



# Syntax & Semantics WS2019/2020

Lecture 12: Head-Driven Phrase Structure Grammar I (HPSG)

02/12/2019, Christian Bentz



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# Overview

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Section 2: Historical Notes  
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The Noun-Phrase

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## Comments on Tutorial Week 5

- ▶ *What does number of the subcategorization index in GPSG stand for, e.g. in H[1], H[2], H[3], etc. ?*
  - This is simply a *running number* for the different rewrite rules used for different verbs and their complements. The number itself does not have any particular grammatically relevant meaning.

### Immediate dominance rules

VP → H[1]	(die)
VP → H[2], NP	(love)
VP → H[3], NP, PP[ <i>to</i> ]	(give)
VP → H[4], NP, PP[ <i>for</i> ]	(buy)
VP → H[5], NP, NP	(spare)
VP → H[6], NP, PP[ + LOC]	(put)
VP[ + AUX] → H[7], XP[ + PRD]	(be)
VP → H[8], NP, S[FIN]	(persuade)
VP → H[9], (PP[ <i>to</i> ]), S[FIN]	(concede)
VP → H[10], S[BSE]	(prefer)
VP → H[11], (PP[ <i>of</i> ]), S[BSE]	(require)
VP[INF, + AUX] → H[12], VP[BSE]	(to)
VP → H[13], VP[INF]	(tend)
VP → H[14], V <sup>2</sup> [INF, + NORM]	(prefer)
VP → H[15], VP[INF, + NORM]	(try)
VP → H[16], (PP[ <i>to</i> ]), VP[INF]	(seem)
VP → H[17], NP, VP[INF]	(believe)
VP → H[18], NP, VP[INF, + NORM]	(persuade)
VP → H[19], (NP), VP[INF, + NORM]	(promise)
VP[AGR S] → H[20], NP	(bother)

... up to H[48].

Gazdar et al. (1985). Generalized Phrase Structure Grammar, p. 247.

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## Comments on Tutorial Week 5

► *What does the +PRD feature value mean in GPSG rules?*

– According to Gazdar et al. (1985), p. 175: “The copular verb *be* syntactically selects an [XP] complement with the feature specification <PRD, + > (predicative). It imposes no other restrictions on the category status of that [XP]. It may be an NP, a VP, an AP, or a PP, as seen in *is a sick man*, *is suffering from fever*, *is very sick*, and *is in poor health* respectively.”

Note that there is (as far as I can see) no ID rule named in Gazdar et al. (1985) which would explicitly mention the usage of an auxiliary VP[+AUX] with a past participle VP[PSP], hence we need to use the ID rule VP[+AUX] → H[7], XP[+PRD] to built the auxiliary verb construction *hat gelesen* ‘has read’.

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## Comments on Tutorial Week 5

- ▶ *Do we have to write linear precedence rules (LP rules) in pairs of non-terminals, or can there be more than two non-terminals in one rule?*

– Both is possible and equivalent. You can save space by writing all three in one line. Note that this follows from the principle of *transitivity* in mathematical logic. Namely, if  $A \prec B$ , and  $B \prec C$ , then it follows that  $B \prec C$ .

Example:

Writing  $N2 \prec V2$  and  $V1 \prec V2$  is equivalent to  $N2 \prec V1 \prec V2$ .

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## **Section 1: Recap of Lecture 11**



## Interlude: Notational Conventions

The strings in **single quotation marks** and **normal script** (not italics or upper case) are also **feature values**. However, they constitute a particular type of feature value that is called a **semantic form** by Bresnan et al. (2016), p. 44.

*David devoured a sandwich.*

PRED	‘devour < <b>SUBJ,OBJ</b> >’
TENSE	<i>past</i>
SUBJ	[ PRED ‘david’ ]
OBJ	[ SPEC <b>a</b> PRED ‘sandwich’ ]

Note: The specifier *a* is written without quotation marks in Müller (2019). This indicates that determiners – in contrast to other lexical items written inside quotation marks – are not considered to contribute meaning to the sentence.

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# Governable Grammatical Functions

It follows from the definitions above that **governable grammatical functions** are the ones which have to be specified by the head of the overall phrase.

- ▶ SUBJ: subject
- ▶ OBJ: object
- ▶ OBJ<sub>θ</sub>: so-called *secondary* object(s). In English, there is only OBJ<sub>THEME</sub>, where the *theme* typically corresponds to the direct object of a ditransitive sentence (e.g. *gave the book ...*)
- ▶ COMP: sentential complement (*that*-clause)
- ▶ OBL: so-called *oblique grammatical functions*, e.g. OBL<sub>LOC</sub>. Often correspond to adpositional phrases which are necessary to build a grammatical sentence. Remember the example of *to be located* which takes an *obligatory* argument, namely, a prepositional phrase starting with *in...* or *at...*

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Adopted from Müller (2019). Grammatical theory, p. 224.





## Question:

*Why is the semantic role indicated on secondary objects but not on subjects and objects in general?*

**Table 6.1** Examples of English grammatical functions in LFG (based on Asudeh and Toivonen 2015, p. 380; used with permission)

SUBJECT (SUBJ)	<u>Some people with no shame</u> walked in and wrecked the party. <u>The party</u> was wrecked by some people with no shame.
OBJECT (OBJ)	<i>Primary object</i> Ricky trashed <u>the hotel room</u> . Ricky gave <u>John</u> a glass. Ricky gave <u>a glass</u> to John.
OBJECT <sub>θ</sub> (OBJ <sub>θ</sub> )	<i>Secondary object; thematically restricted object</i> (OBJECT <sub>theme</sub> restricted to theme roles) Sandy gave John <u>a glass</u> . Tom baked Susan <u>a cake</u> . (OBJ <sub>θ</sub> in English restricted to theme, cannot be beneficiary)
OBLIQUE <sub>θ</sub> (OBL <sub>θ</sub> )	<i>Typically has oblique case or is a PP</i> Julia placed the vase <u>on the desk</u> . Ricky gave a glass <u>to John</u> .
COMPLEMENT (COMP)	<i>Closed (saturated) complement: a clausal argument which has its own subject</i> Peggy told Matt <u>that she had won the prize</u> .

Bresnan et al. (2016), p. 99.

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# Non-Governable Grammatical Functions

**Non-governable grammatical functions** are then the ones which are not specified by the head (i.e. not being arguments of the head).

- ▶ ADJ: adjuncts (typically adpositional phrases)
- ▶ TOPIC: the topic of an utterance
- ▶ FOCUS: the focus of an utterance

Note: we will not consider TOPIC and FOCUS constructions here.

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# F-Structure Examples: Intransitive Sentence + Complement

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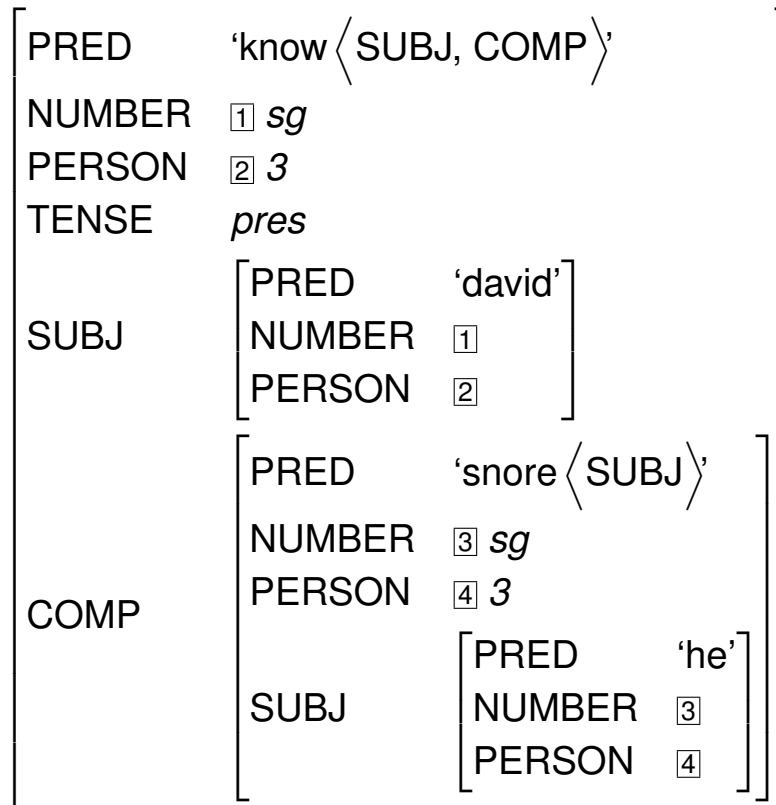
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**f-structure** for *David knows that he snores*:



