On Non-Head Non-Movement

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The paper discusses different approaches to the analysis of finite verb position in German within the framework of HPSG. It argues that among three parameters (a) standard subcategorization and adjunction, (b) uniform structural representation and (c) clause initial finite verbs as heads, only two can be maintained simultaneously, unless additional devices are introduced. We abandon (c) and present an approach which allows to derive a binary right-branching structure for the "Mittelfeld" also for V-initial structures without modifications of general principles of the theory. The key to the analysis is the postulation of an empty node as a functional head which takes the finite verb as a complement.

Die Arbeit diskutiert mehrere Analysen für die Stellung des finiten Verbums im Deutschen im Rahmen der HPSG. Es wird argumentiert, daß von den drei Parametern (a) Standard Subkategorisierung und Adjunktion, (b) uniforme strukturelle Representation und (c) initiale Verben als Köpfe, ohne eine Erweiterung der Theorie um spezielle Mechanismen nur zwei aufrechterhalten werden können. Wir geben (c) auf und diskutieren eine Analyse, die auch bei V-initialen Strukturen ein binär verzweigendes Mittelfeld erzeugt, ohne daß generelle Modifikationen die Theorie erforderlich werden. Der Schlüssel für die Analyse ist die Annahme eines leeren Knoten als funktionalen Kopf des Satzes, der das finite Verbum als Komplement subkategorisiert.

1 Introduction

The initial and final position of the finite verb in languages such as German or Dutch presents an interesting problem for grammar frameworks such as Head Driven Phrase Structure Grammar (HPSG) and related Categorial Grammar style theories. Since the finite verb as the head of a clause may either precede or follow its complements and adjuncts (1)/(2), the question arises whether the two types of clauses can and should be assigned a uniform structural representation (modulo the position of the finite verb and the complementizer).[1]

(1) [$_H$ Bringt] [$_C$ er] [$_A$ morgen] [$_C$ dem Kunden] [$_A$ pünktlich] [$_C$ die Fracht]
(2) daß [$_C$ er] [$_A$ morgen] [$_C$ dem Kunden] [$_A$ pünktlich] [$_C$ die Fracht] [$_H$ bringt]

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[1] Throughout this paper we will abbreviate the abstract grammatical functions HEAD, COMPLEMENT and ADJUNCT as H, C and A respectively. In our discussion we will largely abstract away from the phenomena of V-second or topicalization and from word order variations in the "Mittelfeld". Both of these phenomena we consider to be quite unrelated to the problem of the position of the finite verb and for both a range of independent modular solutions can be envisaged.

In this paper we want to show that the possible analyses of this problem within the framework of HPSG are limited by combinations of the following basic assumptions:

(a) The HPSG treatment of complements and adjuncts is maintained as it is expressed in the Subcategorization Principle (SP) and the Semantics Principle (SemP).

(b) V-initial and V-final structures are given a uniform structural representation.

(c) The verb in the initial position is analysed *in situ* as the head of the clause.

We will argue that fixing two of the parameters will automatically lead to a rejection of the remaining assumption. Maintaining all three assumptions will require the introduction of additional devices requiring a modification and extension of principles and generalizations of the framework.

The first approach we discuss, by (Pollard 1991), maintains the parameters (b) and (c) by postulating a flat structure for the verb and its complements and adjuncts. We will argue that this approach not only complicates the treatment of adjunction but also commits one to the assumption of a phrase structure for which there is little linguistic motivation. As a variant of the rejection of (a) we discuss the possibility of a uniform binary right-branching structure which involves a modification of the SP and which has a technically very unpleasing analysis as a consequence. Thirdly, we will discuss the effects of maintaining the assumptions (a) and (c) on the second parameter, above all the implications of a non-uniform phrase structural representation for V-initial and V-final clauses. Finally two solutions suggested by Borsley (1990) and Kiss/Wesche (1991), and Oliva (1992) attempt to maintain all three assumption at the cost of introducing additional devices.

