) above, insertion of an AP under N''' as indicated would produce "*Devastating the enemy's destruction of the city" and not the desired structure "The enemy's devastating destruction of the city."

Furthermore, this would allow the head of Det and its maximal projection to have a uniform path. In the above structures (produced by Siegel's original PS rules), the determiner is unnecessarily disjointed from the maximal Det node under N". Accordingly, with the proposed changes, one could produce the following structure:[9]

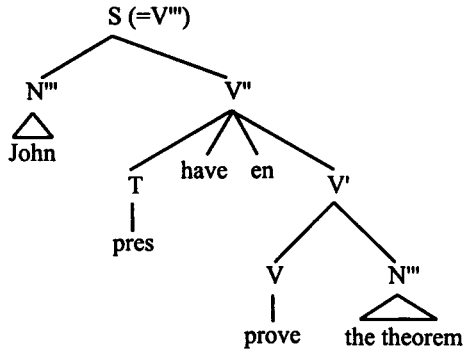
(15)



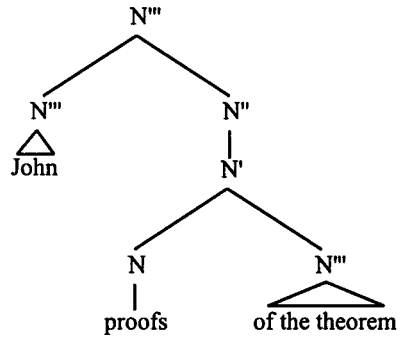
Although Siegel's approach brought many issues to light, the X"" structure was seen as too large. Future work would constantly aim at reducing the number of tiers available to the X-bar model. Jackendoff (1977) brings a new approach to the problem, trying again to streamline the structures between S and NP. Most importantly, Jackendoff limits the maximal projection to X'''. He 'eliminates' S by saying that it is equivalent to V'''. Now NP and S can be drawn with a much more parallel structure. Under Jackendoff's paradigm we produce the following structures for Chomsky's original examples:

[9] Even with the modifications proposed, however, there are still problems with this structure. For instance the fact that N' dominates a full N"" is not stated in the PS rules. More evidence that the PS component was not sufficient in producing well-formed structures. Thanks to Piotr Ruszkiewicz for pointing this out.

(16) a.



b.

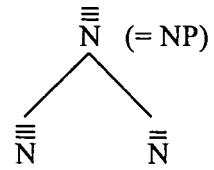


(Jackendoff 1977: 258)

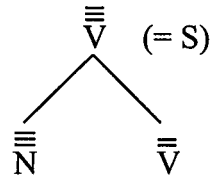
Here, the maximal projection of the head is also the maximal category of the phrase. The Subject is the specifier of the maximal category (the left topmost branch), and is itself a maximal category (N'''). The Object is also the complement in both structures and is also a maximal category. Unfortunately, this model has little to say about Case assignment and determiners, which makes it less practical. It has, however, introduced the important proposal that S may be equivalent to the maximal projection of V.

Selkirk (1977) comes to a strikingly similar conclusion. She proposes the following structure for NP and S:

(17a)



(17b)



(Selkirk 1977: 301)

Again, the advantage to this structure is the parallel subject relation for both NP and S. The disadvantage is that it does not deal with Det very well. Selkirk has trouble arguing that the left branch (the Specifier) of NP should be NP. She proposes that the specifier of NP can actually be filled by either Det, or a special maximal category: NP_{poss}. In this structure QP has also found a convenient position under N".

(18a) $NP \rightarrow \left(\left\{ \begin{matrix} Det \\ NP_{poss} \end{matrix} \right\} \right) \overline{\overline{N}}$

(18b) $\overline{\overline{N}} \rightarrow \left(\left\{ \begin{matrix} NP \\ QP \end{matrix} \right\} \right) \overline{N}$

(18c) $\overline{N} \rightarrow N \left\{ \begin{matrix} PP \\ S \end{matrix} \right\}$ [10]

(18d) $\overline{N} \rightarrow NP$

(Selkirk 1977: 312)

(18d) was added as a special rule for the formation of partitives. It seems to be quite powerful, and somewhat *ad hoc*. Hopefully, a system can be found to alleviate such additional phrase structure rules.

In both Jackendoff's and Selkirk's approaches, the Subject of NP is NP, while the subject of S (=VP) is not VP. What Selkirk hinted at in her phrase structure rules, and Siegel had tried to work into her own system, was that the Subject of NP should, in fact, be a separate maximal category, i.e. Det. If Det could be the Subject of NP, many problems would fall away.