Governable functions  
(arguments): SUBJ, COMP

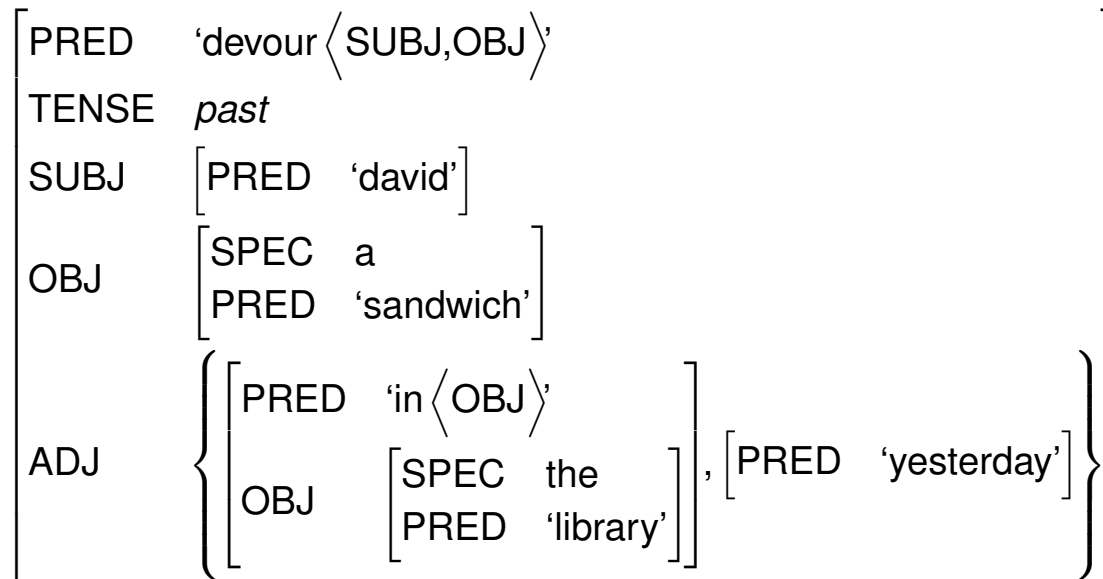
Non-Governable functions  
(adjuncts):

Note: The structure shared features of the subject in the main clause have to get different indices to the structure shared features of the complement clause (i.e. 1 and 2 versus 3 and 4). While in this particular example, the feature values are the same (i.e. *sg* and 3), this does not have to be the case. For example, for the sentence *David knows that we snore* the feature values would be 3 and *sg* for the main clause, but 2 and *pl* for the complement clause.



# F-Structure Examples: Transitive Sentence + Adjuncts

**f-structure** for *David devoured a sandwich in the library yesterday*:



Note: For Adjuncts, **curly brackets** (indicating a set) are used instead of the list brackets, since the order of adjuncts is irrelevant.

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# Constituent Structure (C-Structure)

**Nodes in the c-structure tree** can be connected to the corresponding **feature description (f-structure)**. This will here be indicated with *red color*, while arrows are used in Bresnan et al. (2016) and Müller (2019) to the same effect.

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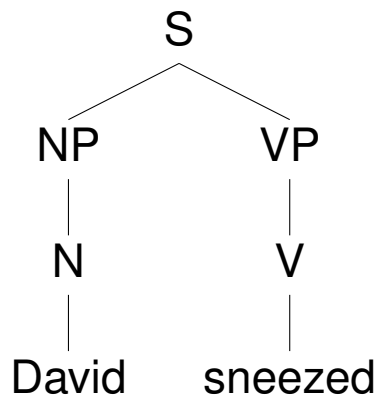
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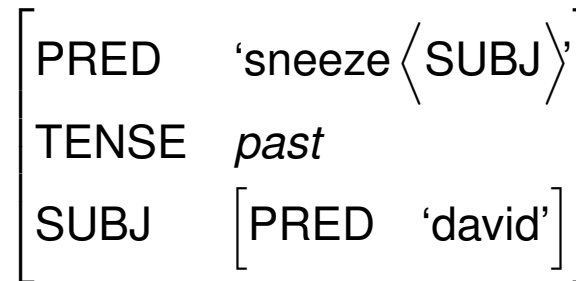
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**c-structure:**



**f-structure:**





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## **Section 2: Historical Notes**



## Historical Perspective

“Head-Driven Phrase Structure Grammar (HPSG) was developed by Carl Pollard and Ivan Sag in the mid-80’s in Stanford and in the Hewlett-Packard research laboratories in Palo Alto (Pollard & Sag 1987; 1994). Like LFG, HPSG is part of so-called West Coast linguistics. Another similarity to LFG is that HPSG aims to provide a theory of competence which is compatible with performance [...]”

Müller (2019). Grammatical theory, p. 263.

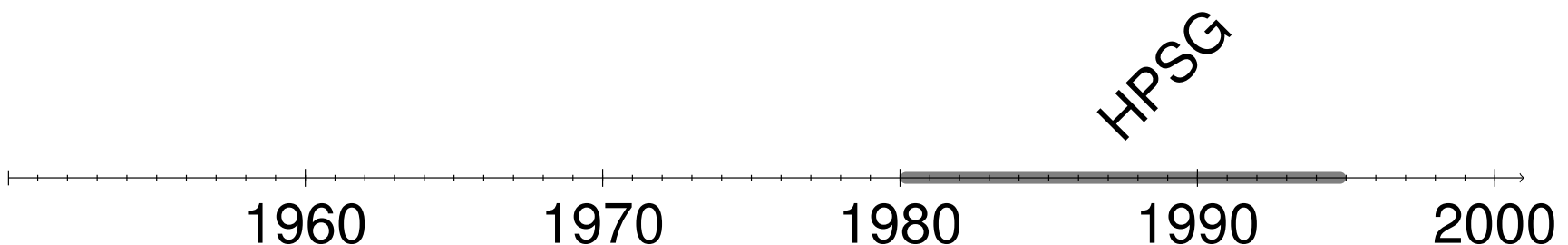
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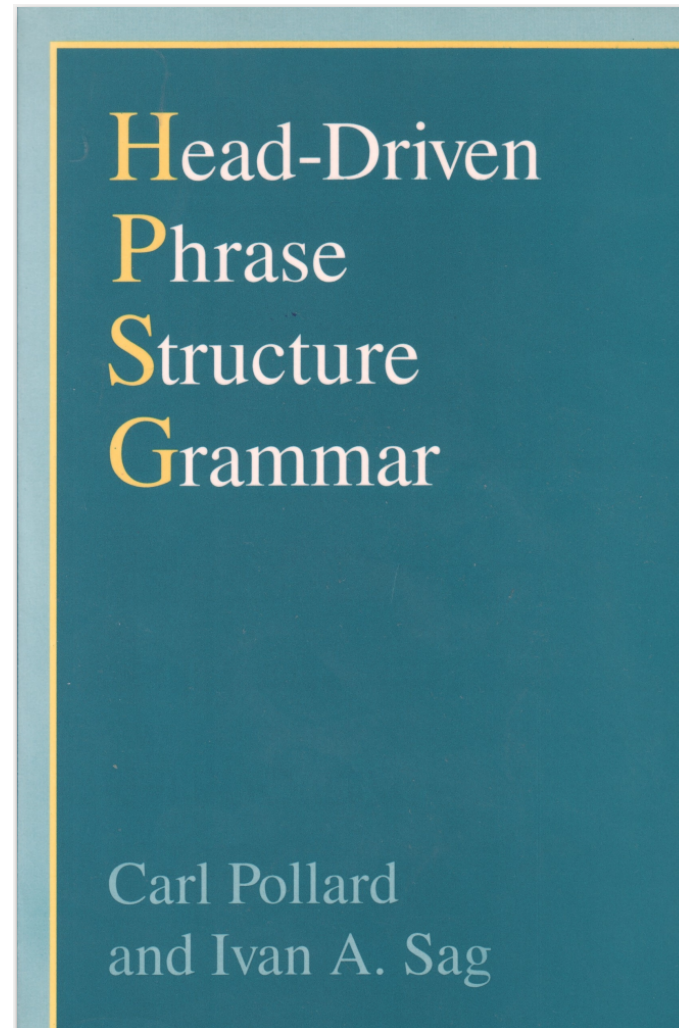




## GB and HPSG: Similarities

- ▶ “A number of similarities between GB theory and the theory advocated here will be apparent. For example, in both theories, structure is determined chiefly by [...] rules reduced to a handful of highly general and universally available phrase structure (or immediate dominance) schemata [...]”

Pollard & Sag (1994). *Head-Driven Phrase Structure Grammar*, p. 2.



