Chapter ?

Nominal structures

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1 Introduction

Nominal structures minimally contain a noun. That may be all there is, as in the subject of *oil is expensive*, but usually the noun is accompanied by one or more dependents. They can precede the noun, such as the article and the adjective in *the red box*, or follow the noun, such as the prepositional phrase and the relative clause in *books about WW I which are out of print*.

Such combinations are constrained by co-occurrence restrictions. An obvious one concerns the possibility of stacking. While a noun can be combined with more than one adjective or PP, as in *red wooden boxes* and *books on sale about WW II*, it cannot be combined with more than one article: **the a box*. In that respect, the articles belong to a group of words, known as determiners (Det), that also includes the demonstrative in *this box* and the interrogative in *which car*. The defining property of this group of words is that they are in complementary distribution with the articles: **the this/which box* and **this/which a box*. One way to model these observations is the rewrite rule in (1).

(1) NP → (Det) A* N PP* S* (where * is Kleene star)

This rule licenses flat structures in which the dependents are all sisters of the noun.

Applying some classical constituency tests, though, it turns out that there is evidence for a more hierarchical structure. The conjunction test, for instance, reveals that it is not only possible to conjoin full NPs, but also parts of NPs. In *every man above forty and woman under thirty*, for instance, *every* is combined with the nominal *man above forty and woman under thirty*. This suggests a binary branching structure in which the determiner is combined with the rest of the noun phrase, as in (2), quoted from Sag, Wasow and Bender (2003, 31–32).

(2) NP → (Det) Nom

Confirming evidence is provided by the pro-form replacement test. While personal pronouns are distributionally equivalent to full NPs, suggesting that they are

pro-NPs, there are also pro-forms which are distributionally equivalent to nominals without determiner, i.e. pro-Noms, such as the English *one* and its plural counterpart *ones* in (3).

(3) a. John took this apple$_i$ and Mary took that one$_i$.
b. John took these apples$_i$ and Mary took those ones$_i$.

The same tests provide evidence that the addition of adjectives and PPs had better be modeled in terms of binary branching rules too, as in (4), quoted from Levine (2017, 80).

(4) a. Nom → Adj Nom
b. Nom → Nom PP

This accounts for the fact that an adjective or PP can scope over a conjunction of Noms, as in (5), and that it can be followed, c.q. preceded, by the pro-Nom *one*, as in (6).

(5) a. the [former [French presidents and Spanish kings]]
b. the [[wooden tables and leather chairs] in this room]

(6) a. John bought the [old [box with the green lid]$_i$] and Mary bought the [new [one]$_i$].
b. John bought the [[wooden box]$_i$ with the green lid] and Mary bought the [[one]$_i$ with the blue lid].

Since the rules in (4) are recursive, they allow stacking. This is justified for PP modifiers, but not for PP complements, since their number is limited by the argument structure of the noun. The relational noun *sister*, for instance, takes at most one PP complement, as in *the sister of Leslie*. Modeling this requires a non-recursive rule, as in (7).

(7) Nom → N (PP)

The distinction is also relevant for clausal dependents. While clausal modifiers, such as relative clauses, can be stacked, clausal complements cannot. The deverbal noun *claim*, for instance, takes at most one clausal complement, as in *the claim that Brexit is inevitable*. To model this one can use the same kinds of rules as for the PP dependents, i.e. a recursive one for the modifiers anda non-recursive one for the complements.

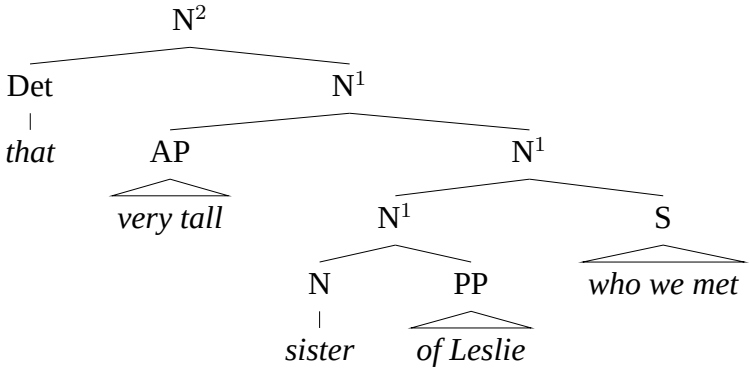
(8) a. Nom → Nom S
b. Nom → N (S)

The resulting set of rewrite rules fits the mold of X-bar syntax, as developed in Chomsky (1970) and Jackendoff (1977). Characteristic of X-bar syntax is that it does not employ category specific rewrite rules, but cross-categorial rule schemata. For any category X, where X initially ranged over the substantive categories V, N, A and P, there is a phrasal projection X^i, for $0 \leq i \leq 2$, which conforms to the rule schemata in (9).

(9) a. $X^2 \rightarrow$ Specifier X^1
b. $X^1 \rightarrow X^0$ Complements
c. $X^1 \rightarrow$ Modifier X^1
d. $X^1 \rightarrow X^1$ Modifier

A double-bar category X^2 consists of a specifier and the single-bar category X^1, and X^1 consists of the lexical category X^0 and its complements. Modifiers are recursively adjoined to X^1.[1] In transformational grammar the X-bar schemata are constraints on the rules which generate deep structures, but they also got adopted in non-transformational frameworks and applied to surface structures. An example is the analysis of the noun phrase in (10), quoted from Gazdar, Klein, Pullum and Sag (1985, 126), the standard reference for Generalized Phrase Structure Grammar (GPSG).

(10)



The noun phrase is analyzed as a projection N^i, in which the double-bar category N^2 (NP) consists of the determiner and the single-bar category N^1 (Nom), in which the AP and the relative clause are adjoined to N^1, and in which the lowest N^1 consists of the noun (N) and its PP complement.

For a presentation of the HPSG treatment of nominal structures we make a distinction between those that fit the mold of rule (1), henceforth called the regular nominals, and those that do not. They are discussed in sections 2 and 3 respectively.[2]

[1] In some versions of X-bar syntax modifiers can also be adjoined to X^2. There are also versions with more than two bar levels.

[2] Relative clauses will not be discussed. They are the topic of a separate chapter in this volume.

2 Regular nominals

The oldest HPSG analysis of nominal structures can be characterized as a lexicalist reformulation of the GPSG analysis. It is first proposed in Pollard and Sag (1987) and further developed in Pollard and Sag (1994) and Ginzburg and Sag (2000). We call it the specifier treatment, after the role which it assigns to the determiner. As such, it contrasts with the DP treatment, in which the determiner is considered to be the head of the nominal, as proposed in Netter (1994) and Netter (1996), and with the functor treatment, in which the distinction between specifiers and modifiers is eliminated, as proposed in Van Eynde (1998) and Allegranza (1998), and further developed in Van Eynde (2003), Van Eynde (2006) and Allegranza (2007).[3]

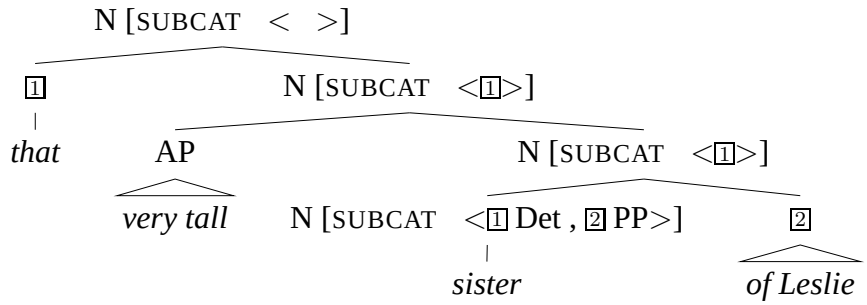
2.1 The specifier treatment

For the presentation of the specifier treatment we first focus on the nominals with a determiner and then on those without.