This situation led Abney (1987) to form the DP-hypothesis and to bring a new maximal projection into the X-bar model. In fact, he took the process one step further and said that DP is the subject of both NP and S. Under his model, DP is a new functional category which must directly dominate NP.

Abney was lead by the desire to form a parallel to the AGR category I (which dominates VP) for the NP structure. The basis of his work comes from Hungarian, Turkic and other languages which have overt morphological agreement between the possessor and the head noun in the NP, and the additional fact that in some of these languages, the agreement morphology is identical. Abney used an example from Central Alaskan Yup'ik to illustrate this fact (his (11)):

[10] Selkirk seems to have made an oversight here. The an N can optionally take either PP or S as its complement but not both. The complement is optional in both cases, however, which means that the rule should properly read:

$\overline{N} \rightarrow N \left(\left\{ \begin{matrix} PP \\ S \end{matrix} \right\} \right)$

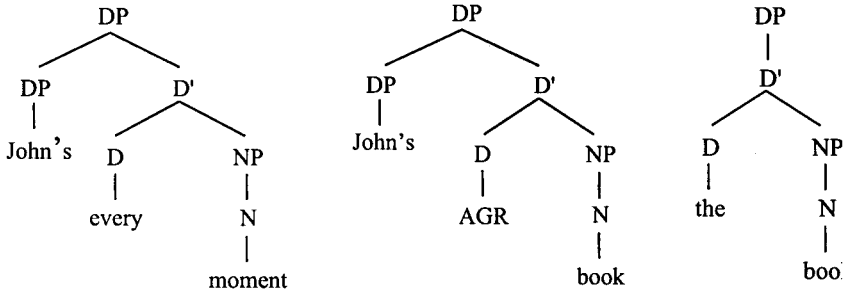
Thanks again to Piotr Ruszkiewicz for pointing this out.

(19a) *kiputaa* - Ø 'he bought it'
(19b) *kiputaa* - *t* 'they (dual) bought it'
(19c) *kiputaa* - *k* 'they (plural) bought it'

(19d) *kuiga* - Ø 'his river'
(19e) *kuiga* - *t* 'their (dual) river'
(19f) *kuiga* - *k* 'their (plural) river' (Abney 1987: 20)

To account for this agreement, he proposed the introduction of a functional category to dominate NP and assign case to the possessor in the specifier position. He calls this category D and defends his hypothesis that it is in fact the Determiner. His basic structure is the following:

(20)



(Abney 1987: 25)

Abney argues that the new functional category (D) provides a position to account for noun phrase internal agreement and case assignment, so that the noun phrase (DP) can match the verb phrase (IP) and the Sentence (CP) in structure. It is true that his explanation of D as the head of the former NP seems to solve many problems internal to the entire NP. It seems strange, however, that nowhere in the dissertation (1987) does he account for feature percolation from the NP up to DP for feature checking with IP. Standard percolation theories say that a feature is passed from the head up to its maximal category (for instance from N to NP). Chomsky's original definition of percolation was just that, and nothing more:

(21) One might extend this operation of *there*-insertion, introducing the complex symbol [*there*, +NP, α *plural*] (α = + or α = –), where the third term in the proper analysis (*a man*, in the cited example) is [α *plural*], plurality now being regarded as a feature that *ascends from a head noun to the NP node dominating it* (Chomsky 1970: 50, note 31, emphasis added).

Since that time, this definition has not really changed. Some modifications have been made specifically to tailor for the needs of morphology, as in Lieber (1992):

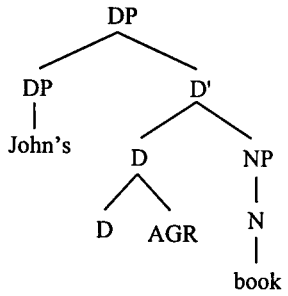
(22a) Head Percolation – Morphosyntactic features are passed from a head morpheme to the node dominating the head. Head Percolation propagates the categorial signature. [footnote deleted]

(22b) Backup Percolation – If the node dominating the head remains unmarked for a given feature after Head Percolation, then a value for that feature is percolated from an immediately dominated non-head branch marked for that feature. Backup Percolation propagates only values for unmarked features and is strictly local (Lieber 1992: 92).

I can see no way, however, for percolation of the features from the head N up to the maximal projection DP. Even if we were to propose some kind of incorporation, by which the head N *incorporates* (perhaps along the lines of Baker 1988) into the head D, the features of the head would not be expected to percolate up to the top of the DP.