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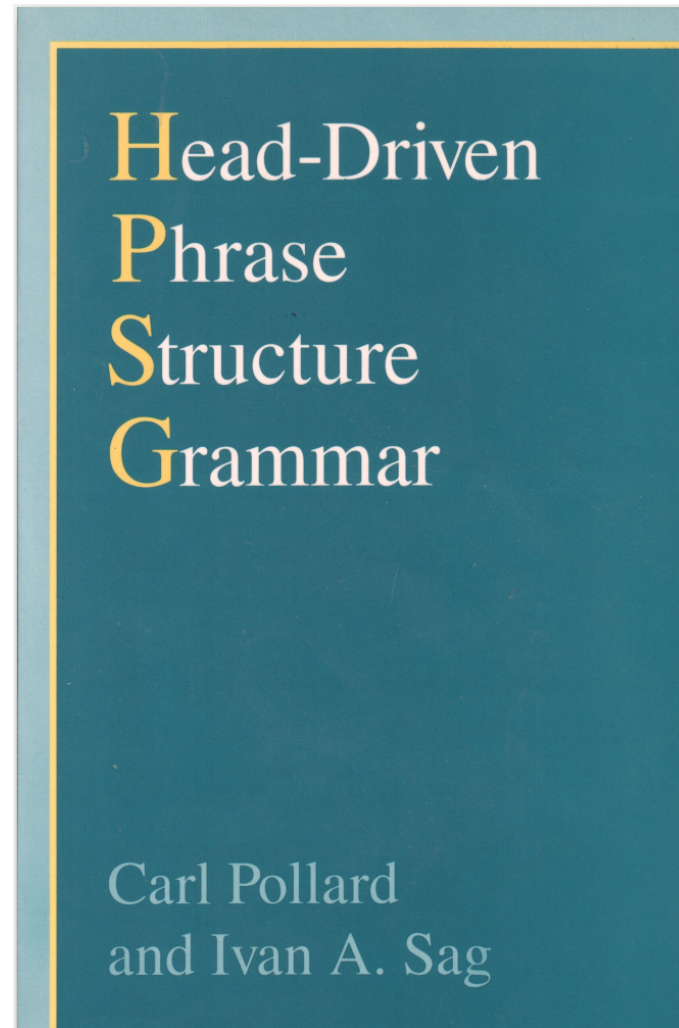




## GB and HPSG: Similarities

- ▶ “HPSG principles (the head feature principle and the subcategorization principle) play a role in the theory roughly comparable to that of the projection principle in GB.”

Pollard & Sag (1994). Head-Driven Phrase Structure Grammar, p. 2.



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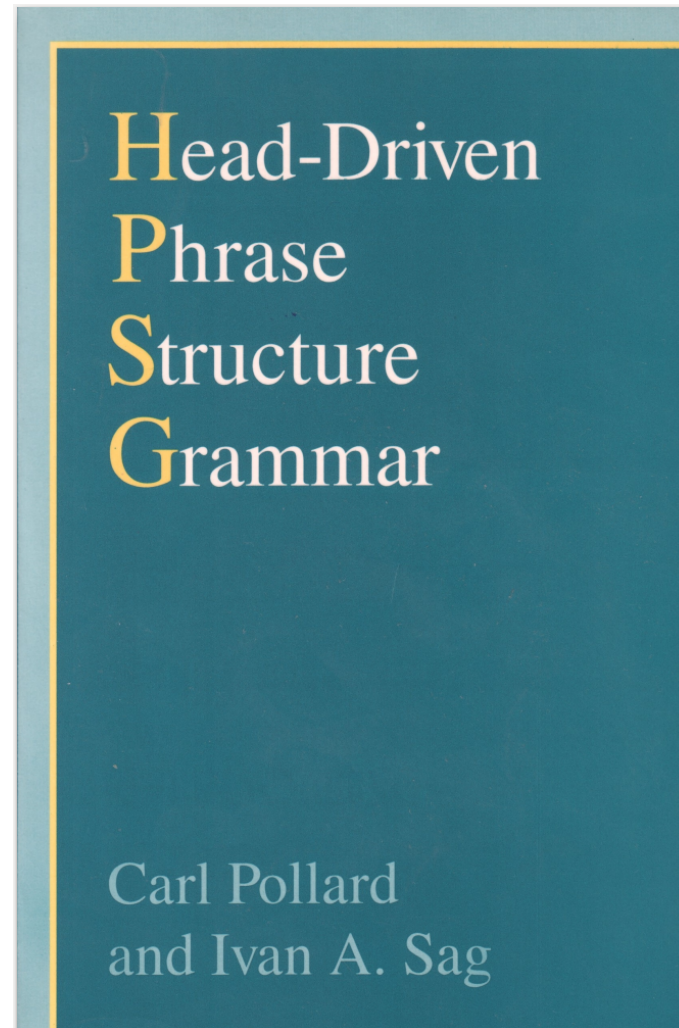
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## GB and HPSG: Similarities

- ▶ “[...] in both GB and HPSG, there are assumed to be several distinct ‘levels’ (or, as we will call them, attributes or features) of linguistic structure.”

Pollard & Sag (1994). Head-Driven Phrase Structure Grammar, p. 2.



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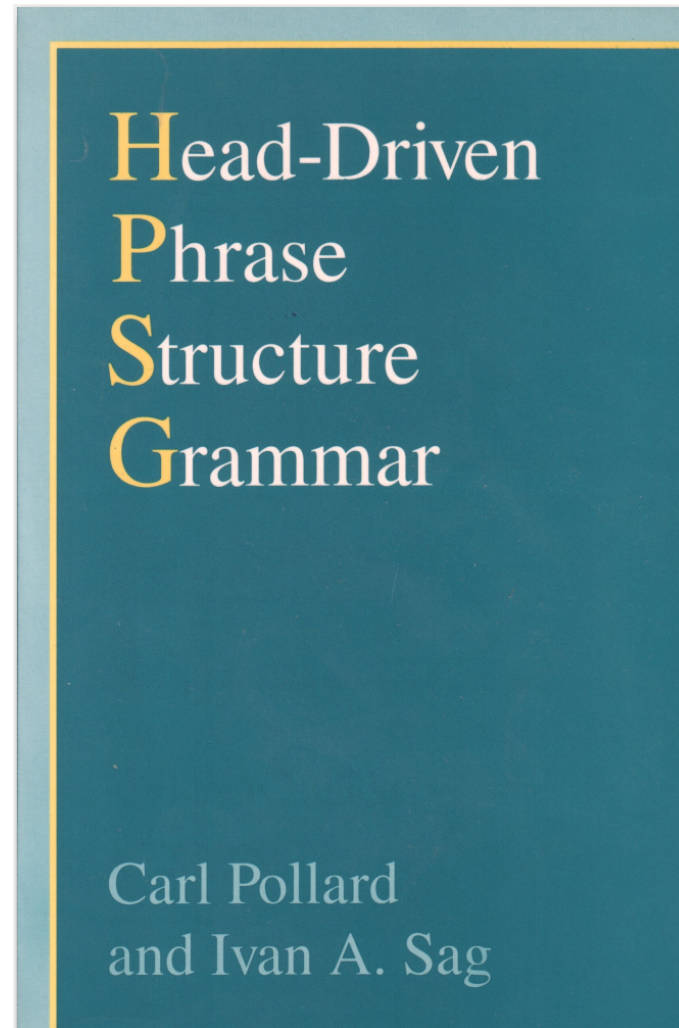
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## GB and HPSG: Differences

- ▶ “One key architectural difference is the absence from HPSG of any notion of transformation. Unlike GB levels [...] the attributes of linguistic structure in HPSG are related not by movement but rather by *structure sharing* [...]”

Pollard & Sag (1994). Head-Driven Phrase Structure Grammar, p. 2.



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## Further Characteristics of HPSG

- ▶ HPSG “is a **lexicon-based theory**, that is, the majority of linguistic constraints are situated in the descriptions of words or roots.”
- ▶ “HPSG is sign-based in the sense of Saussure (1916a): the **form and meaning** of linguistic signs are always represented together.”
- ▶ “**Typed feature structures** are used to model all relevant information.”
- ▶ “[...] trees [...] are only visualizations of the constituent structure and do not have any theoretical status. There are also **no rewrite rules in HPSG.**”

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Müller (2019), p. 266-271.



## Languages analyzed by HPSG

Arabic, **Bengali**, **Bulgarian**, Cantonese, **Danish**, **Dutch**, **English**, Esperanto, **French**, Ga, Georgian, **German**, **Greek**, Hausa, Hebrew, Hungarian, Indonesian, Japanese, Korean, Maltese, Mandarin Chinese, **Norwegian**, **Persian**, **Polish**, **Portuguese**, **Russian**, Sahaptin, **Spanish**, Sign Languages (German, French, British, Greek, South African), Turkish, Wambaya, **Yiddish**

According to Müller (2019). Grammatical theory, p. 263.