2.1.1 A lexicalist NP treatment

The first proposal to model the noun phrase in HPSG adopts the same kind of structure as in GPSG, but dispenses with the bar levels. The role of registering the degree of saturation is taken over by the valence feature SUBCAT. In the case of a relational noun, such as *sister*, the SUBCAT value contains a determiner and a PP. When the noun is combined with a matching PP, the PP-requirement is canceled from the SUBCAT list, and when it is combined with a determiner, the Det-requirement is canceled too, as illustrated in (11) (Pollard and Sag 1987, 139–143) and (Pollard and Sag 1994, 47–57).[4]

(11)



[3]The term *functor* is also used in categorial (unification) grammar, where it stands for the non-head daughter in combinations of a head with a specifier or a modifier, and for the head daughter otherwise, see (Bouma 1988). This broader notion of 'functor' is also used in (Reape 1994).

[4]The members of the SUBCAT list in (11) are ordered as in Pollard and Sag (1994), which is the mirror image of the order in Pollard and Sag (1987).

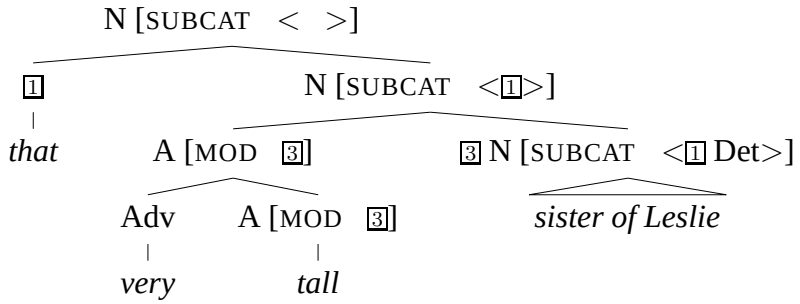
In this analysis a fully saturated nominal is one with an empty SUBCAT list. Since the members of a SUBCAT list are objects of type *synsem*, i.e. bundles of syntactic and semantic features, they are not only used to register the degree of saturation, but also to capture more specific co-occurrence restrictions, such as number agreement between noun and determiner (**that sisters*) and constraints on the category of the complement (PP vs. S).

In contrast to the determiner and the complements, the modifiers are not part of the SUBCAT value. This is justified in the sense that their addition has no effect on the degree of saturation of the nominal, but it also implies that one needs another device to model the co-occurrence restrictions between modifiers and their heads. The fact, for instance, that modifiers of nominals can be adjectival but not adverbial has to be captured in some other way. For this purpose early HPSG explored two approaches.

The first one is based on the assumption that a head selects its modifiers. To model this Pollard and Sag (1987, 161–168) employs a set valued feature, called ADJUNCTS, which specifies for some given word with what kind of modifiers it combines. The ADJUNCTS value of the noun *sister* in (11), for instance, contains an AP. Since ADJUNCTS is a HEAD feature, this value is shared with the phrase *sister of Leslie*, and matched with the category of the modifier.

The second approach is based on the assumption that a modifier selects its head. To model this Pollard and Sag (1994, 47–57) employs a feature called MOD(IFIED). It is part of the HEAD value of the substantive parts-of-speech, i.e. noun, verb, adjective and preposition. Its value is of type *synsem* in the case of modifying items and of type *none* otherwise. In the case of the adjective *tall* in (11), the MOD value consists of a nominal that has not yet been combined with a determiner ([HEAD *noun*, SUBCAT <Det>]). This value is shared with the AP *very tall*, as required by the Head Feature Principle, and matched with the SYNSEM value of its head sister, as illustrated in (12).

(12)



The constraint on the SUBCAT value of the selected nominal captures the fact that the AP cannot be combined with a fully saturated nominal, as in **very tall that sister of Leslie*. The incompatibility with adverbial modifiers is accounted for in the MOD value of the adverbs: They select a head that is not nominal.

The MOD feature is also used to model NP-internal agreement. For languages in which the adjectives show number and gender agreement with the nominal, such as Italian and French, the MOD value of the adjective captures the relevant co-occurrence restrictions. The MOD value of the Italian *rossa* 'red', for instance, contains the restriction that the modifed nominal be singular and feminine. This accounts for the fact that it is compatible with *scatola* 'box', but not with the plural *scatole* 'boxes', nor with the masculine *libro* 'book' or *libri* 'books'.

Parallel with the syntactic build-up is the semantic composition. This is modeled in terms of the CONTENT feature. For nominal phrases the relevant CONTENT value is called *nominal-object* in Pollard and Sag (1994) and *scope-object* in Ginzburg and Sag (2000). The latter also makes a distinction between scope-objects that contain a quantifier (*quant-rel*), and those that do not (*parameter*). A scope-object is an index-restriction pair in which the index stands for entities and in which the restriction is a set of facts which constrain the denotation of the index, as in (13).

(13)
$$\begin{bmatrix} \text{INDEX} & \boxed{1} \\ \text{RESTR} & \left\{ \begin{bmatrix} \text{RELN} & \textit{box} \\ \text{ARG} & \boxed{1} \end{bmatrix} \right\} \end{bmatrix}$$

This is comparable to the representations which are canonically used in Predicate Logic (PL), such as $\{x|\textit{box}\ (x)\}$. Attributive adjectives have similar CONTENT values. When combined with a noun, as in *red box*, the resulting representation should be one in which the indices of the adjective and the noun are identical, as in (14).

(14)
$$\begin{bmatrix} \text{INDEX} & \boxed{1} \\ \text{RESTR} & \left\{ \begin{bmatrix} \text{RELN} & \textit{red} \\ \text{ARG} & \boxed{1} \end{bmatrix}, \begin{bmatrix} \text{RELN} & \textit{box} \\ \text{ARG} & \boxed{1} \end{bmatrix} \right\} \end{bmatrix}$$

Also this is comparable to the PL practice of representing such combinations with one variable to which both predicates apply, as in $\{x|\textit{red}\ (x)\ \&\ \textit{box}\ (x)\}$. What triggers the index sharing is the MOD value of the adjective, as illustrated by the AVM of *red* in Pollard and Sag (1994, 55).

(15)
$$\begin{bmatrix} \text{CATEGORY} \mid \text{HEAD} \begin{bmatrix} \textit{adj} \\ \text{MOD} \quad \text{N'}: \begin{bmatrix} \text{INDEX} & \boxed{1} \\ \text{RESTR} & \boxed{2} \end{bmatrix} \end{bmatrix} \\ \text{CONTENT} \begin{bmatrix} \text{INDEX} & \boxed{1} \\ \text{RESTR} & \left\{ \begin{bmatrix} \text{RELN} & \textit{red} \\ \text{ARG} & \boxed{1} \end{bmatrix} \right\} \cup \boxed{2} \end{bmatrix} \end{bmatrix}$$

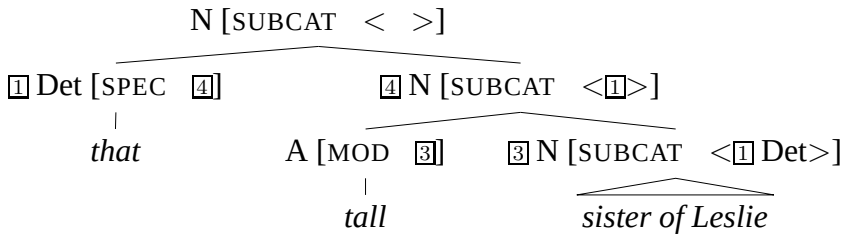
The adjective selects a nominal, shares its index and adds its own restriction to those that are already present in the nominal.[5] The resulting CONTENT value is then shared with the mother.