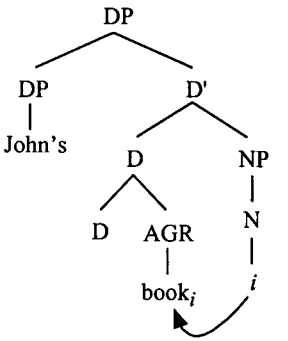
The only way that this structure can work is through the use of movement. This is the method which seems to be assumed by Abney. Exact clarification of this process is, however, not available in the text (Abney 1987). Accordingly, the following base structure in (23) has D and AGR under D':

(23)



The head of the NP *book* then undergoes movement to check its features with AGR:

(24)



At this point, the DP could obtain the noun features necessary for agreement with the verb. Note equally that the same movement procedures must be applied twice in order to produce *John's book*. The DP *John's* also requires movement of *John* to the D node. This becomes even more complicated when we consider that Abney proposes *'s* in English as a case assignor. In any event, Abney is unclear as to the mechanisms used which allow all of this to take place. His main claim is that the use of DP (as well as categories such as DegP (degree phrase), qp (DP +quantifier), mp (DP +measure), advp (DP +adverb) and others (Abney 1987: 319)) provide a means to preserve the Uniform Two-Level Hypothesis:

(25) (a) All non-head nodes are maximal projections, and
(b) Two-bar projections are maximal projections for all categories (what we might call the "Uniform Two Level Hypothesis", to adapt a term from Jackendoff 1977) (Abney 1987: 288)

and create structures with parallel dependencies between DP, IP, CP and DegP (that is: noun phrases, verb phrases, sentences and adjective phrases).

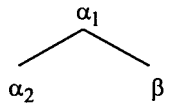
Aside from the problems that I have drawn attention to above, the X-bar model has been further scrutinized in Chomsky (1995), with some striking conclusions. The most striking recent modifications to the X-bar model which are related to this discussion are: a drastic restriction of the X-bar structure to its bare minimum and the elimination of the Agr node from the S-bar model. These modifications will be discussed shortly.

In Chomsky (1995) syntactic objects are reduced to the following 'minimalist' types:

(26) (a) lexical items
(b) $K = \{\gamma, \{\alpha, \beta\}\}$, where α, β are objects and γ is the label of K (Chomsky 1995: 243).

Further, the label γ has, in fact, been determined to be either α or β depending on which element *projects* and is thus the head. For instance, if α projects then we get: $K = \{\alpha, \{\alpha, \beta\}\}$, which can be drawn as:

(27)



(Chomsky 1995: 245)

This is the "minimalist" model of phrase structure in which nodes, bars, primes, XP, subscripts and other indices are only used for "expository convenience" (Chomsky 1995: 244). Even the structure in (27) is an informal notation. The *complement* and *specifier* relationships are defined as follows:

(28) The terms *complement* and *specifier* can be defined in the usual way, in terms of the syntactic object K. The head-complement relation is the "most local" relation of an XP to a terminal head Y, all other relations within YP being head-specifier (apart from adjunction...) (Chomsky 1995: 245)

In this system all categories are constructed as projections of the properties of the lexical items selected from the lexicon. Thus any relationships within α (which are projected from the lexical item α) are *Specifier-head* relations.

In the "minimalist" model, structures are built using two distinct procedures: *merge* and *move,* the latter consisting of *adjunction* and *substitution*. *Merge* is the procedure by which the structure in (27) above is constructed from the set (α, β). *Substitution* is a non-expanding building procedure which forms:

(29) L = {H(K), {α, K} }, where H(K) is the head (= the label) of the projected element K (Chomsky 1995:248).

This procedure does not build onto the existing structure, but simply adds information to the existing element and changes the label. *Adjunction*, on the other hand, *is* a structure building procedure which forms a two-segment category:

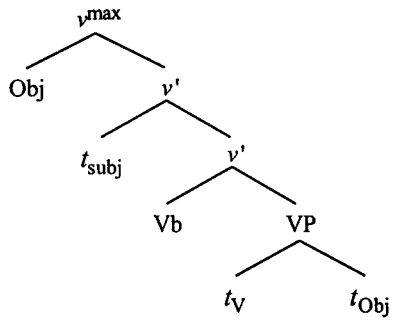
(30) $L = \{\langle H(K), H(K)\rangle, \{\alpha, K\}\}$ [where] $\langle H(K), H(K)\rangle$ the label of L, is not a term of the structure formed (Chomsky 1995: 248).