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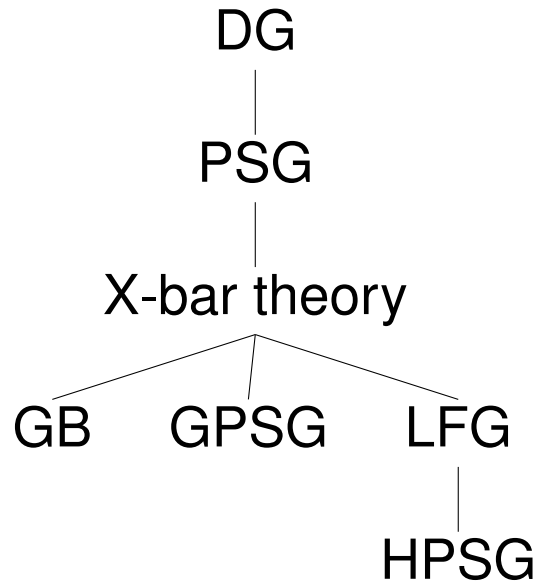
## Language Families<sup>1</sup>

Afro-Asiatic, Artificial, Austronesian, Atlantic-Congo, **Indo-European**, Japonic, Kartvelian, Mirndi, Sahaptin, Sino-Tibetan, Turkic, Uralic

<sup>1</sup>According to Glottolog 4.0, <https://glottolog.org/>.



# Syntactic Framework Tree



DG: Dependency Grammar

PSG: Phrase Structure Grammar

GB: Government & Binding

GPSG: Generalized Phrase  
Structure Grammar

LFG: Lexical Functional Grammar

HPSG: Head-Driven Phrase  
Structure Grammar

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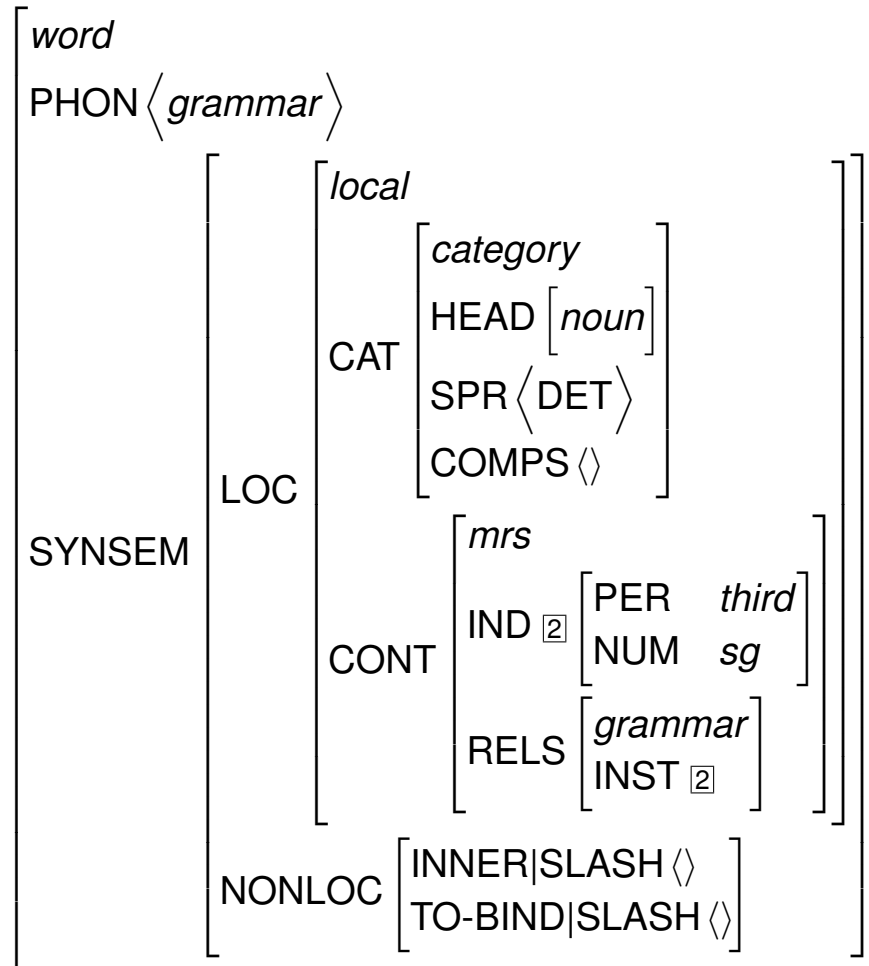
## **Section 3: The Word Level**



## Typed Feature Description: Word Level

In contrast to LFG (as discussed in Lecture 11), HPSG feature descriptions a) are **typed**, and b) start already at the **word level**, not only at the phrase level.

Typed feature description for the word *grammar*.



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# Notational Conventions

- ▶ PHON: Phonology – an *orthographic representation* of the analyzed string.
- ▶ SYNSEM: Syntax-Semantics – highest level feature containing all features relevant in the *syntactic/semantic* domain.
- ▶ SYNSEM|LOC: *locally* relevant information, e.g. agreement information between determiner and noun.
- ▶ SYNSEM|NONLOC: *non-local* information relevant long-distance dependencies and binding.
- ▶ SYNSEM|LOC|CAT: feature specifying information linked to the *word category*, i.e. part of speech of the head (HEAD), relevant specifiers of the head (SPR), and complements (COMPS).
- ▶ SYNSEM|LOC|CONT: feature specifying so-called *content* (i.e. semantic) according to Minimal Recursion Semantics (mrs).

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# Simplified Typed Feature Description

We will not consider the semantic features of SYNSEM|LOC|CONT here. Also, SYNSEM|NONLOC is only relevant for particular constructions (e.g. long-distance dependencies) and can be dropped otherwise.

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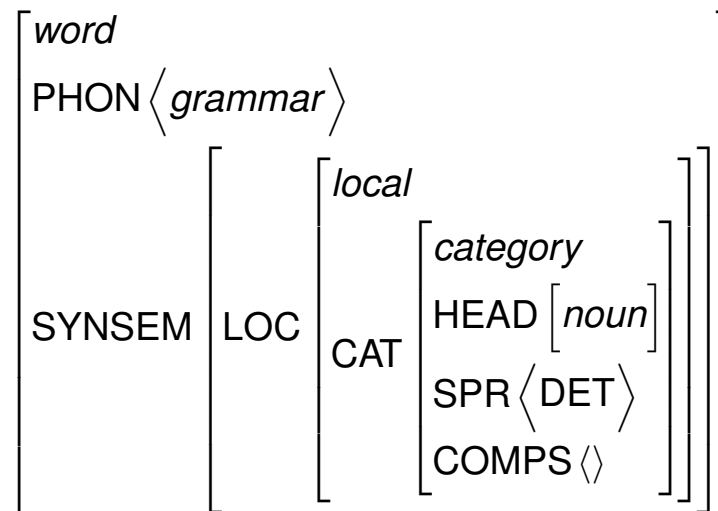
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Typed feature description for the word *grammar*.





# The Word Level: Nouns

If case plays a role for the agreement between determiner and noun, a **CASE** feature is given in **SYNSEM|LOC|CAT|HEAD**, and it is *structure shared* with the determiner. Note that person, number, and gender features are not located here, since they are considered part of semantics, i.e. located in **CONT|IND**.

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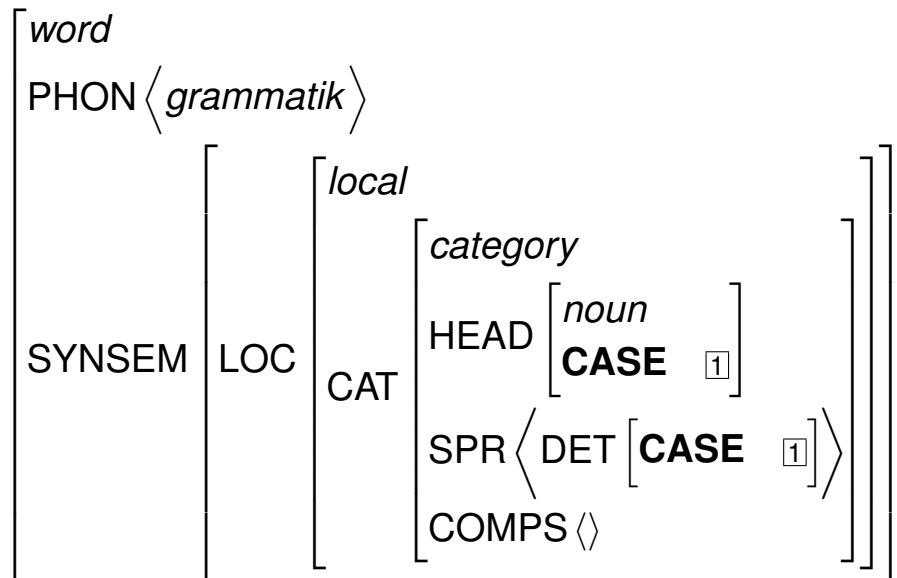
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Typed feature description for the word *Grammatik*.