The addition of a quantifying determiner, such as *every*, triggers a type shift from *parameter* to *quant-rel*. This is modeled in terms of another selection feature, called SPEC(IFIED). It is assigned to the functional parts-of-speech, i.e. determiner and marker, and its value is of type *synsem*. In the case of *every*, for instance, the SPEC value contains a nominal whose CONTENT value is an index-restriction pair. This is integrated in the CONTENT value of the determiner, and the resulting quantifier is put in store, to be retrieved at the place where its scope is determined, as illustrated by the AVM of *every* in Ginzburg and Sag (2000, 204).[6]

(16)
$$\begin{bmatrix} \text{CATEGORY} \mid \text{HEAD} \begin{bmatrix} \textit{det} \\ \text{SPEC} \quad \text{N'}: \begin{bmatrix} \text{INDEX} & \boxed{1} \\ \text{RESTR} & \Sigma \end{bmatrix} \end{bmatrix} \\ \text{CONTENT} \quad \boxed{2} \begin{bmatrix} \textit{every-rel} \\ \text{INDEX} \quad \boxed{1} \\ \text{RESTR} \quad \Sigma \end{bmatrix} \\ \text{STORE} \quad \{\boxed{2}\} \end{bmatrix}$$

Adding the SPEC feature to (12) we get the structure in (17).

(17)



[5] N' stands for N-bar, i.e. a nominal with one element on its SUBCAT list, i.e. the determiner.

[6] *every-rel* is a subtype of *quant-rel*.

Just like the MOD feature, the SPEC feature also plays a role in the treatment of NP-internal agreement. Pollard and Sag (1994, 371–373), for instance, uses it to model the effect of declension class (*weak*, *strong*, *mixed*) on the inflection of prenominal adjectives in German.

2.1.2 Nominals without determiner

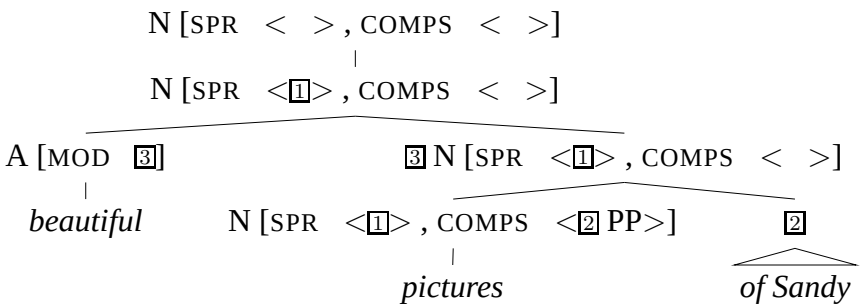
A complication for the specifier treatment concerns the existence of bare plurals and mass nouns. In contrast to singular count nouns, which can be said to require a determiner in languages like English, mass nouns and plurals may combine with a determiner, but they do not need to.

One way to accommodate this is to make the Det requirement in their SUBCAT list optional. This, however, complicates the treatment of the modifiers, for if the SUBCAT list of the mass noun in *water is a scarce commodity* is empty, then one has to allow the adjective in *fresh water* to combine with a nominal with an empty SUBCAT list, and in that case one also licenses the ill-formed combination **fresh the water*.

An alternative is "to employ phonetically empty determiners in bare plural and mass NPs." (Pollard and Sag 1994, 90) This preempts the need to tinker with the treatment of the modifiers, but it does not square well with the tendency in HPSG to avoid the use of empty elements.

Another alternative is the use of a non-branching rule, as proposed in Ginzburg and Sag (2000, 191–192). Such a rule licences a fully saturated nominal with one daughter in which the specifier is missing, as in (18).[7]

(18)



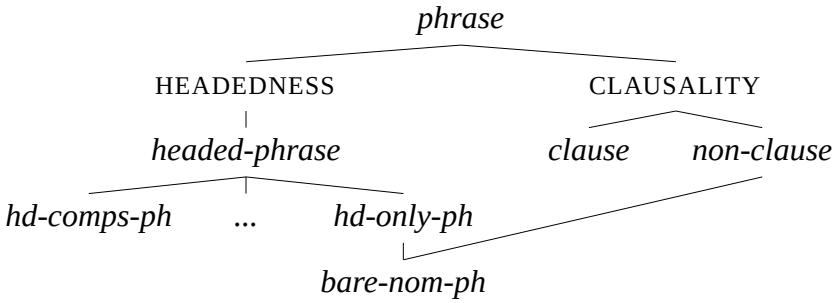
Innocent as this move may seem, it has far reaching consequences, since it involves a departure from the purely lexicalist approach of early HPSG. Characteristic of the purely lexicalist approach is that the properties of a phrase are fully

[7] In this analysis the SUBCAT feature is replaced by the more specific features SUBJ(ECT), SP(ECIFIE)R and COMP(LEMENT)S. The use of the more specific valence features is advocated in chapter 9 of Pollard and Sag (1994), following a proposal in Borsley (1987), and has become a matter of common practice since. The SUBJ feature is not mentioned in (18), since its value is the empty list throughout.

determined by the properties of the words which it contains, on the one hand, and by a small set of cross-categorial schemata, on the other hand. In less radical variants of lexicalism, phrases may have properties which derive from more specific constraints on phrase formation. Non-branching rules are an example of this.

To pave the way for an analysis of phenomena which resist a purely lexicalist treatment Sag (1997) introduced the idea of classifying phrases in terms of a bi-dimensional hierarchy. In such a hierarchy, the cross-categorial schemata are rephrased as constraints on types of phrases in one dimension, called HEADEDNESS, and complemented by possibly category-specific constraints on types of phrases in another dimension, called CLAUSALITY. Since the dimensions are orthogonal to one another, it is possible to define phrasal types by multiple inheritance, in the same way as this is done for the lexical types, see the chapter on the lexicon in this volume. The proposal was originally proposed for the analysis of relative clauses, but got extended to all types of clauses in Ginzburg and Sag (2000). The latter also contains a small inventory of non-clausal phrase types, including the one in (19).

(19)



The HEADEDNESS hierarchy is extended with a new type, called *head-only-phrase*, which subsumes headed phrases which have only got a head daughter. One of its subtypes is *bare-nominal-phrase*. It inherits the properties of its supertypes and has some properties of its own, spelled out in (29), quoted from Ginzburg and Sag (2000, 191).[8]

(20)
$$\left[\begin{array}{l} \textit{bare-nom-phrase} \\ \text{SYNSEM} \mid \text{CATEGORY} \mid \text{SPR} \ \langle\,\rangle \\ \\ \text{HEAD-DTR} \mid \text{SYNSEM} \mid \text{CATEGORY} \left[\begin{array}{l} \text{HEAD} \ \ \textit{noun} \\ \text{SPR} \ \left\langle \text{DET} \left[\text{WH} \ \{\,\}\right] \right\rangle \end{array}\right] \end{array}\right]$$

[8]We have taken the liberty of converting the rewrite rule format of Ginzburg and Sag (2000) into the AVM format.

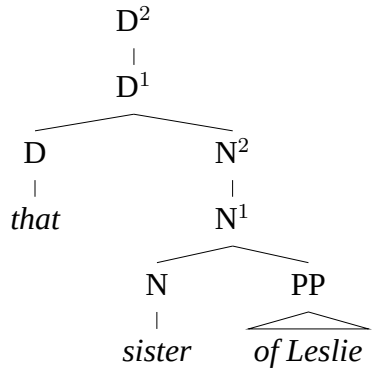
This type is category-specific and contains the extra requirement that the unexpressed determiner have an empty WH set.[9] Strange enough, the constraint does not include a restriction to plurals and mass nouns. That such a restriction is intended, though, is clear from the discussion of bare plurals and mass nouns in Sag et al. (2003, 265–266), where the formulation of the constraint is left as an exercise for the reader.

Summing up, the specifier treatment of bare plurals and mass nouns involves a departure from the purely lexicalist stance of early HPSG. This can take various forms, but the one that has stuck and that will also play a pivotal role in the treatment of idiosyncratic nominals in section 3 is based on the use of a bi-dimensional hierarchy of phrases, in which the maximal types may contain detailed category-specific constraints, either by inheritance or by declaration.

2.2 The DP treatment

The departure from pure lexicalism did not appeal to Klaus Netter. He proposed an alternative, aiming for "the theoretical rigor we can derive from forbidding unary rules for category transformation or unmotivated empty terminals." (Netter 1994, 321) This alternative takes some inspiration from a development in transformational grammar: While the X-bar principles were initially meant for verbs, nouns and adjectives (V, N, A) and somewhat later for prepositions (P), it became common practice during the eighties to apply them to all categories, including the functional ones, such as complementizer (C) and determiner (D). In this style of analysis, determiners are lexical heads (D) which take a nominal projection as their complement and which yield a DP, as in (21) (Abney 1987).[10]

(21)



This style of analysis is widely known as the DP treatment and was taken on board in a number of non-transformational frameworks, such as Word Grammar

[9] WH registers the presence of *wh*-words in a sign. It is used to model pied piping effects.