Under the model described above, the relations internal to α in (27) are not restricted by bar levels, but are constrained by *maximal projections* and the *head*, which determines the label for the entire structure. For instance, in a Larsonian verb shell structure with a light verb (*v*)[11] dominating VP, we can produce the following structure in Icelandic:[12]

[11] The term *light verb* was introduced by Jespersen in 1954, and was further discussed in Grimshaw and Mester (1988). It is used to signify a verb that has no semantic content and no theta-roles, but only fills a syntactic function. Verb shells as introduced by Larson (1988) to explain the double object phenomena, produce an empty structure above the VP so that the V and its arguments can move up and into their correct positions for word order. With Larson's shells, the light verb (*v*) position is always present, even if there is no phonetic realization. Thanks to Mark R. Baltin, John P. Boyle, John Moore and others on the PrinParam list for their help in clarifying this for me.

[12] I would like to thank the reviewer for his comments on this section, which led to a fruitful rethinking and appropriate changes.

(31)

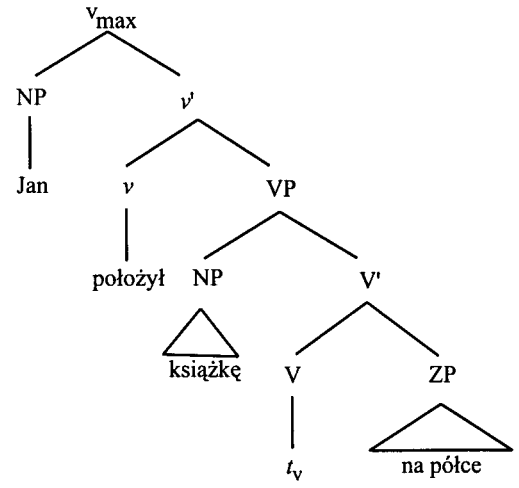


(Chomsky 1995: 360)

According to the analysis there (Chomsky 1995), Vb is a complex position [$_{V}$ V *v*] in which V has raised to *v*, and the Subject has moved to the [Spec, I] position leaving the trace t_{subj}. The Object (Obj) has targeted the v^{max} position for movement producing the extended structure shown above. The multiple specifier construction in which *v* is dominated by two occurrences of *v'* is created as a projection of the root *v*. In this structure, both *Obj* and t_{subj} are treated as being equally distant from Vb in terms of the Specifier-Head relation. That is to say, they both hold a relation internal to α (as represented in (27)). Note how the *multiple-specifier* approach produces structures surprisingly similar to Gazdar's GPSG structures.

A similar structure for Polish can be created starting with the *traditional* Larsonian analysis of the sentence: *Jan położył książkę na półce*:

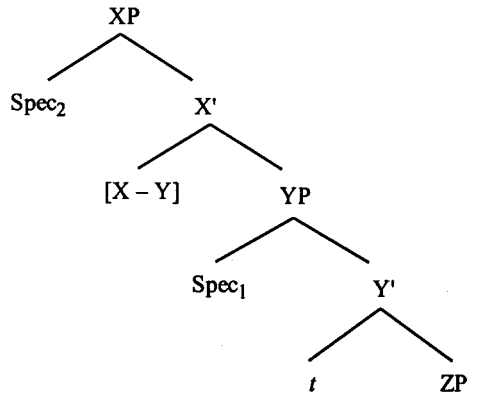
(32)



(adopted from Chomsky 1995: 298).

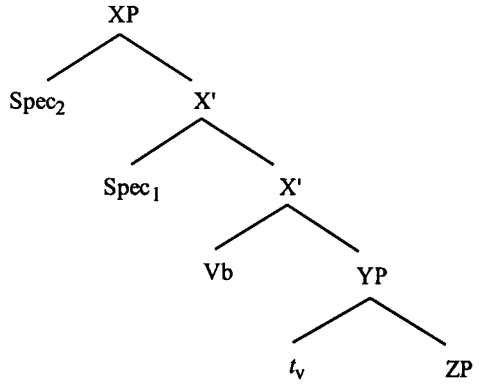
This then can be given a slightly more abstract representation:

(33)



Where X is a light verb *v* and the head verb Y raises to form a complex Vb which has the structure [$_v$ V *v*]. Finally, in accordance with the above, if we eliminate Agr from the grammar, and if we assume Object raising to account for the optional version of the analyzed sentence: *Jan książk położył na półce*. Then instead of moving the Object to Agr_O it should be raised to a specifier position in XP:

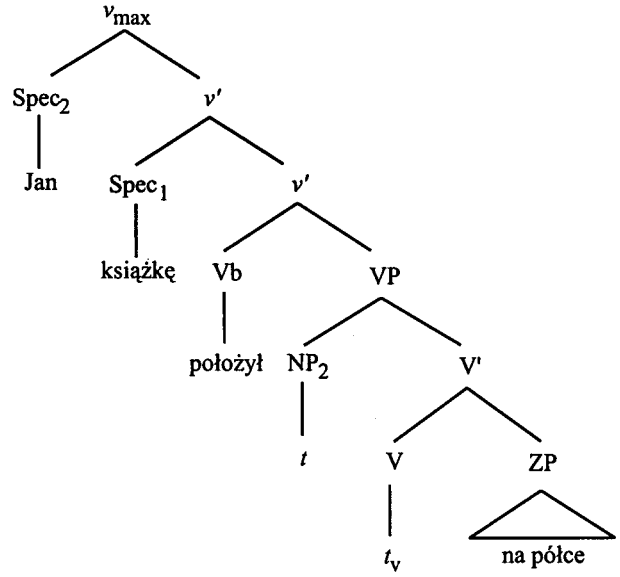
(34)



(adopted from Chomsky 1995: 356).

Which would be realized as follows:

(35)



This is important because, if we are able to do away with the need for an AGR node in the clause, then there should also be no call for one in the Noun Phrase. This was one of Abney's central arguments in the defense of the DP-Hypothesis. In fact, if we bring these most recent developments in the Minimalist Program together, the arguments supporting the DP-hypothesis are significantly weakened. First, the *multiple-specifier* constructions make it possible to account for many noun-phrase phenomena including determiners, adjectives, quantifiers etc. without needing to introduce a new category and deprive the noun of the *head* position. Second, if the AGR node is not needed in S, then its parallel position in NP is also questionable.

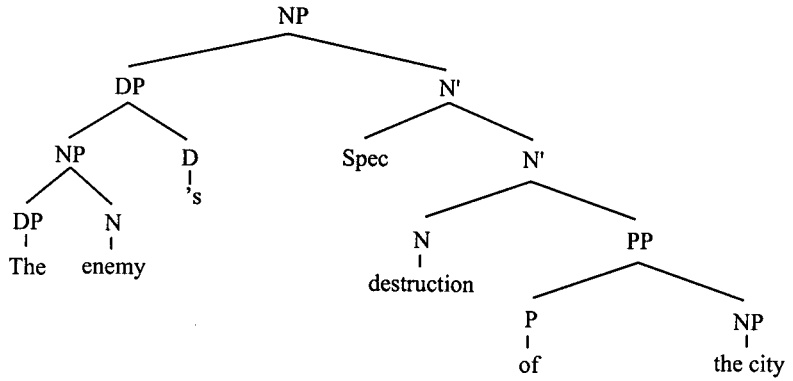
4. The "Multiple Specifier" structure

Let us return now to the approach proposed by Gazdar et al. under the GPSG model. It bears striking resemblance to the structures produced through adjunction under the Minimalist Program. The structure proposed in (5) above, which I will call the "Multiple Specifier" structure, presents a system which resolves many of the problems that were present in other proposals, and seems to fit within the current understanding of generative grammar. The "Multiple Specifier" structure offers the following features: (1) we are able to achieve parallel NP/S structures; (2) we do not introduce unnecessary complications; (3) there is room for all components found in both structures; and (4) suitable explanations for structural relations are derived directly from the structure itself. The term "multiple-specifier" is taken from the Minimalist Program and reflects the fact that there are multiple positions which are dominated by an XP position and are sister to an X' position without calling for

tertiary structures. It is also striking that both the GPSG and the Minimalist Program structures are heavily *lexicalist* in that the structures are determined by the information stored in each lexical entry and not determined by an independent module of the grammar.