Note: The case feature for the German word *Grammatik* can take any of the four possible values (i.e. *nom*, *acc*, *dat*, *gen*), since this particular word type displays syncretism in all four singular forms. Hence, we could either write *nom* ∨ *acc* ∨ *dat* ∨ *gen*, or just leave the feature value empty and only use the structure sharing index.



# The Word Level: Pronouns

For *pronouns* in English we would get either nominative or accusative/dative/genitive case. Note that in contrast to proper nouns, pronouns do not take any specifiers.

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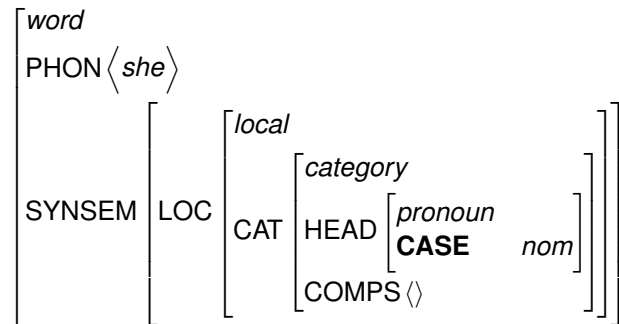
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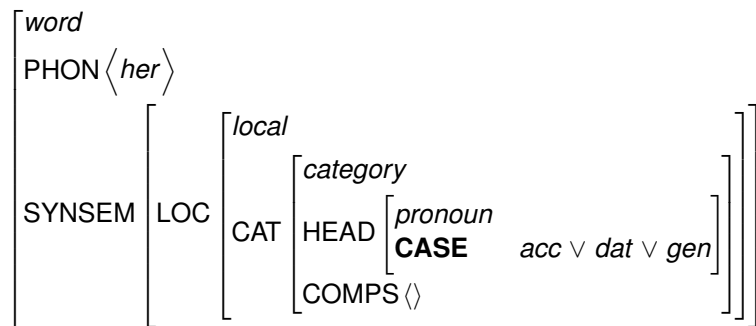
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Typed feature description for *she*.



Typed feature description for *her*.





## The Word Level: Adjectives

As in many other frameworks, *adjectives* are considered *adjuncts* to nouns (or noun phrases), hence they are construed with a MOD (modifier) feature in SYNSEM|LOC|CAT, which essentially means “modifier of...” and the value is then a (not further specified) noun phrase. This is a typical example of embedding, that is, one category with a noun as head is embedded into another category with an adjective as head.

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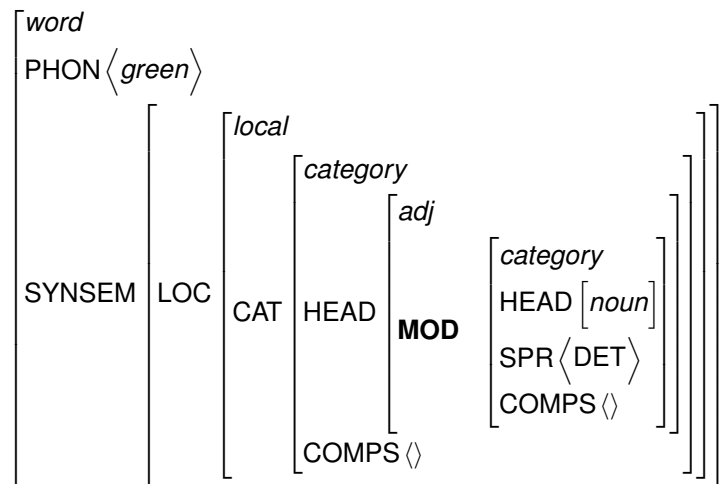
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Typed feature description for the word *green*.





# The Word Level: Prepositions

*Prepositions* are handled at the word level in a similar manner to adjectives. Namely, they have a head feature MOD which takes a noun phrase as its value. One important difference here is that now we also have to mention a complement to the preposition under COMPS.

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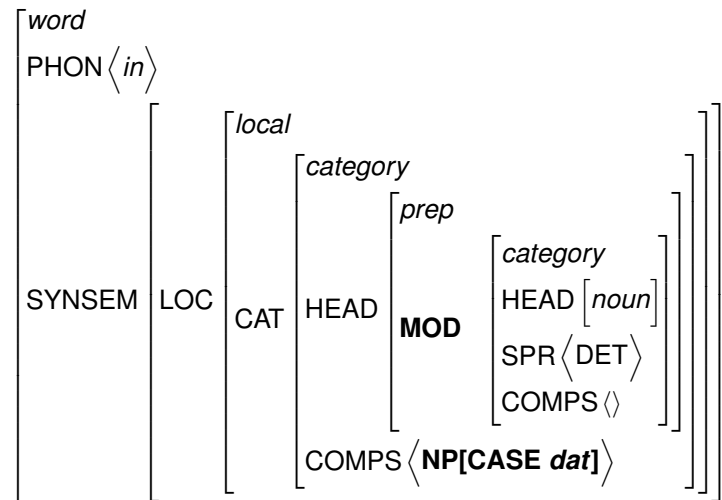
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Typed feature description for the word *in*.



Note: The complement NP[CASE *dat*] is necessary since the preposition *in* requires a dative complement. While proper nouns do not inflect for dative in English, we can see this with pronouns, e.g. *in him*. Importantly, the noun phrase which is the value of MOD is not the same as the noun phrase in the COMPS list! The former would correspond to *the book* in a phrase like *the book in the library*, while the latter would correspond to *the library*.



## Some Further Comments On Adjuncts

- ▶ It might seem strange that noun phrases – while heading adjectives and prepositions – are at the same time embedded inside the *adj* and *prep* feature description. But note that we have here discussed feature descriptions of individual lexical items only. In HPSG, it is necessary to specify at the lexical level what type of category an adjunct modifies. Head/complement relationships in whole phrases are then handled separately (see below).
- ▶ Remember that it is common for adjuncts to also modify, for instance, verb phrases, not just noun phrases (e.g. *the child reads in the library*). This case is handled with the adjuncts being part of the verb phrase complements (see next Lecture).

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## The Word Level: Verbs (English)

**Verbs** have a feature structure similar to nouns. Instead of a CASE feature given in the type *noun*, the type *verb* gives a **VFORM** feature which takes the same values as in GPSG (*fin*: finite; *inf*: to-infinitive; *bse*: bare infinitive; *prp*: present participle; *psp*: past participle; *pas*: passive participle). Also, the potential complements of the verb phrase are now given in **COMPS** with phrase notation and case feature values. **For English**, the subject NP is considered a **specifier (SPR)**.

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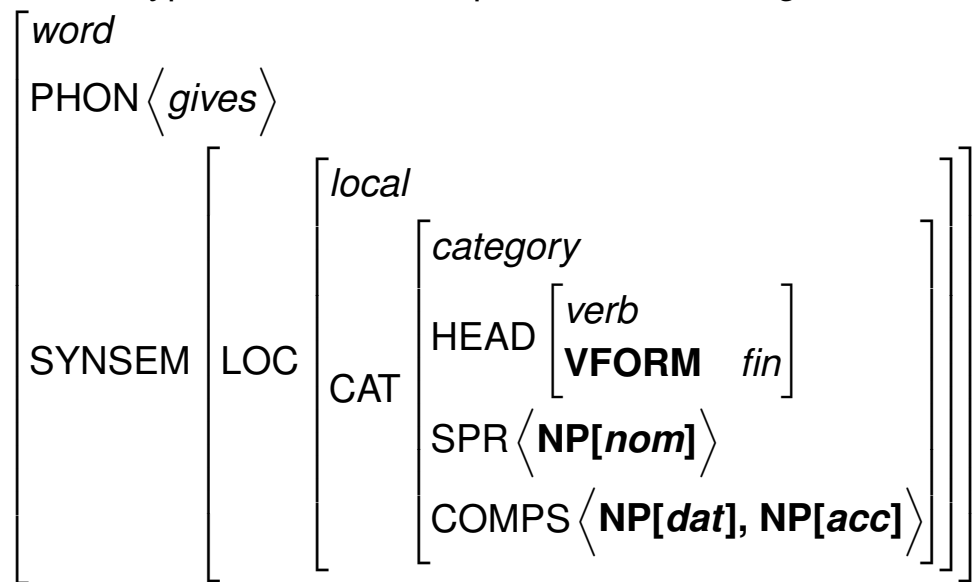
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Typed feature description for the word *gives*.







## The Word Level: Verbs (German)

**For German**, we have, in principle, the same structure, though with the important difference that the **subject NP** is not treated as a specifier, but also as a **complement**.