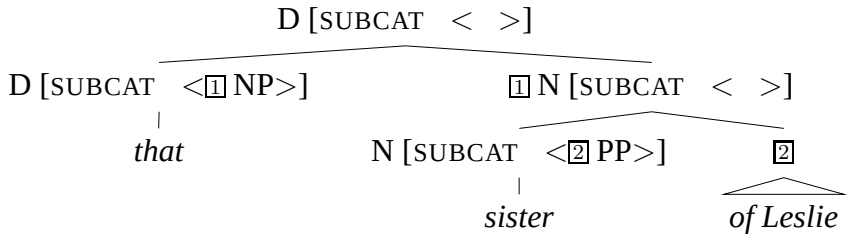
[10] Modifiers are recursively adjoined to N^1 or N^2.

(Hudson 1990) and Lexical Functional Grammar (Bresnan 2001, 99). Klaus Netter took it as the starting point for an HPSG analysis of the noun phrase, described in (Netter 1994) and (Netter 1996).

2.2.1 A lexicalist DP treatment

For a noun phrase that includes a determiner, Netter proposes a structure like (24).

(22)



The determiner *that* has an NP on its SUBCAT list, and this requirement is canceled after the combination with a determinerless nominal, in the same way as the requirement of *sister* for a PP complement is canceled after the combination with *of Leslie*. The similarity between the complementation of functional and substantive categories, which is highlighted in transformational grammar, is however downplayed by Netter. He makes a distinction between functional complementation and ordinary complementation, and defines the former as follows (Netter 1994, 311–312).

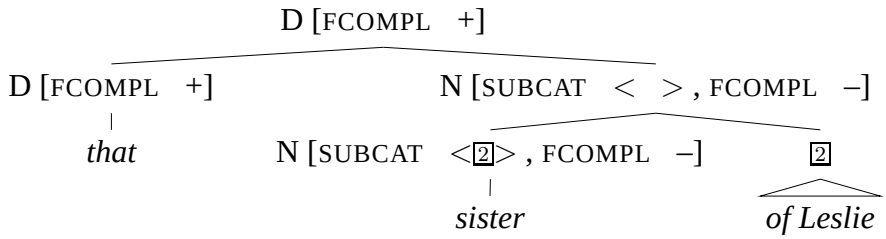
(23) In a lexical category of type *func-cat* the value of its MAJOR attribute is token identical with the MAJOR value of its complement.

The MAJOR attribute is part of the HEAD value of all signs. It includes the boolean features N and V. As in X-bar syntax, nouns are [+N, –V], adjectives are [+N, +V], verbs are [–N, +V], and prepositions are [–N, –V]. In [+N] signs, the MAJOR value also includes the agreement features CASE, NUMBER and GENDER. Since the MAJOR value of a nominal is shared with the determiner and –given the Head Feature Principle– with the determiner phrase, it is accessible for external selectors, in the same way as in an analysis which treats the noun as the head of the nominal. This is obviously different from ordinary complementation: The noun *sister* in (24), for instance, does not share the MAJOR value of its PP complement.

Beside the MAJOR attribute, the HEAD values also have a MINOR attribute. It is used to model properties which a function word does *not* share with its complement. It includes FCOMPL, a boolean feature which registers whether a projection is functionally complete or not. Its value is positive for determiners, negative for singular count nouns and underspecified for plurals and mass nouns. Determiners select a nominal with a negative FCOMPL value, and are hence compatible with singular count nouns, as well as with plurals and mass nouns, but not

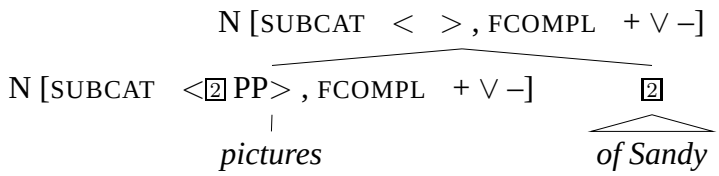
with nominals that have a positive FCOMPL value. In this analysis, a nominal is complete, if it is both saturated (empty SUBCAT list) and functionally complete (positive FCOMPL).

(24)



For the analysis of bare plurals and mass nouns Netter does not add a phonetically empty determiner, as in the transformational DP treatment. Instead, he assumes that such nominals are headed by the noun, as in (25).

(25)



The resulting nominal has an empty SUBCAT list, but its FCOMPL value is underspecified. To turn this into the positive value, Netter adds a type, called *dp*, to the hierarchy of SYNSEM values and declares it to be both saturated and functionally complete. Unification of this type with the SYNSEM value of *pictures of Sandy* then results in a phrase with a positive FCOMPL value.

To model the adjectival modifiers, Netter uses the same MOD feature as (Pollard and Sag 1994). In terms of this feature an adjective can require its head sister to be nominal and impose further constraints on its agreement features (CASE, NUMBER and GENDER), if needed. The selected nominal must have an empty SUBCAT list, but its FCOMPL value cannot be required to be negative, since it should be allowed to add an adjective to a bare plural or a mass noun, as in *beautiful pictures of Sandy*. At the same time, the adjectives should not be allowed to combine with a nominal that contains a determiner, as in **fresh the water*. To model this Netter adds another MINOR feature, called SPEC(IFIED), which registers whether a nominal contains a determiner ([SPEC +]) or not ([SPEC –]). Nouns are assigned the negative value in the lexicon, and since SPEC is a HEAD feature, this value is shared throughout its phrasal projection. Determiners, by contrast, are assigned the positive value. As a result, combinations like **fresh the water* are excluded, if the MOD value of the adjectives includes the requirement that the selected head be [SPEC –].

2.2.2 A comparison with the specifier treatment

In a comparison of his analysis with the one of Pollard and Sag (1994) Klaus Netter emphasizes that his is more in line with the lexicalist surface-oriented spirit of HPSG, since it avoids the use of unary rules and empty elements. His alternative involves:

- the introduction of a hierarchy of *synsem* objects, including a type, called *dp*, which is declared to be a fully saturated and functionally complete nominal, and
- the assumption that the SYNSEM value of a determinerless nominal is unified with *dp*, so that it is functionally complete.

The result is that nominals which exclusively consist of a noun, such as the subject in *oil is expensive* are of type *dp*, just like nominals which contain a determiner. It might be wondered whether this scores any higher on the scale of theoretical rigor than a non-branching rule, but given the absence of such a scale, the matter is admittedly undecidable.

A more serious issue concerns the notion of functional complementation, as defined in (23). If determiners share the N and V values of the nominals which they select, then it follows that they are nouns ([+N, –V]), but this is at odds with the fact that many determiners share more properties with adjectives ([+N, +V]) than with nouns. The Italian demonstrative *questo* 'this', for instance, shows the same variation for number and gender as the adjective *rosso* 'red', and the same holds m.m. for the German determiners *dieser* 'this', *jeder* 'every' and *welcher* 'which'. A similar remark applies to the agreement features. The claim that they are shared between the determiner and its nominal complement is problematic for nominals with a genitive determiner, as in the Dutch *wiens huis* 'whose house' and *'s werelds hoogste berg* 'the highest mountain of the world'. These genitives are in complementary distribution with the articles and are, hence, determiners, but they do not share the CASE value of their nominal sister. In this respect, the specifier treatment fares better, since it does not require determiners to share the part-of-speech nor the CASE value of their nominal sister.

2.3 An intermezzo on NP completeness

What the specifier treatment and the DP treatment have in common is the assumption that a nominal must be complete to be fit for use in context. Netter affirms this explicitly: "we assume that all substantive categories will require the complement they combine with to be both saturated and functionally complete." (Netter 1994, 311). The question is whether this is correct.