In section 3 we introduce our own approach and assume that assumption (c) as the least motivated should be abandoned, i.e., that a clause initial finite verb is not derived as the clausal head *in situ*. We present an analysis which is embedded in an approach to specifiers or functional categories, such as determiners, complementizers etc., which analyses these categories as the functional heads of the respective constituents. The analog to a complementizer in a V-final clause will be a clause-final empty functional head which subcategorizes for the (initial) finite verb.

2.1 Pollard: On Head Non-Movement

Pollard (1991) suggests to treat V-initial structures in German as a more general case of the phrase structure schema for auxiliary inversion in English.[2] Whereas in English the schema is restricted to apply only to phrases headed by an auxiliary, it would apply in German to all finite verbs, such that the structure for V-initial clauses will be (3).

(3) [$[_H$ Schenkt] $[_C$ der Mann] $[_C$ dem Kind] $[_C$ ein Fahrrad]]

The position of the finite verb is determined by a topological `HEAD` feature `INV` marking inversion. All root sentences (or main clauses) are required to be specified as [`INV` +]. Two LP-rules have to specify that a verbal head marked as [`INV` +] has to precede all its complements, whereas a verbal head marked [`INV` −] has to follow them.

The obvious advantage of this approach is that it not only provides a solution to the problem of finite verb position but also gives us a relatively simple handle on the order of complements in the "Mittelfeld" which can be freely permuted.[3]

[2] Cf. Pollard/Sag (1992: 29), where the relevant phrase structure schema for English is defined as "(Schema 3) a saturated ([`SUBCAT` ⟨ ⟩]) phrase with `DTRS` value of sort *head-comp-struc* in which the `HEAD-DTR` value is a lexical sign."

[3] In fact, in connection with a technique developed by Hinrichs/Nakazawa (1992), this approach even allows the description of some of the more intricate phenomena of partial VP-fronting. Some of the shortcomings of this analysis are addressed and neutralized in Nerbonne (1992).

However, ignoring a certain number of linguistic counter-arguments, the main problem of this approach is that it will complicate the syntactic treatment of adjunction and complementation. If we want to maintain a uniform *flat* structure for the "Mittelfeld" and the assumption of the finite verb as a head in *in situ*, we may be able to keep up the SP, but we cannot maintain the treatment of adjunction as it is proposed in Pollard/Sag (1992:45ff).[4]

In Pollard/Sag (1992) adjuncts are characterized as non-head daughters which select a head through an attribute `MOD` whose value is identified with the `SYNSEM` value of the `HEAD-DTR`. In the SemP the flow of semantic information for head-complement structures and head-adjunct-structures (4) is defined such that in the latter case the `CONTENT` value of the mother node is not identified with the one of the `HEAD-DTR` but rather with the `CONTENT` value of the `ADJ-DTR`. Thus, while the `HEAD-DTR` continues to provide the syntactic head, the `ADJ-DTR` functions as the semantic head.

(4) Phrase Structure Schema for Head Adjunct Structures

$$\mathbf{H}\quad \left[\texttt{LOC}\begin{bmatrix}\texttt{CAT} & \left[\texttt{HEAD}\ \boxed{1}\right] \\ \texttt{CONT} & \boxed{2}\end{bmatrix}\right]$$

$$\mathbf{H}\quad \left[\texttt{LOC}\ \boxed{3}\left[\texttt{CAT}\left[\texttt{HEAD}\ \boxed{1}\right]\right]\right] \qquad \mathbf{A}\quad \left[\texttt{LOC}\begin{bmatrix}\texttt{CAT} & \left[\texttt{HEAD}\left[\texttt{MOD}\ \boxed{3}\right]\right] \\ \texttt{CONT} & \boxed{2}\end{bmatrix}\right]$$

Sentences such as (1)/(2) where several adjuncts are interspersed with complements present a serious problem for Pollard's approach for various reasons. To begin with, it will be necessary to modify the approach such that in a flat head-complement structure the verb combines not only with all the complements but also with all the adjuncts at the same time. In a certain way this renders the notion of a phrase structure obsolete, since head, complements and adjuncts appear now as a list of constituents on a par.