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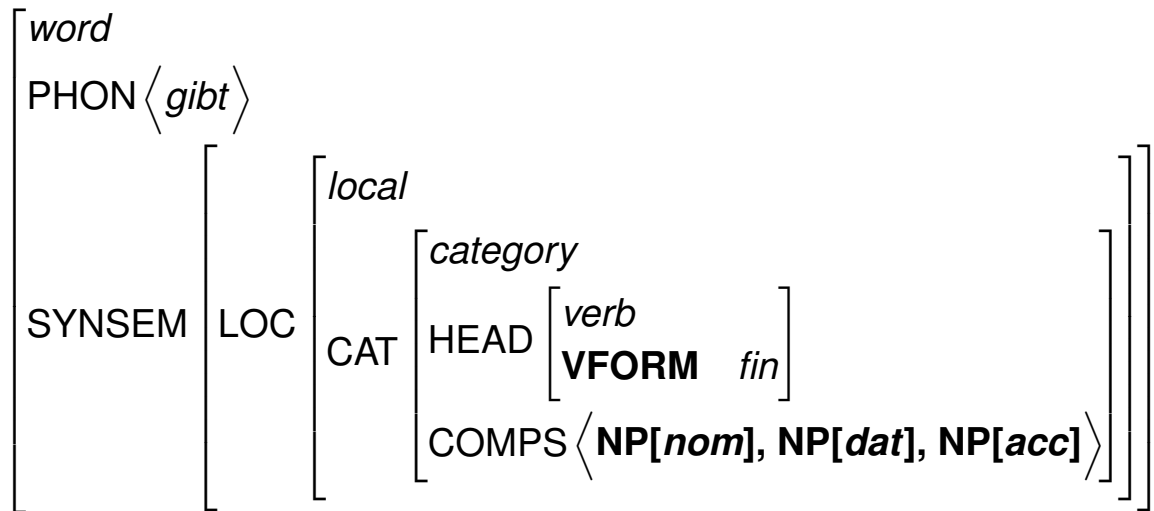
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Typed feature description for the word *gibt* 'gives'.





## The Word Level: Verbs

Since we do not give any number, person and tense information here, the feature description would actually be the same for other inflected (i.e. finite) forms of the word *give*, e.g. *gave*. It is only different in the **VFORM feature** if a different type of verb form is used (e.g. infinitives or past participles).

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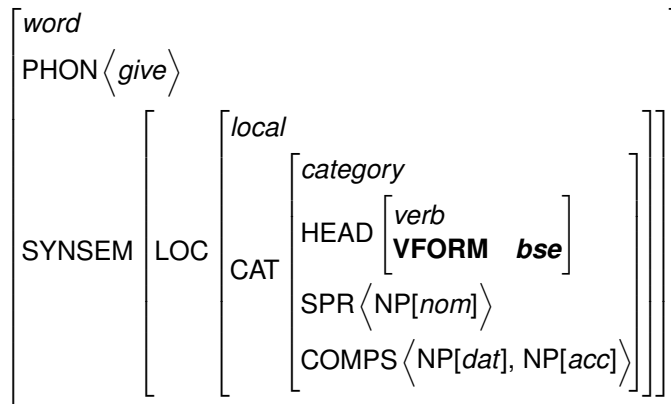
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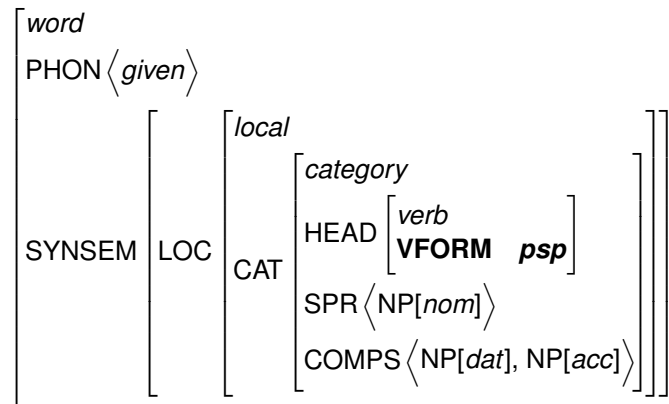
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Typed feature description for the word *give*.



Typed feature description for the word *given*.





## Some Further Comments On Verbs

- ▶ As was mentioned also for nouns, inflectional features in HPSG feature descriptions are given in CONT, i.e. considered part of the semantics of a word, rather than its syntax (CAT).
- ▶ Note, however, that deviating from the simplified notation given in Müller (2019), Pollard & Sag (1994), p. 28 actually give the person and number feature of the word *walks* as an index to the complement representing the subject of a potential intransitive sentence, i.e. NP[nom]<sub>[3rd,sg]</sub>. Hence, inflectional features here come into the CAT feature description “through the backdoor” so to speak.

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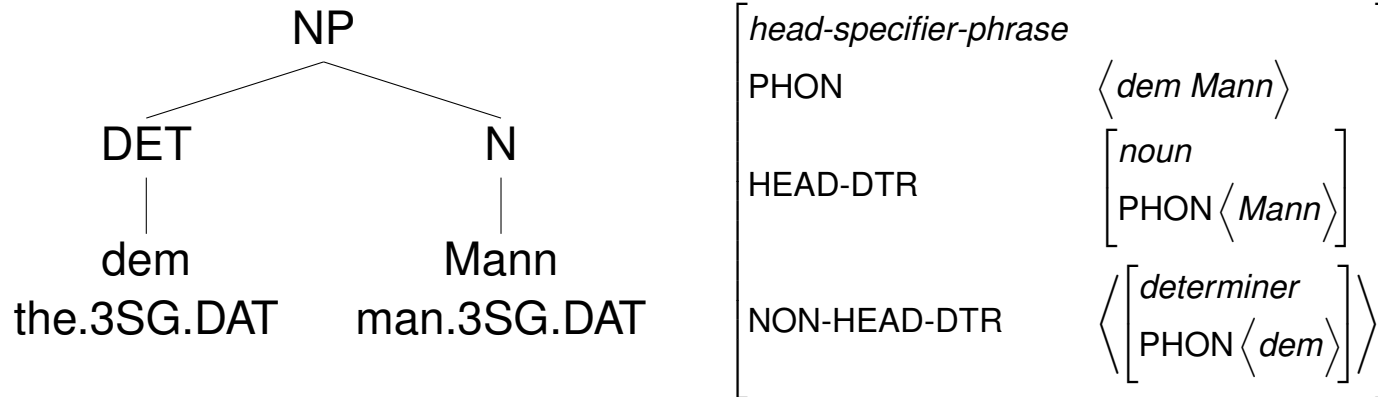
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## Section 4: The Phrase Level



# Representation of Constituent Structure

Just as for LFG, in HPSG **constituent tree structures** are represented by means of **feature description matrices**, such that trees have no theoretically important status anymore, but might be used for visualization.



Adopted from Müller (2019). Grammatical theory, p. 270.

Note: I have here added the type *head-specifier-phrase*. Remember that determiners are considered specifiers to the head noun in this framework.

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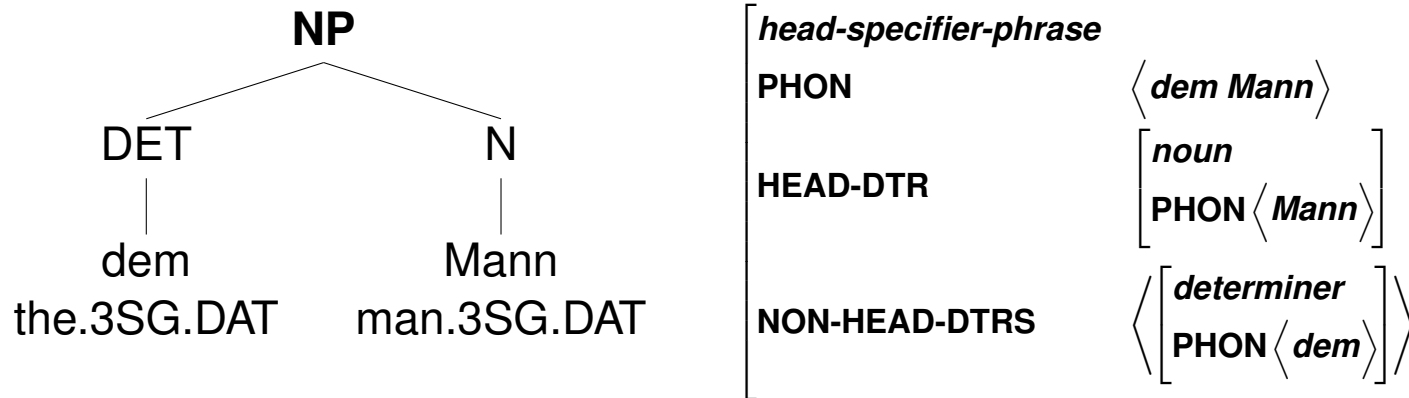
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# Representation of Constituent Structure

The nodes in the tree are then associated with particular parts in the feature description, e.g. **NP with the whole *head-specifier-phrase***, **DET with NON-HEAD-DTR** (non-head-daughter), and **N with HEAD-DTR** (head-daughter).