To probe the matter, let us take the German prepositions *an, in, von, bei* and *zu*. They have an alternate form which diachronically results from the incorporation of a dative form of the definite article (*dem*), as in *am, im, vom, beim* and *zum*. In a lexicalist framework these count as syntactic atoms, just like the forms without incorporated article, but in contrast to the latter they require their complement to lack a determiner: *in dem Zimmer* 'in the room' vs. *im (*dem) Zimmer* 'in.the (*the) room'. The phenomenon also exists in Italian, where the prepositions *a, da, su, di* and *in* have alternate forms with an incorporated form of the definite article, as in *allo, dallo, sullo, dello* and *nello*, each with feminine and plural counterparts (*alla, agli, alle, dalla, dagli, dalle, ...*). Also here, the alternate forms require a nominal without determiner, as shown by the contrast between *in questo palazzo* 'in this palace' and *nello (*questo) palazzo* 'in.the (*this) palace'. Moreover, there are prepositions which do not contain an incorporated article, but which nonetheless require a determinerless nominal. The Dutch *te* and *per*, for instance, are not compatible with nominals that contain a determiner, even if the nominal is singular and count, as in *te (*het/een) paard* 'on horse' and *per (*de/een) trein* 'by train'. This must be due to a lexical property of these prepositions, since most other prepositions require such nominals to have a determiner, as in *ze viel van *(het/een) paard* 'she fell from *(the/a) horse' and *ze zit op *(de/een) trein naar Londen* 'she is on *(the/a) train to London'. Taking stock, German, Italian and Dutch have prepositions which require their nominal complement to be functionally incomplete (in Netter's terms) or unsaturated (in Pollard & Sag's terms).

Further doubt is cast by the existence of prepositions and verbs which do not require their complement to contain a determiner, also if that complement is singular and count. The Dutch prepositions *met* 'with', *zonder* 'without' and *als* 'as', for instance, are compatible with a determinerless singular count noun, as shown in *een huis met garage* 'a house with garage', *een huis zonder dak* 'a house without roof' and *ze heeft een krokodil als huisdier* 'she has a crocodile as a pet'. The same holds for the Dutch and German copular verbs, as illustrated by *Henk wordt leraar* 'Henk becomes a teacher' and *Hans ist Lehrer* 'Hans is a teacher', respectively.

What these data suggest is that there is no context-independent norm for determining whether a nominal is fit for use in context. Instead, different external selectors require or allow different degrees of saturation. In this respect, the combination of a determiner with a nominal is more like the combination of a complementizer with a clause. Whether a clause needs a complementizer does not depend on any properties of the clause itself, but on exigencies of external selectors and other contextual factors. This is the rationale behind the third style of analysis, known as the functor treatment.

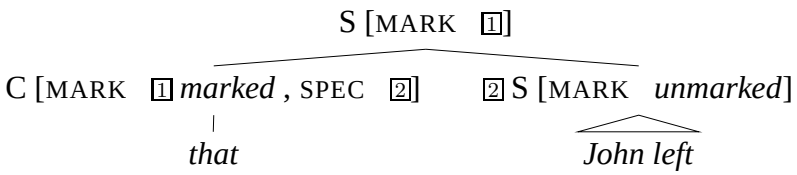
2.4 The functor treatment

As in the presentation of the specifier treatment we first focus on the nominals with a determiner and then turn to those without.

2.4.1 Basics

The functor treatment differs from the specifier treatment and the DP treatment in two respects. The first concerns the registration of the degree of saturation of a nominal. This is not done by a valence feature, such as SUBCAT or SPR, nor by a boolean HEAD feature, such as FCOMPL, but by the feature that is used to model the addition of complementizers in Pollard and Sag (1994, 46), i.e. MARK(ING).

(26)



The complementizer selects an unmarked clause as its head sister and has a MARKING value of type *marked* which it shares with the mother. The latter is, hence, a marked clause and cannot be combined with another complementizer.[11]

The second difference concerns the elimination of the distinction between substantive and functional categories. Van Eynde (2006), for instance, argues that the words which are used as determiners in Dutch are a heterogeneous lot which includes adjectives, pronouns and common nouns. The argumentation is based on inflectional variation and NP-internal agreement. While determiners like *ons* 'our', *welk* 'which' and *elk* 'each' show the same inflectional variation and the same morphosyntactic agreement with the noun as prenominal adjectives, there are other determiners which inflect like pronouns, such as *dat* 'that', *wiens* 'whose' and the quantifying *wat* 'some', and which do not show morphosyntactic agreement with the noun, but either index agreement or no agreement. From this perspective, adjectives cannot only be used as modifiers, but also as specifiers, and pronouns cannot only be used as complements or subjects, but also as specifiers. Technically, the elimination of the distinction between substantive and functional categories implies that there is no need to use separate features for the selection by substantive categories (MOD) and the selection by functional categories (SPEC). Instead, the functor treatment employs one feature, called SEL(ECT), that models the selection of heads by their non-head sister. It is part of the HEAD value of all signs, and its value is either of type *synsem* or *none*.

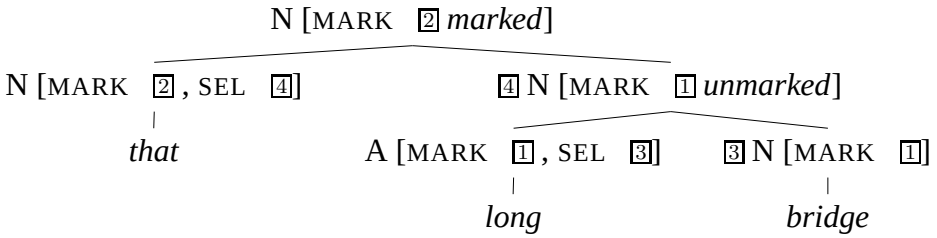
[11] In combinations which are not of type *head-marker* the MARKING value is shared with the head daughter. The one of *John left*, for instance, is shared with the verb *left*.

The consequence of these two changes is that the distinction between modifiers, specifiers and markers is neutralized. Since they are not selected by the head and since they select their head sister in the same way, there is no need for separate schemata to model them. Instead, there is one type of headed phrase that subsumes them all, spelled out in (27).

(27)
$$\begin{bmatrix} \textit{head-functor-phrase} \\ \text{SYNSEM} \mid \text{CATEGORY} \mid \text{MARKING} \quad \boxed{2}\ \textit{marking} \\ \text{HEAD-DTR} \quad \boxed{3}\begin{bmatrix}\text{SYNSEM} \quad \boxed{1}\ \textit{synsem}\end{bmatrix} \\ \text{DAUGHTERS} \quad \left\langle \begin{bmatrix} \text{SYNSEM} \mid \text{CATEGORY} \begin{bmatrix} \text{HEAD} \mid \text{SELECT} \quad \boxed{1} \\ \text{MARKING} \quad \boxed{2} \end{bmatrix} \end{bmatrix}, \boxed{3} \right\rangle \end{bmatrix}$$

An illustration is given in (28).

(28)



The common noun *bridge* has the value *unmarked* in the lexicon. The adjective *long* selects an unmarked nominal, shares its MARKING value, and, being a functor, shares it with the mother as well. The pronoun *that* also selects an unmarked nominal, but does not share its MARKING value. Instead, it has a MARKING value of type *marked*, which it shares with the mother. The discrepancy between its own MARKING value and the MARKING value of the selected nominal accounts for the fact that determiners cannot be stacked. Moreover, it also accounts for the ill-formedness of combinations like **fresh the water*, since adjectives like *fresh* select an unmarked nominal.

Nominals which do not combine with a determiner, such as the pronouns, are inherently marked. This implies that nominals which contain a pronominal functor are marked as well. This is in fact what happens in (28), where the demonstrative pronoun is used as a functor.