As a further consequence the value of the attribute `ADJ-DTR` will have to be a list or set of feature structures rather than a simple feature structure. Since each element of this set may impose selectional restrictions on the head, we will need universal quantification in order to distribute the head daughters information over all the elements. In addition, we cannot maintain the SemP anymore since we would now have multiple semantic heads, namely as many as there are adjuncts. This would again make it necessary to use universal quantification or a corresponding function to collect the semantic content of all the adjuncts.

2.2 Inversion of the Subcategorization Principle

To avoid in particular the last problem addressed, one could go for an alternative approach where the verbal head is combined with only one complement or adjunct at a time, yielding a binary branching structure of a lexical or phrasal head, and a complement or adjunct.

While the head-adjunct rule could be maintained as it is given above, only one head-complement rule is required (5). For the sake of simplicity we assume here that the SP is

[4]This problem is the central concern of Kasper (1992) who also develops a proposal for the necessary modifications.

reduced to a simple function **cons** concatenating the `SYNSEM` value of the `COMP-DTR` with the `SUBCAT` list on the mother.

(5) Phrase Structure Schema for a Binary Head-Complement Structure

$$\overset{\textbf{H}}{\left[\texttt{LOC}\left[\begin{array}{l}\texttt{CAT}\left[\begin{array}{ll}\texttt{HEAD} & \boxed{1}\\ \texttt{SUBCAT} & \boxed{2}\end{array}\right]\\ \texttt{CONT}\ \boxed{3}\end{array}\right]\right]}$$

$$\overset{\textbf{H}}{\left[\texttt{LOC}\left[\begin{array}{l}\texttt{CAT}\left[\begin{array}{ll}\texttt{HEAD} & \boxed{1}\\ \texttt{SUBCAT} & cons(\boxed{4},\boxed{2})\end{array}\right]\\ \texttt{CONT}\ \boxed{3}\end{array}\right]\right]} \qquad \overset{\textbf{C}}{\left[\texttt{LOC}\ \boxed{4}\right]}$$

The advantage of such a binary derivation is obviously that we can freely mix complements and any number of adjuncts without having to worry about the identity of the syntactic or semantic head at any given time. However, according to the definition of the SP a head cannot precede a right-branching structure of complements (or follow a left-branching one) since the SP works "inside out". The head introduces the subcategorization list which is then successively reduced until it has become an empty list at the root of the domain of the head.

Thus, it seems that the assumption of the "Mittelfeld" as a uniform right-branching structure and the initial finite verb as a head *in situ* could only be maintained if we inverted the SP for the particular case of V-initial structures, such that it works exactly the opposite to standard derivations. In such a definition, the `SUBCAT` value of the mother node would have to be the sum or concatenation of the `SUBCAT` lists of the `HEAD-DTR` and the `COMP-DTR`. This could be implemented with a lot of tricky hacking but it is easy to imagine that it would also cause an enormous complication and proliferation of rules and principles just for this one particular case.[5]

2.3 Non-uniform Structural Representations

If we want to assume a binary structure, due to the problem of adjunction *and* maintain that the verb in initial position is derived as the head, the standard SP will enforce two different directions of branching for V-initial and V-final structures, namely left-recursive and right-recursive respectively (6).