Adopted from Müller (2019). Grammatical theory, p. 270.

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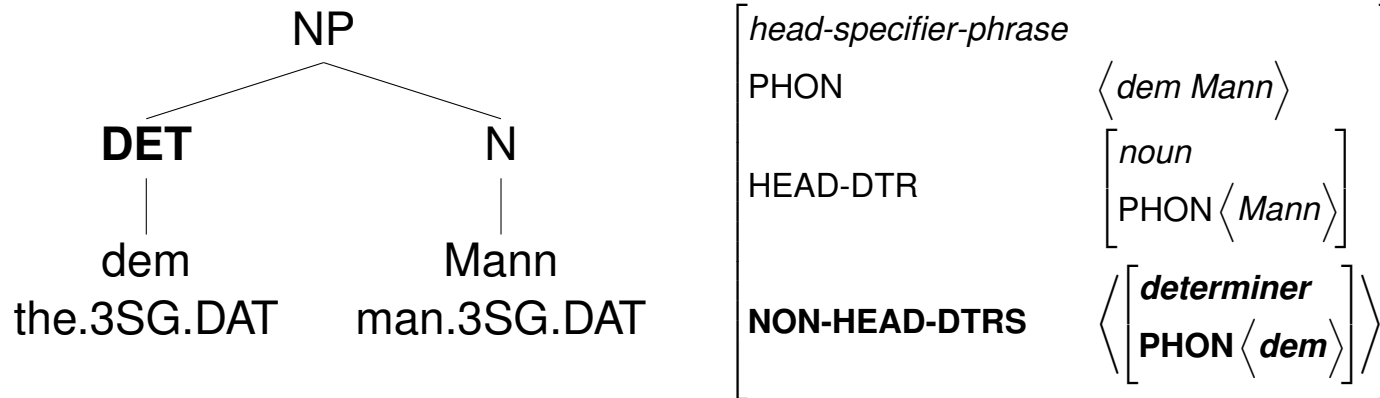
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# Representation of Constituent Structure

The nodes in the tree are then associated with particular parts in the feature description, e.g. NP with the whole *head-specifier-phrase*, **DET** with **NON-HEAD-DTRS** (non-head-daughters), and N with HEAD-DTR (head-daughter).



Adopted from Müller (2019). Grammatical theory, p. 270.

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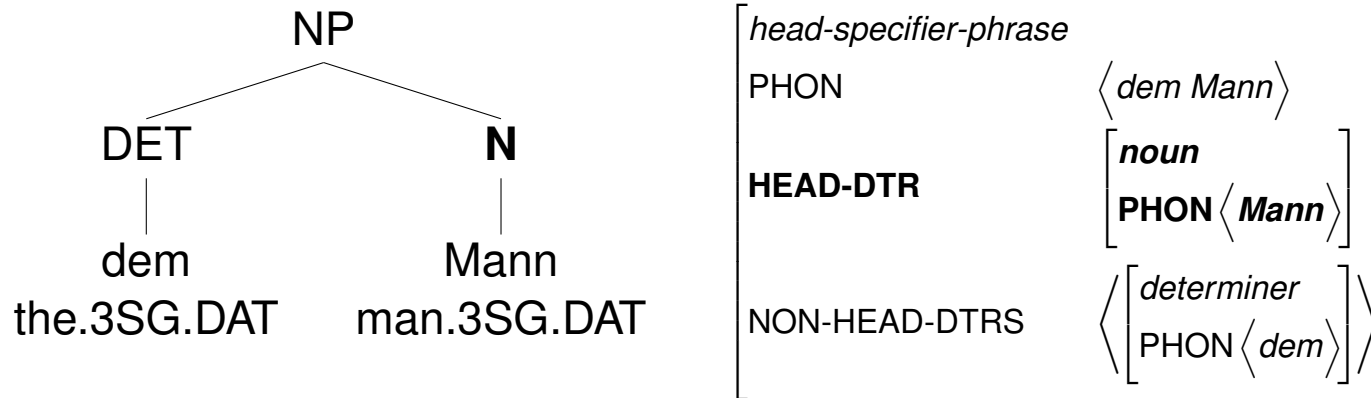
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# Representation of Constituent Structure

The nodes in the tree are then associated with particular parts in the feature description, e.g. NP with the whole *head-specifier-phrase*, DET with NON-HEAD-DTR (non-head-daughter), and **N** with **HEAD-DTR** (**head-daughter**).



Adopted from Müller (2019). Grammatical theory, p. 270.

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## The Phrase Level: Noun-Phrase

However, note that the attribute-value matrix (AVM), i.e. feature description matrix, given by Müller (2019) for this particular *head-specifier-phrase dem Mann* is **highly underspecified**. Namely, it only specifies the PHON feature but none of the syntactically relevant features in SYNSEM|LOC|CAT. A more complete AVM is developed below.

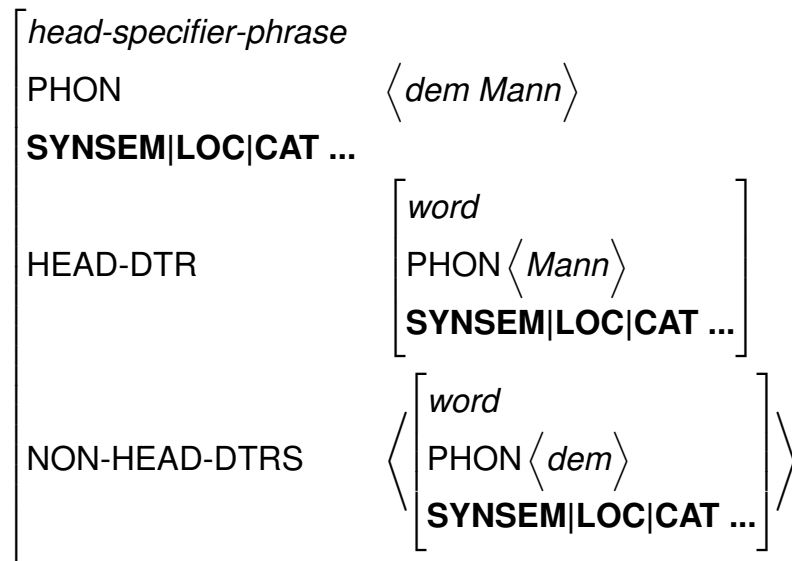
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## The Phrase Level: Noun-Phrase

First, we need to add the **SYNSEM|LOC|CAT feature** for the highest level NP *dem Mann*. Note that the CAT feature matrix is here not further specified, just represented **with an index** 1. Imagine that this reflects the fact that we are here in the highest level NP node in the tree, where we do not yet “see” the actual head and specifier features of the category.

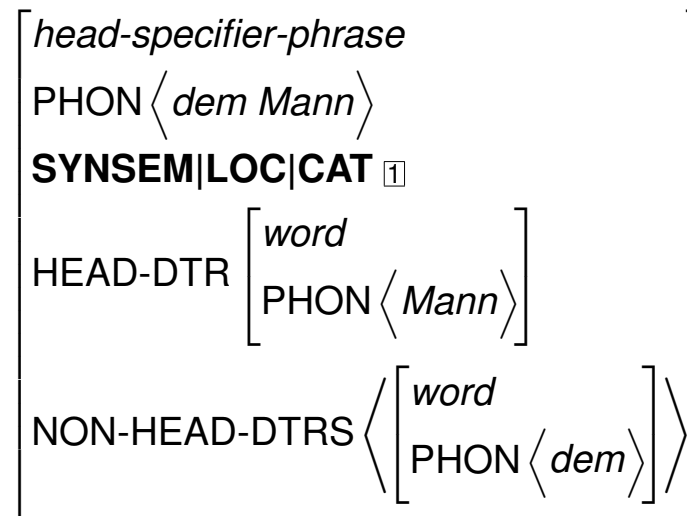
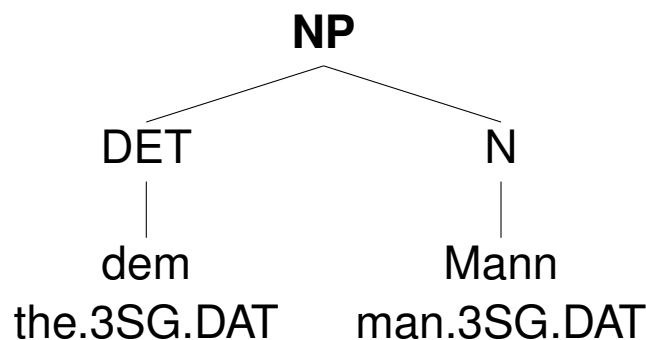
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Note: From here on we use the path notation SYNSEM|LOC|CAT instead of spelling out all the matrices.