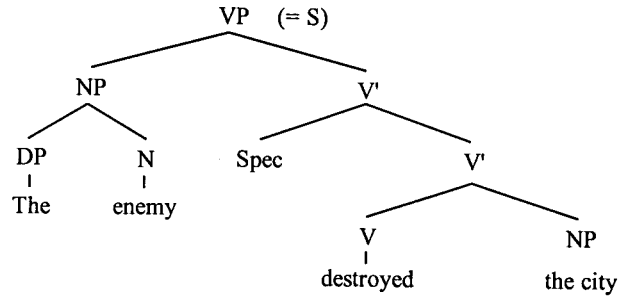
Let us look at some of the sentences which gave rise to problems in earlier analyses and see how they are handled using the Multiple Specifier approach. To start with, let us work with the example: *The enemy's destruction of the city.* This NP would have the following structure:

(36)



The corresponding S (*The enemy destroyed the city.*) would have this structure:

(37)

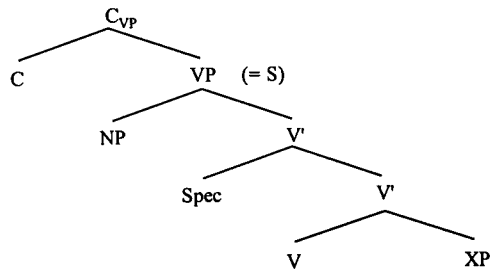


A couple of details peculiar to the "Multiple Specifier" structure need to be explained. In this paradigm, VP and NP are the most important lexical categories. AP, PP, DP are also categories, but they are always dominated by either NP or VP. AP is a category which modifies both NP and VP. DP also plays a kind of modifying role, and recent research may show that it, in fact, is a type of AP (see Delsing 1998 and Lindauer 1998 for analysis of Germanic DP structures). One of the goals of

such a model is to try to reduce the role of movement in syntactic analysis.[13] There are many proposals for and evidence of movement in generative grammar such as passive constructions, agreement through raising, raising for feature checking and others. Constraints on space will not allow me to explore these situations here.[14]

However, if movement of any kind (i.e. *wh*-movement) is foreseen, a target position into which the elements can move will need to be available. To satisfy scope conditions, the target position is usually required to c-command the entire structure out of which an element has moved. Furthermore, traditionally only VP (or equivalently S) was c-commanded by a purely structural position to account for the scope phenomena involved with relative clauses and sentences. I propose that both NP and VP be dominated by a structural position which provides room for the more 'syntactic' elements of clause and noun-phrase production. Further, I propose that a functional category C (Complementizer) be used for this function.[15] In clausal structures, C_{VP} is used for *wh*- movement, relative clause formation etc. In NP structures, however, C_{NP} is used for the logical quantifiers such as *each, every, some, few, several, all* number nouns etc. Having C be a common element to both the NP and VP structures allows for the explanation of certain scope and agreement issues which have occurred in the literature, without needing to use movement (except for *wh*-movement). Thus the final Multiple Specifier structure for NP and VP will look like this:

(38a)



[13] The definition for Specifier will also have to be expanded slightly. Chomsky (1986) proposes the following two level phrase structure system:

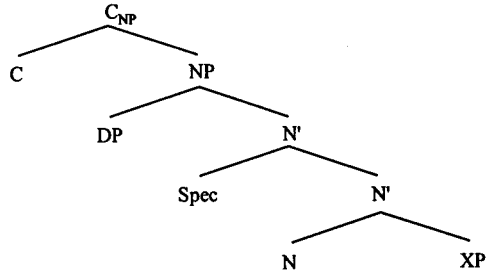
(a) $X'' \rightarrow YP\ X'$
(b) $X' \rightarrow X\ ZP*$

Where YP is the specifier position and ZP the complement position (Cited after Rothstein (1991)). In the "Multiple Specifier" structure a specifier is any YP which is sister to an X'. This is strikingly similar to Chomsky's original definition (Chomsky 1965). We will need to draw on the idea of "equally distant" as described in Chomsky (1995) to say that all specifiers are equally distant from the head in terms of feature checking relations with the head.

[14] The reviewer's comments were very helpful here, keeping me from being a bit too enthusiastic.

[15] In this paper I have presented two different types of C, one which subcategorizes for NP (C_{NP}) and one which subcategorizes for VP (C_{VP}). C may well subcategorize for other categories such as PP, AP, or DP. At present I have no evidence of this and thus will not investigate this topic further. However, see (44) for a possible example of C subcategorizing for PP (C_{PP}).

(38b)



To show that there is in fact a category which dominates both NP and VP, note the following observations. First, the parallel between NP and VP structures becomes shaky if we add an operator such as *each* or *every* to the NP structure.[16]

(39) NP: Each destruction of the city → VP: Each time (they) destroyed the city (?)

In order to make the parallel VP structure in (39), we must add a subject (as expected), but we must also add a time-frame to fill the subcategorization frame required by this use of *each*. Second, while *each* can carry gender features for agreement purposes, it seems to be marked [-plural], not allowing for a plural pronoun:

(40) (a) Each nun said her prayers.
(b) Each of the nuns said her prayers.