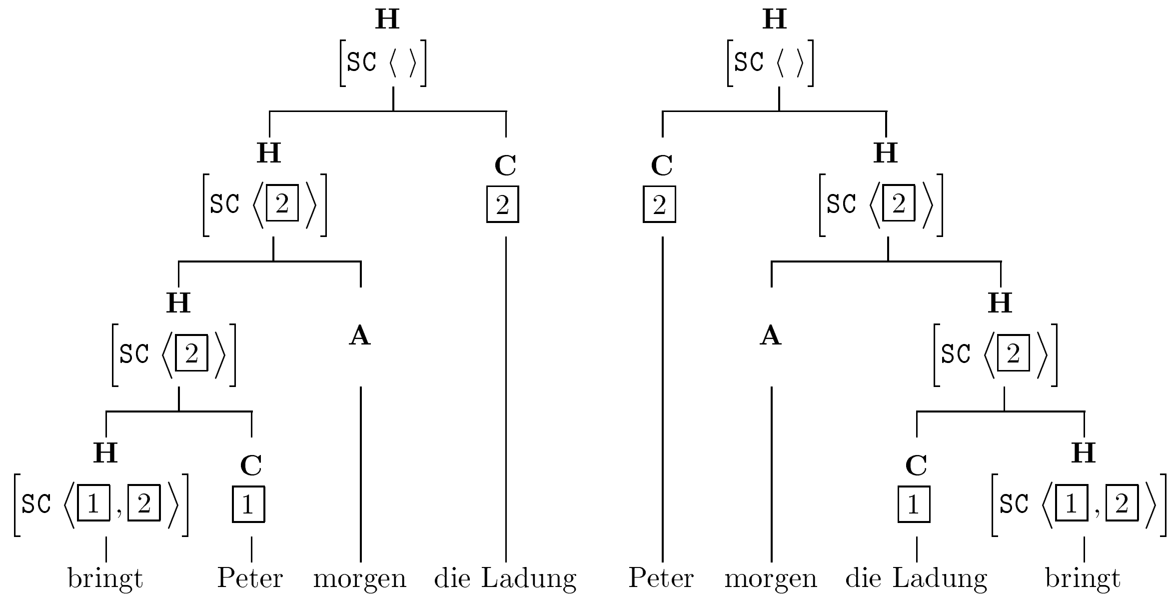
As one effect of these assumptions standard c-command relations will be inverted for different head positions. If c-command should play a role in determining the scope of quantifiers or adjuncts, we end up in a situation where we would have to accept different scoping relations for the same sequence of complements and adjuncts, depending on whether the verbal head appears in a final or inital position.

Similarly, the simplified implementation of the SP above, which exploits the order of elements on the `SUBCAT` for determining the order of complements, will now give us reversed orderings of complements for a left- and a right-branching structure. As a consequence we have to reverse the order of elements on the `SUBCAT`-list for the two different

[5] An approach in categorial grammar which goes in this direction is Hepple (1990) who suggests to apply type raising to the verbal head as well as to the complements, such that all complements can be combined with each other to form a constituent *before* they combine with the head.

verb positions, i.e., assume two different lexical entries.[6] Furthermore, under this account we are forced to stipulate constituency for substrings for which there is no linguistic evidence whatsoever. In particular, in a simple unmarked V–S–O structure we would have to claim that the verb first of all forms a constituent with its subject before it combines with an object.

(6) Left- and Right-Recursive Binary Branching



In short, the only mileage that we can get out of a left-branching binary structure is that it simplifies our treatment of adjuncts, whereas it does not increase in any respect the linguistic adequacy or elegance of the description.

2.4 Introduction of Extra Mechanisms

To resolve the obvious conflict between a right-branching structure and the preceding verbal head several proposals have been made to "transport" the subcategorization frame from the "external" position of the head to an "internal", i.e., clause final position, such that the SP can be applied in its standard way. One proposal along this line is by Kiss/Wesche (1991) who apply an approach by Borsley (1989) to German and who use a non-local mechanism, another suggestion is by Oliva (1992) who exploits the Head Feature Principle (HFP) for this purpose.

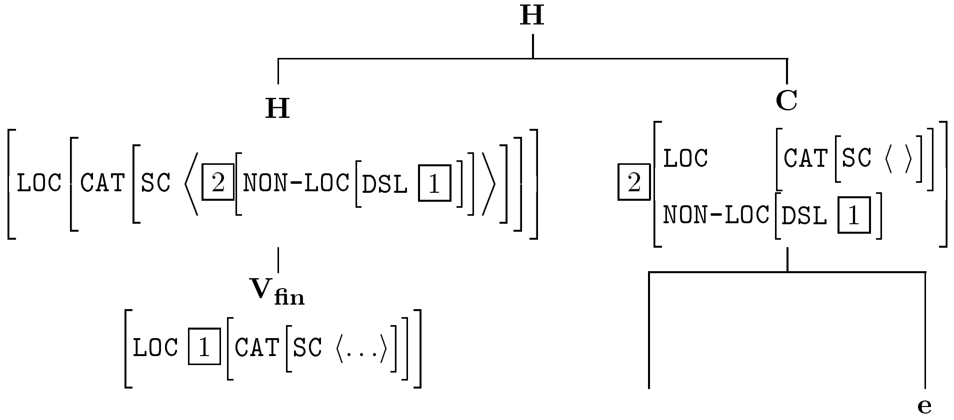
Kiss/Wesche's proposal involves a specific non-local feature "Double Slash" `DSL` in analogy to the standard non-local feature `SLASH` used to percolate dislocated WH-Phrases. The finite verb in initial position is derived by a lexical rule and subcategorizes for a VP carrying this feature. This lexical rule also coindexes the value of the `DSL` feature with the `LOCAL` attribute of the original verb such that `DSL` also contains the original subcategorization frame (7). At the bottom of the tree `DSL` is coindexed with the `LOCAL` value of an empty head such that the `SUBCAT` list can now be reduced from right to left.