Adjectives are unmarked, just like the nominals which they select, except for those that are in complementary distribution with the articles. These include amongst others the Italian demonstratives *questo* 'this' and *quello* 'that', the German *dieser* 'this', *jeder* 'each' and *welcher* 'which', and the Dutch *ons* 'our', *elk*

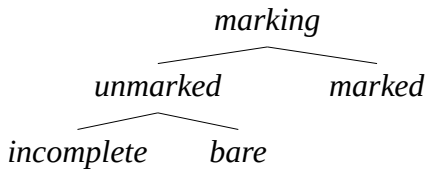
'each' and *welk* 'which'. They are marked, just like the articles and the pronominal functors. Whether an adjective is marked or unmarked is subject to considerable variation. The Italian possessives, for instance, are unmarked and hence compatible with an article, as in *il suo cane* 'the his dog' and *un mio amico* 'a my friend', but the French possessives are marked: *(*la) ma maison* '(*the) my house' and *(*un) mon ami* '(*a) my friend'.

2.4.2 Nominals without determiner

In the functor treatment, a fully saturated nominal is one with a MARKING value of type *marked*. Nominals with a value of type *unmarked* are not fully saturated, but —in contrast to what is done in the specifier treatment and the DP treatment— no measures are taken to make them look fully saturated. In fact, this would be pointless since there are contexts in which nominals are explicitly required to be unmarked, as shown in section 2.3.

Still, there do exist combinations which are inherently incomplete without determiner. An example is provided by the prenominal adjectives of Dutch. They come in two forms: the base form, such as *warm* 'warm', and the declined form, such as *warme* 'warm.DCL'. In nominals which do not contain a definite determiner, the base form is used in combination with singular neuter nouns, as in *(een) warm brood* '(a) warm bread', and the declined form is used in combination with singular non-neuter and plural nouns, as in *(een) warme koffie* '(a) warm.DCL coffee' and *warme dagen* 'warm.DCL days'. In nominals which contain a definite determiner, it is the declined form that is used throughout, also in combination with singular neuter nouns, as in *het warme brood* 'the warm.DCL bread'. This has consequences for the status of determinerless nominals with a singular neuter head: *warm brood* 'warm bread' and **warme brood* 'warm.DCL bread', for instance, are both unmarked, but while the former is well-formed, the latter is not. To model this the hierarchy of MARKING values is extended.

(29)



Employing the more specific subtypes of *unmarked*, the declined adjectives which select a singular non-neuter or plural nominal have the value *bare*, while their homophonous counterparts which select a singular neuter nominal have the value *incomplete*. The MARKING value of a nominal which is introduced by the former is, hence, resolved to *bare*, and that of a nominal which is introduced by the latter to *incomplete*. For example, *warme koffie* 'warm coffee' is bare, but **warme*

brood is incomplete. The fact that definite determiners are compatible with incomplete nominals while other determiners are not is modeled by their SELECT value: While the former select an unmarked nominal, the latter select a bare nominal. This accounts for the contrast between *het warme brood* 'the warm.DCL bread' and **een warme brood* 'a warm.DCL bread'.

Summing up, the functor treatment does not require a nominal to be fully saturated, functionally complete or marked. This is not only unnecessary, given the data in section 2.3, it also preempts the need for such non-lexicalist devices as empty determiners and non-branching rules.

2.5 Conclusion

We have presented three approaches to the analysis of nominals in HPSG. The specifier treatment is the oldest and has long been considered to represent the mainstream, as is clear from the integration in textbooks, such as Borsley (1996), Sag et al. (2003) and Levine (2017). The DP treatment was shortlived. The functor treatment is increasingly used for the analysis of nominals with idiosyncratic properties, as in (Maekawa 2015), (Maekawa 2016) and the references in section 3. It has also been adopted in Sign-Based Construction Grammar (Sag 2012).

3 Idiosyncratic nominals

This section focusses on the analysis of nominals which do not fit the mold of (1), repeated in (30).

(30) NP → (Det) Adj* N PP* S* (where * is Kleene star)

Since there are many such nominals it is not possible to give a complete survey. Instead we will discuss two in some detail, i.e. the verbal gerunds (3.1) and the big mess construction (3.2), and add a brief survey of other idiosyncratic nominals (3.3).

3.1 Verbal gerunds

The assumption that nominal structures minimally contain a noun is challenged by the existence of verbal gerunds. Some examples are given in (31–33), quoted from Quirk, Greenbaum, Leech and Svartvik (1985, 1290).

(31) *Brown's deftly painting his daughter* is a delight to watch.

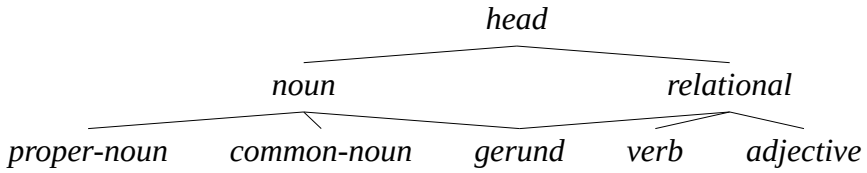
(32) I dislike *Brown painting his daughter*.

(33) Brown is well known for *painting his daughter*.

The italicized phrases have the external distribution of an NP, taking the subject position in (31), the direct object position of a transitive verb in (32) and the complement position of a preposition in (33). Their internal structure, though, is that of a verbal projection: The complement of *painting* takes the form of an NP, rather than of a PP, and its modifier in (31) is an adverb, rather than an adjective. The subject can be a genitive NP, as in (31), or an accusative NP, as in (32). It can also be absent, as in (33).

To model this mixture of nominal and verbal characteristics Robert Malouf introduces a separate part-of-speech for the verbal gerund. It is a subtype of *noun*, on the one hand, and of *relational*, on the other hand (Malouf 2000, 65).

(34)



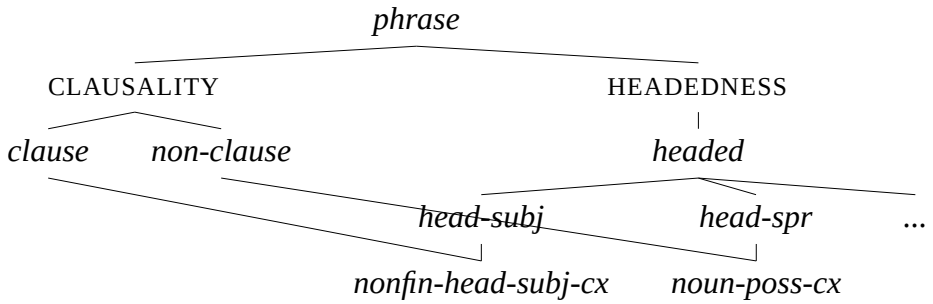
The distinctive properties of this mixed category are spelled out in a lexical rule which derives gerunds from the homophonous present participles (Malouf 2000, 66).

(35)

$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{VFORM} \quad \textit{prp} \end{bmatrix} \\ \text{SUBJ} & \left\langle \boxed{1}\ \text{NP} \right\rangle \\ \text{COMPS} & \boxed{2} \\ \text{SPR} & \left\langle\ \right\rangle \end{bmatrix} \Rightarrow \begin{bmatrix} \text{HEAD} & \textit{gerund} \\ \text{SUBJ} & \left\langle \boxed{1}\ \text{NP} \right\rangle \\ \text{COMPS} & \boxed{2} \\ \text{SPR} & \left\langle \boxed{1}\ \text{NP} \right\rangle \end{bmatrix}$$

The fact that gerunds take the same kind of complements as the verbs from which they are derived is captured by the token-identity of the COMPS value (2), and the compatibility with adverbial modifiers follows from the fact that adverbs typically modify objects of type *relational*. The availability of different options for realizing the subject is captured by the inclusion of the subject requirement of the present participle in both the SUBJ list and the SPR list of the gerund. To model the two options Malouf (2000, 15) employs a bi-dimensional hierarchy of phrase types, similar to the one of Ginzburg and Sag (2000).

(36)



The combination with an accusative subject is subsumed by a subtype of *head-subject*, and the one with a genitive subject by a subtype of *head-specifier* (o.c., 16).