In (40a, b), agreement is displayed for singular feminine features, yet in (40b) the nominal antecedent has feminine plural features.

One explanation for these phenomena is that the word *each* in these structures is not actually internal to either the NP or the VP, but rather that it heads the NP and the VP, marking them for scope. I propose that *each* belongs to a class of *operators*, which reside in C_{NP} and have scope over the NP which they head. The class of *operators* has both nominal and adjectival attributes but is underspecified for gender features which they must pick up from the NP within their scope. In turn they themselves are assigned case from the NP or VP which dominates them. Some *operators* seem to have a dominant [±Plural] feature which overrides the features found in the NP over which they have scope. Furthermore, *operators* have at least two subcategorization frames. Either they take an NP which (a) has no determiner and (b) carries the same [±plural] feature marking, or they take a partitive *of*-PP.

[16] Here I am using a specific meaning of *each*. It seems that, in fact, *each* has several subcategorization frames. In these examples, *each* takes an NP or an *of*-PP as its complement and as its scope. Other uses of *each* such as: *The boys ate one apple each*, seem to have different subcategorization frames and scope definitions. Further examples of this type of phenomenon are perhaps: *many problems, many of the problems* and *many a problem*. Thanks to Piotr Ruszkiewicz for pointing out the nuances involved here.

How then does the *operator* receive marking for gender (in the second case) if it is separated from the NP by a PP? This must occur along similar lines to reflexive marking of predicates. Just as Williams (1980) showed that there is a way for a subject and a pronoun acting as the object of a VP to have the same referential index, it seems reasonable that partitive *of*-PPs can have the same index as the dominating *operator* and the NP it dominates. This would allow for the *operator's* underspecified features to be filled:

(41) Each_i [of the $\text{nuns}_i]_i$

In fact, we could further analyze the *operator* structure along the lines of A-chains as proposed by Reinhart and Reuland (1993). They propose the following definition (42a) and condition on well-formedness (42a) for A-chains as used in reflexive environments:

(42a) Definition: A maximal A-chain is any sequence of (two or more) coindexed elements which is headed by an A-position and satisfies antecedent government.
(42b) General condition on A-chains: A maximal A-chain $<a_1, \ldots a_n>$ must contain exactly one link a_1 which is both [+R(eferentialy independent)] and case-marked (taken from Daniel Fox 1997: 2).

If we look at *operator* constructions as a kind of 'reverse A-chain', in which the link a_1 must be [-R], then the agreement problems are reasonably explained. The only difference is that reflexive pronouns may be underspecified for both gender and number, where *operators* seem only to be underspecified for gender, being specifically marked for number (usually [-plural] as we saw earlier with *each*).[17]

This can be seen more clearly if we take an example from Polish which has more robust morphological features for case and gender agreement than English:

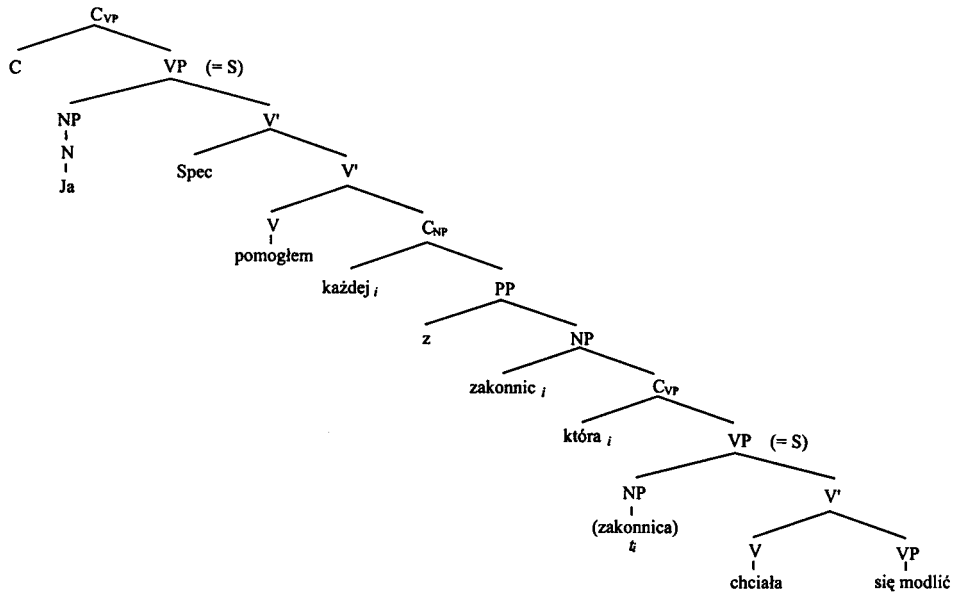
(43) Ja pomogłem każdej z zakonnic,
I helpedeach(sing, fem. dat.) of the nuns (pl. fem. gen.)

która chciała się modlić.
who (sing. fem. nom.) wanted (sing fem.) reflexive to pray.
'I helped each of the nuns who wanted to pray.'