The weaknesses of this approach are not only that it requires in addition to an empty head a lexical rule deriving a second type of finite verb. Above all, it makes use of a mechanism devised for non-local relations, in order to express a dependency which is clearly limited to "head domains" which could be defined through the HFP.

While genuine non-local dependencies in German, such as topicalization or dislocation of WH-elements, are not limited by clause boundaries, the relation between a finite verb

[6] An approach along these lines has been suggested in Hoeksema (1985) for categorial grammar.

(7) Introduction of `DSL` (including Lexical Rule)



in initial position and a corresponding empty terminal node is clearly bound to a domain which is even smaller than the domain of a clause, if one assumes that a clause may contain several (non-finite) verbal heads in addition. As a consequence the Non-Local Principle governing the distribution and flow of non-local information has to be artificially constrained for this particular case in order to percolate `DSL` features *only* along a path of heads.

At least in this latter aspect the approach taken by Oliva (1992) appears to be preferable insofar as he exploits the HFP directly for establishing a relation between the subcatorization of an initial finite verb and a clause final empty node. The structures he proposes are very similar to (7), the difference being that not the entire `LOCAL` value of the verb is coindexed with the `DSL` value, but only the `SUBCAT` value is coindexed with a `HEAD` feature `HEAD-SUBCAT` appearing on its complement. This subcategorization is percolated by the HFP and taken off again at the bottom of the tree where it becomes the `SUBCAT` value of an empty node.

However, in order to achieve this percolation effect Oliva has to split up the HFP and the SP into several subprinciples which regulate when the `HEAD-SUBCAT` may be identified with `SUBCAT` value and when not, i.e., again some very general prinicples have to be modified.

3 Non-Head Non-Movement

Before we now outline our own approach, we shortly summarize some of the basic assumptions and generalizations that we consider to be linguistically relevant.

– There is no evidence for assuming different types of lexical entries for finite verbs in a V-final and a V-initial position.

– A right branching binary structure for the "Mittelfeld" presumably simplifies the description of phenomena such as adjunction, scoping and focus, and coordination.

– The most general way to characterize word order in German is that categories which can be marked as [`V` $-$], i.e., nouns and prepositions, take a head-initial position, whereas those which are marked [`V` $+$], i.e., verbs and adjectives, are consistently head-final.

– A relation between an initial finite verb and a clause final empty head is not a non-local relation but should be restricted to head domains.

In order to maintain these generalizations we will adopt one assumption from the movement analysis for V-initial, namely that there is a clause final empty node which functions as the head of the clause. However, to establish the relation between this empty node and the finite verb we will make use of the existing *subcategorization* mechanism of HPSG rather than introducing new or modifying existing principles.

Before we go into the details of our analysis we outline some background assumptions concerning some steps in the direction of a theory of *functional heads* outlined in Netter (1992). In this paper we give an analysis for German noun phrases based on the view that the determiner functions structurally as the `HEAD-DTR` of noun phrases.[7]

One of the crucial hypotheses in this analysis is that the traditional `HEAD` features can be split into two subsets, which are organized under two features `MAJOR` and `MINOR`. Under the `MAJOR` feature information associated with "major" categories (nouns, verbs, adjectives, prepositions) would be encoded, such as some categorial features, agreement, tense and mood features, etc. The `MINOR` feature contains information concerning "minor" or functional categories such as complementizers, determiners, conjunctions etc.