(37)
$$\begin{bmatrix} \textit{nonfin-head-subj-cx} \\ \text{SYNSEM} \mid \text{CATEGORY} \mid \text{HEAD} \mid \text{ROOT} \quad - \\ \text{NON-HD-DTR} \mid \text{SYNSEM} \mid \text{CATEGORY} \mid \text{HEAD} \begin{bmatrix} \textit{noun} \\ \text{CASE} \quad \textit{acc} \end{bmatrix} \end{bmatrix}$$

(38)
$$\begin{bmatrix} \textit{noun-poss-cx} \\ \text{SYNSEM} \begin{bmatrix} \text{CATEGORY} \mid \text{HEAD} \quad \textit{noun} \\ \text{CONTENT} \quad \textit{nom-obj} \end{bmatrix} \\ \text{NON-HD-DTR} \mid \text{SYNSEM} \mid \text{CATEGORY} \mid \text{HEAD} \begin{bmatrix} \textit{noun} \\ \text{CASE} \quad \textit{gen} \end{bmatrix} \end{bmatrix}$$

(37) triggers the cancelation of the SUBJ requirement, being a subtype of *head-subj*, and denotes a parametrized state-of-affairs (*psoa*), being a subtype of *clause*. The clause is stipulated to be a non-root clause with an accusative subject. Its syntactic category is the maximal projection of *gerund* (VGERP) and since this is a subtype of *noun*, the clause is also a nominal phrase. This accounts for the fact that its external distribution is that of an NP. The construction in (38) triggers the cancellation of the SPR requirement, being a subtype of *head-spr*. It denotes a nominal object, i.e. an index-restriction pair, and its specifier is required to be genitive.

In sum, Malouf's analysis of the verbal gerund involves the postulation of a mixed type in the part-of-speech hierarchy and of two construction types in the phrase type hierarchy.

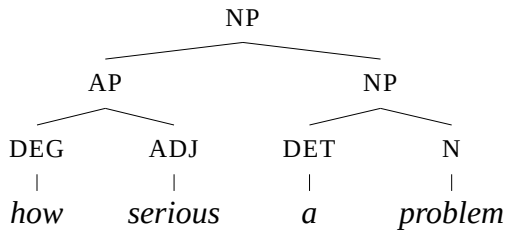
3.2 The Big Mess Construction

The assumption that adjectives follow the determiner is challenged by the italicized nominals in (39).

(39) a. *How serious a problem* is this?
b. It's *so good a bargain* I can't resist buying it.

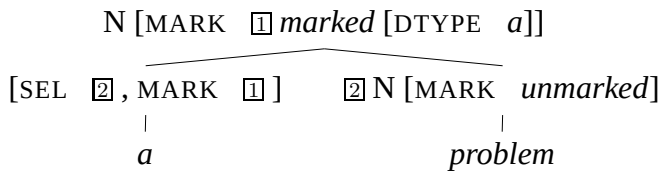
This order is only possible —c.q. required— if the nominal is introduced by the indefinite article, and if the AP is introduced by one of a small set of degree markers, including *how, so, as, this, that* and *too*. The construction is known as the Big Mess Construction (BMC), a term coined by Berman (1974). Its internal structure is canonically assumed to be as in (40). See a.o. Bresnan (1973, 308), Van Eynde (2007, 425), Kim and Sells (2011, 353), Kay and Sag (2012, 240), Arnold and Sadler (2014, 51) and Van Eynde (2018).[12]

(40)



The AVM of the lower NP must contain some trace of the indefinite article, since that is needed to model the formation of the higher NP. Working within the functor treatment, Van Eynde (2018) adds a feature, called DTYPE, for this purpose. One of its possible values is *a*, and since it is made part of the MARKING value, its value is shared between the determiner and the NP, as spelled out in (41).[13]

(41)

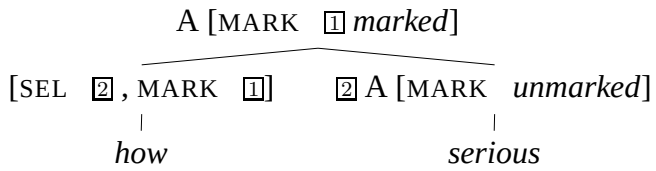


The AP is treated as another instance of the head-functor type in Van Eynde (2007), Kim and Sells (2011) and Van Eynde (2018). In this analysis, the adverb has a MARKING value of type *marked*, so that the AP is marked as well, as shown in (42).

[12] An alternative analysis is provided in Ginzburg and Sag (2000, 201), where the AP is treated as a sister of the determiner.

[13] The DTYPE value of the article looks similar to its PHON value, but it is not the same. *A* and *an*, for instance, have different PHON values, but the same DTYPE value.

(42)



In combination with the fact that determiners select an unmarked nominal, this accounts for the ill-formedness of (43).

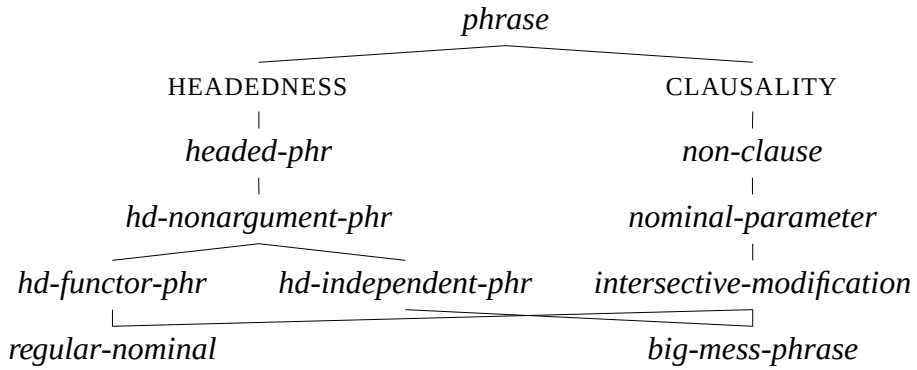
(43) a. * A how serious problem is it?
b. * It's a so good bargain I can't resist buying it.

By contrast, adverbs like *very* and *extremely* are unmarked, so that the APs which they introduce are admissible in post-determiner position, as in (44).

(44) a. This is a very serious problem.
b. We struck an extremely good bargain.

The challenge at this point is the combination of the AP with the lower NP. An obvious way to model it is by means of a selection feature in the AP whose value is an NP that is introduced by the indefinite article. However, no matter whether ones choose the MOD feature for that purpose or the SELECT feature, since these are HEAD features, their value is shared between the AP and the adjective, so that the latter has the same SELECT value as the AP, erroneously licensing such combinations as **good a bargain*. As an alternative Van Eynde (2018) exploits the possibilities of the bi-dimensional hierarchy of phrase types in (45).

(45)



The top layer of the hierarchy is the same as in (19) and (36), quoted from Ginzburg and Sag (2000) and Malouf (2000) respectively, but there are differences at the level of the intermediate and the maximal types.

Starting with the inventory of headed phrases the basic dichotomy is that between phrases in which the head daughter selects its non-head sister(s) (*head-argument-phrase*) and phrases in which the head daughter does not select its

non-head sister(s) (*head-nonargument-phrase*). In the former the degree of saturation is registered by the valence features, while the MARKING value remains unchanged. In the latter, the degree of saturation is registered by the MARKING value, while the values of the valence feature remain unchanged. This is spelled out in (46).