## The Phrase Level: Noun-Phrase

Secondly, we need to add the **SYNSEM|LOC|CAT** feature for the **HEAD-DTR** *Mann*. Here the **HEAD** feature is further specified as a noun which takes CASE. The CASE value is represented with another index [2] for structure sharing. The SPR feature is still not specified, but just takes another index [3]. Remember that we are here in the branch of the head *Mann*, where we do not really yet “see” the specifier *dem*. The **whole CAT matrix** is then structure shared with the highest level NP by using the index [1].

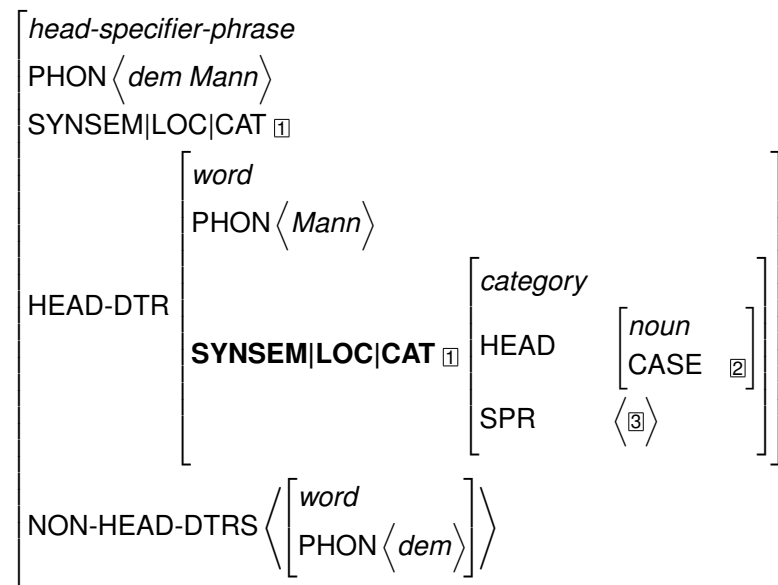
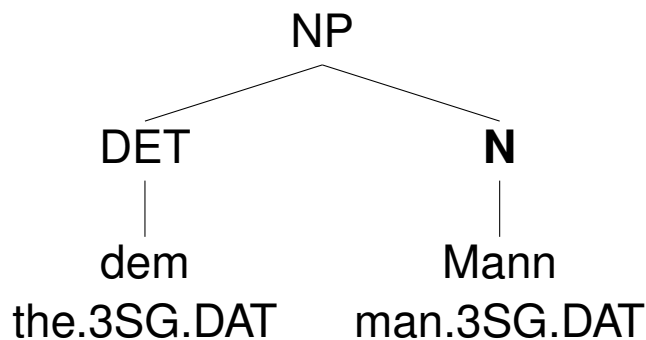
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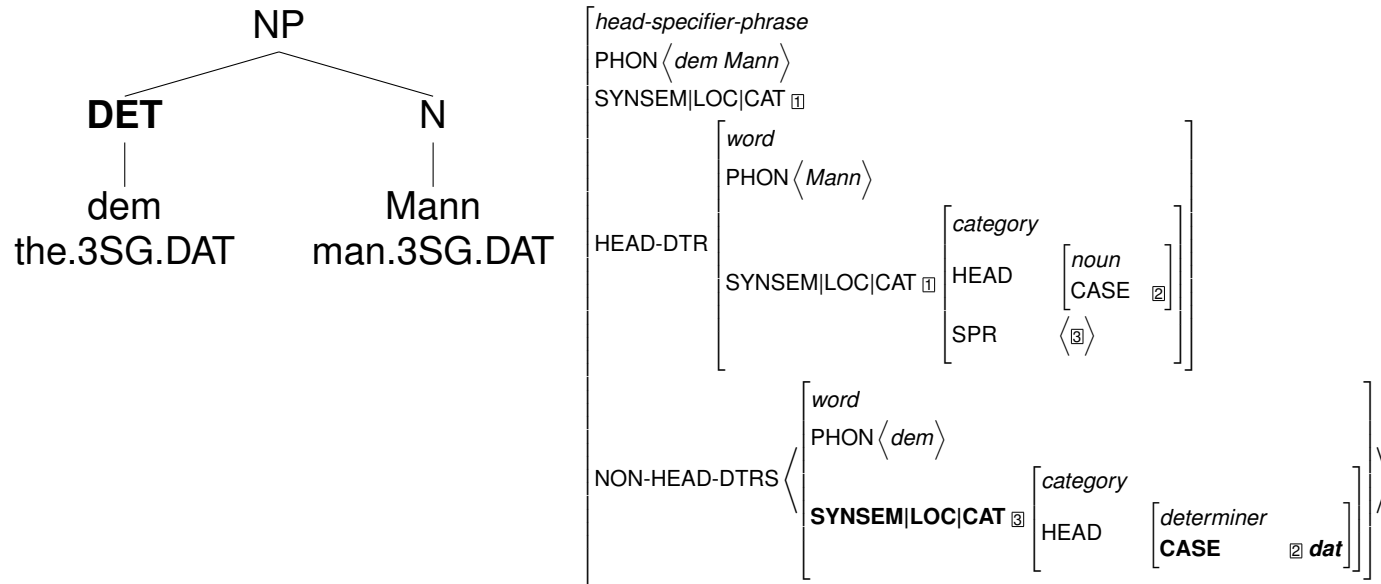
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# The Phrase Level: Noun-Phrase

Finally, we need to specify the CAT value of the NON-HEAD-DTR *dem*. The HEAD within this category is now of the type *determiner*, and the whole CAT matrix is structure shared with the HEAD-DTR as its specifier via the index [3]. Also, it takes a CASE value which is specified as *dative* and structure shared via the index [2].



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Note: While the determiner is construed as a feature (DET) of the specifier feature SPR as part of the type *noun*, in an actual noun phrase, there has to be a word for the determiner with its own typed feature description i.e. *determiner*.



# The Phrase Level: Noun-Phrase

In the case of nouns being modified by **adjectives**, we have a so-called **head-adjunct-phrase**. The **CAT value** of the highest level NP is again indicated by index **1**. This is then specified and structure shared via the same index in the CAT value of the **HEAD-DTR**. As outlined above, the connection between the adjective and the noun is expressed by the **MOD feature** of the *adjective* type which takes the element modified by the adjective as its value, i.e. the noun in this case.

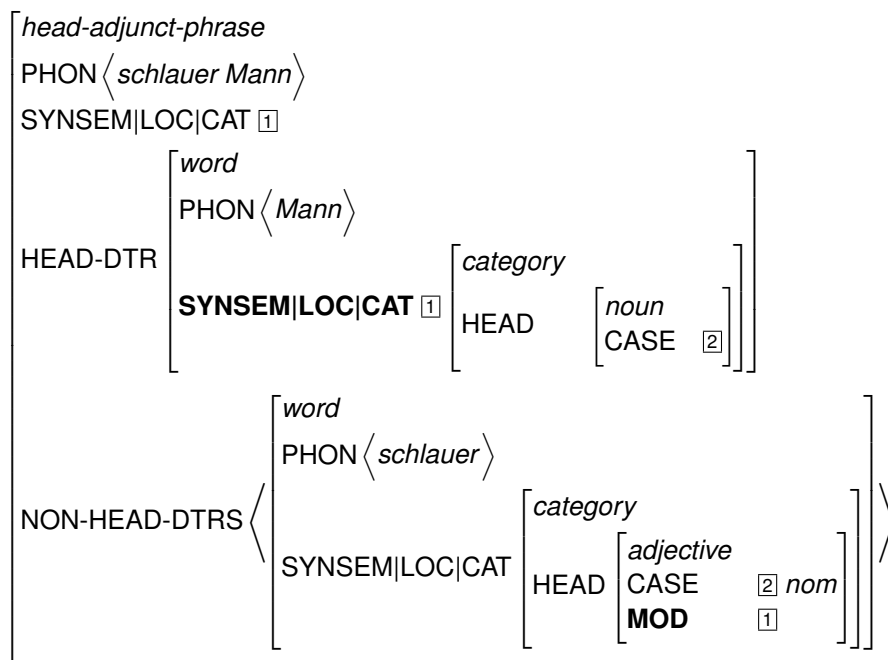
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# References

Bresnan, Joan, Asudeh, Ash, Toivonen, Ida, and Wechsler, Stephen (2016). *Lexical-Functional Syntax*. Second Edition, Wiley Blackwell.

Müller, Stefan. 2019. *Grammatical theory: From transformational grammar to constraint-based approaches. Third revised and extended edition. Volume I*. Berlin: Language Science Press.

Pollard, Carl, and Sag, Ivan A. (1994). *Head-driven phrase structure grammar*. Chicago: University of Chicago Press.

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# Thank You.

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