We then define the category of maximal phrasal projections, such as nominal phrases, sentences, etc., by requiring that they have to be fully saturated (i.e., have an empty `SUBCAT` list) but that they also have to be marked as "functionally complete" (f-complete). Functional completeness is taken to be a property which can either be introduced through a functional category, or which can be associated directly with a lexical category. For example, singular count nouns are marked in the lexicon as being f-incomplete [`FCOMPL` −], which means that they first have to combine with a determiner in order to form a maximal phrase. Mass nouns and bare plurals on the other hand are unmarked in this respect, such that they can either combine with a determiner or they can project into a maximal nominal phrase directly.

Functional categories, such as determiners or complementizers, are assumed be the head of the phrase and to subcategorize for a major category which has to be marked as f-incomplete. The `MAJOR` feature of the complement is "raised" and unified with the `MAJOR` attribute of the functional category. Accordingly, an unspecified and a specified phrase will have the same `MAJOR` feature, but could differ in their `MINOR` features.

(8) Lexical Entry for Determiner (`SYNSEM` value)

$$
{}_{det}\begin{bmatrix} \texttt{LOC} & \begin{bmatrix} \texttt{CAT} & \begin{bmatrix} \texttt{HEAD} & \begin{bmatrix} \texttt{MAJOR}\ \boxed{1}\begin{bmatrix} \texttt{N} & + \\ \texttt{V} & - \end{bmatrix} \\ \texttt{MINOR}\begin{bmatrix} \texttt{FCOMPL} & + \end{bmatrix} \end{bmatrix} \\ \texttt{SUBCAT} & \left\langle {}_{np}\begin{bmatrix} \texttt{CAT} & \begin{bmatrix} \texttt{HEAD} & \begin{bmatrix} \texttt{MAJOR}\ \boxed{1} \\ \texttt{MINOR}\begin{bmatrix} \texttt{FCOMPL} & - \end{bmatrix} \end{bmatrix} \\ \texttt{SUBCAT} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \end{bmatrix}
$$

How does the notion of f-completeness for nouns and determiners carry over to finite verb constructions? To begin with, if we compare finite with non-finite constructions we see that finite verbs are intrinsically f-incomplete in a way that non-finite verbs are not. For example, while there are plenty of constructions (9)/(10) where non-finite verbs project into full maximal phrase without any specifiers or structural reorganisation, this is never the case for finite constructions.

(9) Den Rasen nicht betreten

(10) Saarländischer Finanzminister zurückgetreten

Whenever we find a finite verb in German involved in the formation of a maximal phrase, be it a main or a subordinate clause, it is bound either to the presence of some *lexical* functional head (f-head) or to some *structural* marking of the finite verb. The former situation is given in the case of V-final clauses, where we have to have a complementizer,

[7] A very similar approach had been suggested by Gosse Bouma (1988) for the framework of categorial grammar.

relative or question pronoun which will mark the sentence as f-complete. In all cases where such a lexical f-head is absent, the finite verb has to appear in a clause initial position. As a natural conclusion, we could assume that its intrinsic f-incompleteness in this case is compensated on a structural level.

We presuppose accordingly that all finite verbs are intrinsically marked in the lexicon as f-incomplete, i.e., [FCOMPL −].[8] The derivation of V-final finite constructions with a complementizer then follows the pattern involving a specifier or determiner in nominal constructions. The lexical entry of a complementizer will be identical to the entry for determiners (10)with the difference that the MAJOR feature of the complement is verbal rather than nominal. Given the assumption that verbal heads always have to appear in a head-final position the clause-final position of the finite verb follows.