(46)
$$\begin{bmatrix} \textit{head-nonarg-phrase} \\ \text{SYNSEM} \mid \text{CATEGORY} \mid \text{MARKING} \quad \boxed{1}\ \textit{marking} \\ \text{DTRS} \quad \left\langle \left[\text{SYNSEM} \mid \text{CATEGORY} \mid \text{MARKING} \quad \boxed{1} \right], \boxed{2} \right\rangle \\ \text{HEAD-DTR} \quad \boxed{2} \end{bmatrix}$$

Within the head-nonargument phrases a further distinction is made between the phrases in which the non-head daughter selects its head sister, and the phrases in which the non-head daughter does not select its head sister. The former are the head-functor phrases; the latter are the head-independent phrases.[14]

(47)
$$\begin{bmatrix} \textit{head-functor-phrase} \\ \text{DTRS} \quad \left\langle \left[\text{SYNSEM} \mid \text{CATEGORY} \mid \text{HEAD} \mid \text{SELECT} \quad \boxed{1} \right], \boxed{2} \right\rangle \\ \text{HEAD-DTR} \quad \boxed{2} \left[\text{SYNSEM} \quad \boxed{1}\ \textit{synsem} \right] \end{bmatrix}$$

(48)
$$\begin{bmatrix} \textit{head-independent-phrase} \\ \text{DTRS} \quad \left\langle \left[\text{SYNSEM} \mid \text{CATEGORY} \mid \text{HEAD} \mid \text{SELECT} \quad \textit{none} \right], \boxed{1} \right\rangle \\ \text{HEAD-DTR} \quad \boxed{1} \end{bmatrix}$$

Head-independent phrases are, hence, phrases in which neither daughter lexically selects the other.

Turning to the CLAUSALITY dimension, the hierarchy of non-clausal phrases mainly captures semantic and category-specific properties, in analogy with the hierarchy of clausal phrases in Ginzburg and Sag (2000). One of the non-clausal phrase types is *nominal-parameter*, as spelled out in (49).

[14] This type is first mentioned in Van Eynde (1998, 130).

(49)
$$\left[\begin{array}{l} \textit{nominal-parameter} \\ \textsc{synsem}\left[\begin{array}{l} \textsc{category}\,|\,\textsc{head}\quad \textit{noun} \\ \textsc{content}\left[\begin{array}{l} \textit{parameter} \\ \textsc{index}\quad \boxed{1}\,\textit{index} \\ \textsc{restr}\quad \Sigma_1 \cup \Sigma_2 \end{array}\right] \end{array}\right] \\ \textsc{dtrs}\quad \left\langle \left[\textsc{synsem}\,|\,\textsc{content}\,|\,\textsc{restr}\quad \Sigma_1\right], \boxed{2} \right\rangle \\ \textsc{head-dtr}\quad \boxed{2}\left[\textsc{synsem}\,|\,\textsc{content}\left[\begin{array}{l} \textit{parameter} \\ \textsc{index}\quad \boxed{1} \\ \textsc{restr}\quad \Sigma_2 \end{array}\right]\right] \end{array}\right]$$

The mother shares its index with the head daughter (1) and its RESTR(ICTION) value is the union of the RESTR values of the daughters (Σ_1 and Σ_2). In the hierarchy of non-clausal phrases, this type contrasts amongst others with the quantified nominals, which have a CONTENT value of type *quant-rel* (Ginzburg and Sag 2000, 203–205). A subtype of *nominal-parameter* is *intersective-modification*, as defined in (50).

(50)
$$\left[\begin{array}{l} \textit{intersective-modification} \\ \textsc{synsem}\,|\,\textsc{content}\,|\,\textsc{index}\quad \boxed{1}\,\textit{index} \\ \textsc{dtrs}\quad \left\langle \left[\textsc{synsem}\,|\,\textsc{content}\,|\,\textsc{index}\quad \boxed{1}\right], \boxed{2} \right\rangle \\ \textsc{hd-dtr}\quad \boxed{2} \end{array}\right]$$

This constraint requires the mother to share its index with the non-head daughter. It captures the intuition that the noun and its non-head sister apply to the same entities, as in the case of *red box*. Another subtype of *nominal-parameter* is *inverted-predication*, which subsumes amongst others the binominal noun phrase construction and certain types of apposition (see 3.3).

The maximal types inherit properties of one of the types of headed phrases, on the one hand, and of one of the non-clausal phrase types, on the other hand. Regular nominals, for instance, such as *red box*, are subsumed by a type, called *regular-nominal*, that inherits the constraints of *head-functor-phrase*, on the one hand, and *intersective-modification*, on the other hand. Beside the inherited properties, there are no other other constraints on this type. Another maximal type is *big-mess-phrase*. Its immediate supertype in the CLAUSALITY hierarchy is the same as for the regular nominals, but the one in the HEADEDNESS hierarchy is different. Being a subtype of *head-independent-phrase*, its non-head daughter does not select the head-daughter. Another difference concerns the fact that the big

mess construction has several properties that are not inherited from its supertypes. They are spelled out in (51).

(51)
$$\left[\begin{array}{l} \textit{big-mess-phrase} \\ \textsc{dtrs} \left\langle \left[\begin{array}{l} \textit{hd-functor-phr} \\ \textsc{synsem}\,|\,\textsc{category} \left[\begin{array}{ll} \textsc{head} & \textit{adjective} \\ \textsc{marking} & \textit{marked} \end{array}\right] \end{array}\right], \boxed{1} \right\rangle \\ \textsc{head-dtr} \ \boxed{1} \left[\begin{array}{l} \textit{regular-nominal} \\ \textsc{synsem}\,|\,\textsc{category}\,|\,\textsc{marking} \left[\begin{array}{ll} \textit{marked} & \\ \textsc{dtype} & \boxed{2}\,a \end{array}\right] \end{array}\right] \end{array}\right]$$

The head daughter is required to be a marked regular nominal whose DTYPE value is *a*, and the non-head daughter is required to be an adjectival head-functor phrase with a MARKING value of type *marked*. This licenses APs which are introduced by a marked adverb, as in *so good a bargain* and *how serious a problem*, while it excludes unmarked APs, as in **good a bargain* and **very big a house*. Iterative application is not licensed, since (51) requires the head daughter to be of type *regular nominal*, which is incompatible with the type *big-mess-phrase*. This accounts for the fact that a big mess phrase cannot contain another big mess phrase, as in **that splendid so good a bargain*.

3.3 Other nominals with idiosyncratic properties

An interesting exception for the claim that nominals minimally contain a noun are nominals which contain anything but a noun, as in the second conjunct of the German *das rote Auto und das blaue* 'the red car and the blue (one)', discussed and analyzed in Netter (1996, 152–170). The phenomenon is less common in English, but it is not entirely absent there either, as shown by (52), discussed in Nerbonne and Mullen (2000).

(52) a. Paul read 20 abstracts. *The most interesting* were on creoles.
b. Guy did not see *any*, but we saw *many*.

Equally puzzling are nominals which contain two nouns that both vie for head status, as in *my brother Richard*, an instance of close apposition, and *Sarajevo, the capital of Bosnia, is where WW I began*, an instance of loose apposition. Kim (2012) and Kim (2014) compare and analyze both types. Van Eynde and Kim (2016) provides an analysis of loose apposition in the framework of Sign-Based Construction Grammar.

Another special case is the binominal noun phrase construction (BNPC), as exemplified in (53).

(53) a. She blames it on *her nitwit of a husband*.
b. She had *a skullcracker of a headache*.

In contrast to ordinary [NP–*of*–NP] sequences, as in *an employee of a Japanese company*, where the first nominal is the head of the entire NP, and where the second nominal is part of its PP modifier, the BNPC shows a pattern in which the relation between the nominals is a predicative one: her husband is claimed to be a nitwit, and the headache is claimed to be like a skullcracker. HPSG treatments of the BNPC are provided in Kim and Sells (2014) and Van Eynde (2018). The latter uses the phrase type hierarchy in (45), defining the BNPC as a maximal type that inherits from *head-independent* and *inverted-predication*.

4 Conclusion

This chapter has provided a survey of how nominals are analyzed in HPSG. For that purpose we have made a distinction between regular and idiosyncratic nominals, defining the former as those that are subsumed by the rewrite rule in (1), repeated in (54).

(54) NP → (Det) A* N PP* S* (where * is Kleene star)

To model them a number of different approaches have been proposed, ranging from the specifier treatment over the DP treatment to the functor treatment.

For the analysis of nominals with idiosyncratic properties we have limited the analysis to two phenomena, i.e. the verbal gerund and the big mess construction. The former adopts the specifier treatment and the latter the functor treatment, but they also have something in common, namely the use of a bi-dimensional hierarchy of phrase types. This is currently the most promising avenue for an analysis of nominal structures which does justice both to what is regular and to what is idiosyncratic about them.

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