In Polish the verb *pomóc* 'to help' assigns dative to its direct object, which is reflected in *każdej* being marked for dative. This indicates that it is indeed an A-position, and can be the head of the 'reverse A-chain'. The *operator* thus acquires gender features from the NP within its scope with which it holds a common index. In

[17] I would like to thank Piotr Ruszkiewicz for helping with the issue of whether number is specified or underspecified in *operators*.

(44)[18]

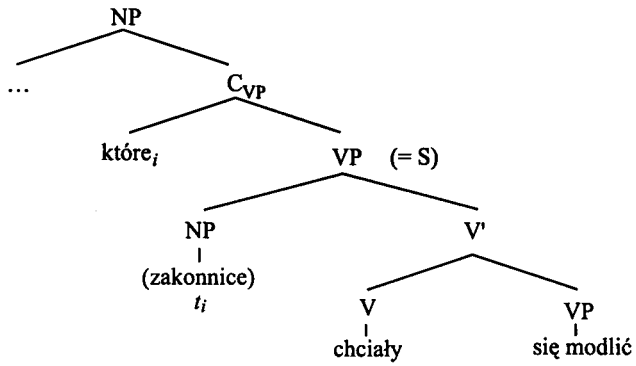


The head of C_{NP} has scope over the PP and the NP that it dominates.[19] The chain formed with the NP head and the C_{NP} allows features to be passed up the chain from the antecedent to the head. The C_{VP} also takes gender and number features from the NP in the subject position, which it dominates. This can be seen in the parallel structure:

[18] Some of the empty positions in this structure have been omitted to save space.

[19] The fact that in (44) C_{NP} dominates a PP can be explained by expanding Williams' analysis of some instances of *to* in English as being a *grammatical preposition* and not a *semantic preposition*. Under this analysis, *grammatical prepositions* are prepositions "that act as mere 'case markers' and lack semantic content" (Williams 1989: 448). As such, we can say that the partitive *z* in Polish is a grammatical preposition and thus only acts as a case marker in the structure. This analysis is supported by the fact that in Polish, the partitive *z* is only needed in noun phrases, verb phrases can form partitive constructions without an intervening preposition: *wypić mleka, przynieść mleka* etc. In these examples, the genitive case, indicating a partitive interpretation, is assigned without the mediation of a preposition.

(45)



Ja pomogłem każdej z zakonnic, które chciały się modlić.

in which the entire C_{VP} is in the plural (corresponding to the plural interpretation of the dominating clause). How exactly this occurs is not exactly clear, but it seems to be similar to English examples of strange agreement such as: *We saw two houses, and neither of them were interesting.*[20] However, this is not a problem related directly to the proposed Multiple Specifier structure, but to relative clause structure in general.

5. Conclusion

In conclusion, it can be seen that the observed parallels between noun phrases and clauses concerning structural and grammatical relations are not easily accounted for. None of the attempts to incorporate these observations into a coherent structure has been able to sufficiently explain the observations. However, when the GSPG approach, with its multiple-$\overline{V}$ structure is expanded to include multiple-$\overline{N}$ structures, it is capable of providing surprisingly coherent representations. If the category of C (C_{NP} and C_{VP}) is added to the structure as a kind of 'structural' category defining scope over NP and VP respectively, many agreement phenomena can also be accounted for. Furthermore, it seems to be very much in line with the Minimalist Program approach to linguistic structures. Especially, considering the importance of lexical information as the basis for the construction of X-bar structures in both the GSPG and Minimalist approaches. It is also interesting that the multiple-$\overline{V}$ and -$\overline{N}$ structures are so close to the *multiple-specifier* approach proposed in the Minimalist Program. Taking the Minimalist Program to heart, I feel that both lexical and functional structures should be kept to a minimum.

[20] While such a construction involving plural agreement and *neither* is not favored by speakers of British English, it is acceptable in many other dialects.

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