However, for the derivation of V-initial structures there is clearly no such explicit lexical element which could operate as the f-head marking the construction as f-complete. To compensate this lack we propose an *empty* f-head whose lexical structure (11) will be quite similar to lexically overt complementizers. This empty node has in common with complementizers that it subcategorizes for a f-incomplete verbal category, however in this case the subcategorization will be for a non-phrasal, lexical category. Exactly like complementizers the empty head will adopt the MAJOR features from the verbal category, while providing itself some MINOR head feature which marks the clause as f-complete.[9]

Under this assumption, the clause initial finite verb will not function as the HEAD-DTR of the clause anymore but simply as a complement to the f-head. However, all of its relevant MAJOR properties (e.g. tense, mood etc.) will still be passed on through the empty head to the maximal projection of the clause. The same holds for the semantic CONTENT of the verb.

(11) Empty Functional Head

$$
{}_{\textit{eps}}\left[\begin{array}{ll}
\texttt{LOC} & \left[\begin{array}{ll}
\texttt{CAT} & \left[\begin{array}{ll}
\texttt{HEAD} & \left[\begin{array}{l}
\texttt{MAJ}\ \boxed{1}\left[\begin{array}{l}\texttt{N}\ -\\ \texttt{V}\ +\end{array}\right]\\
\texttt{MIN}\left[\texttt{FCOMPL}\ +\right]
\end{array}\right]\\
\texttt{SUBCAT}\ \textbf{snoc} & \left(\ {}_{\textit{vfin}}\left[\begin{array}{ll}
\texttt{LOC} & \left[\begin{array}{ll}
\texttt{CAT} & \left[\begin{array}{ll}
\texttt{HEAD} & \left[\begin{array}{l}\texttt{MAJ}\ \boxed{1}\\ \texttt{MIN}\left[\texttt{FCOMPL}\ -\right]\end{array}\right]\\
\texttt{SUBCAT} & \boxed{3}
\end{array}\right]\\
\texttt{LEX} & +\\
\texttt{CONT} & \boxed{2}
\end{array}\right]
\end{array}\right],\ \boxed{3}\ \right)
\end{array}\right]\\
\texttt{CONT} & \boxed{2}
\end{array}\right]
\end{array}\right]
$$

What still requires some explanation is how the subcategorization requirements of the verb are incorporated into those of the empty head. If the verb appears as a complement the empty f-head must be subcategorized on the one hand for the finite verb itself, but

[8] Whether non-finite verb forms should be assumed to be altogether unmarked in the lexicon we want to leave open here. The constructions which have to be investigated to resolve this question involve “non-finite” complementizers such as *um* or *anstatt*. Alternatively, it could also make sense to analyse the infinitive marker *zu* as an f-head.

[9] Note by the way that the f-head in V-initial clauses does not necessarily have to be empty. It is easy to imagine an analysis for separable verb prefixes such as (i) where the prefix replaces the empty f-head subactegorising for the finite verb stem.

(i) *Stellt* er das Problem *dar*

also for all the complements that the finite verb is subcategorized for. This is expressed in (11) by specifying the SUBCAT value of the f-head as the value of a functional constraint **snoc** (the "inverse" of **cons**). This function appends a feature structure to the end of a list of feature structures, yielding as a result a list of feature structures. In this instance, the function will have as its value a list which is obtained from appending the feature structure of the finite verb itself to the list which occurs as the SUBCAT value of the verb.

We illustrate this function with the example of a transitive finite verb which subcategorizes for two nominal complements. If we instantiate the first argument of **snoc** with such a verb the function representing the SUBCAT value of the empty node takes the following form:

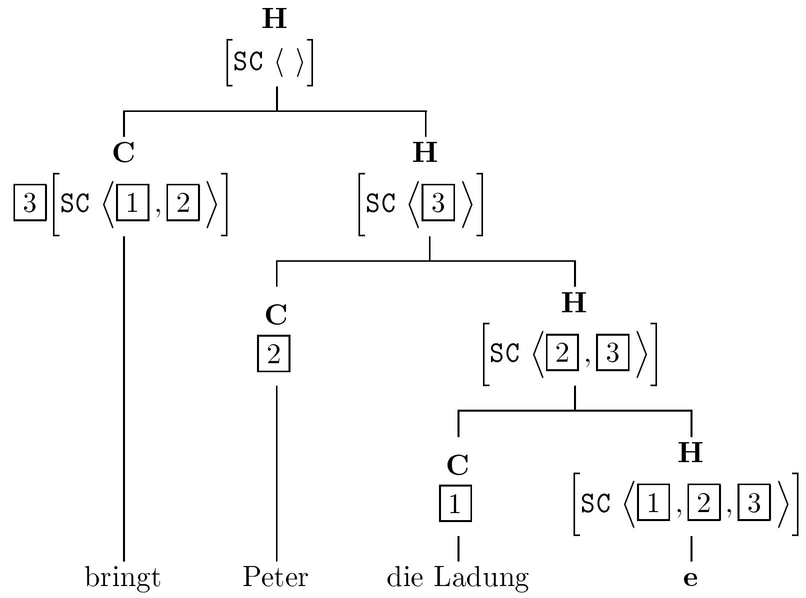
(12) $$\textbf{snoc}\left({}_{\mathit{vfin}}\begin{bmatrix} \texttt{LOC}\begin{bmatrix}\texttt{CAT}\begin{bmatrix}\texttt{HEAD} & \begin{bmatrix}\texttt{MAJ}\begin{bmatrix}\texttt{N} & - \\ \texttt{V} & +\end{bmatrix} \\ \texttt{MIN}\begin{bmatrix}\texttt{FCOMPL} & -\end{bmatrix}\end{bmatrix} \\ \texttt{SUBCAT} & \boxed{3}\left\langle \mathit{np\text{-}acc}[\ ], \mathit{np\text{-}nom}[\ ]\right\rangle \end{bmatrix}\end{bmatrix}\end{bmatrix}, \boxed{3} \right)$$

As the result of the evaluation of the function we obtain a list of three elements consisting of the two arguments of the verb and the verb itself:

(13) $$\left\langle \boxed{1}_{\mathit{np\text{-}acc}}[\ ],\ \boxed{2}_{\mathit{np\text{-}nom}}[\ ],\ {}_{\mathit{vfin}}\begin{bmatrix}\texttt{CAT}\begin{bmatrix}\texttt{HEAD} & \begin{bmatrix}\texttt{MAJ}\begin{bmatrix}\texttt{N} & - \\ \texttt{V} & +\end{bmatrix} \\ \texttt{MIN}\begin{bmatrix}\texttt{FCOMPL} & -\end{bmatrix}\end{bmatrix} \\ \texttt{SUBCAT} & \left\langle\boxed{1},\boxed{2}\right\rangle\end{bmatrix}\end{bmatrix} \right\rangle$$

The important point about this SUBCAT list is of course that as soon as the empty head "consumes" one of the nominal arguments the structure of this argument will be automatically unified with the variables on the SUBCAT list of the finite verb. This is relevant insofar as only the lexical entry of the verb will "know" how to integrate or relate the semantics of its complements. The semantic content of the finite verb is then unified in the lexical entry of the f-head (11) with its CONTENT feature, such that it will enter into the semantic representation of the clause.

(14)



The only other devices that we need to complete the picture are the independently motivated binary head-complement and head-adjunct rules given above. Also, we need only one linear precedence constraint to determine the branching direction of the clausal structure. This LP constraint will require that a `HEAD-DTR` specified as [V +] has to follow a `COMP-DTR` or an `ADJ-DTR`.

Given these two rules together with the head-final LP constraint, we are now able to derive all of the above described V-initial sentences with an unmarked word order of nominal complements and an arbitrary order and number of adjuncts. As mentioned, verb-final clauses will be trivial to derive if we specify the complementizer as the f-head of the clauses.

As a topic for further research we have to mention that our simplistic assumption above, that the order of nominal complements in the "Mittelfeld" can be encoded in the linear order of the `SUBCAT` list, of course cannot be maintained in a more serious approach to this problem. Fortunately, there are already quite a number of proposals on the table which show how precendence constraints over complements can be expressed even if these complements are not sister to each other but occur in a hierarchical structure.[10]

Nevertheless, even if it will have to be proven by further research, we very much expect that our approach will turn out to be sufficiently modular to be maintained under these extensions.

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[10] Cf. e.g., Engelkamp/Erbach/Uszkoreit (1992), Oliva (1992)