Complementizers and Finite Verbs in German Sentence Structure

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In this paper,[1] we discuss a new approach to the analysis of the verb second phenomenon in German. The analysis builds on empirical generalizations previously studied in the GB framework. It accounts for the movement of finite verbs without lexical rules, traces or a feature INV(erted), and it eliminates the HEAD-FILLER-SCHEMA for unbounded dependencies. We show that a lexical theory of the elements at the left periphery of finite sentences allows natural empirical generalizations that phrase structure-based accounts and previous HPSG analyses have not been able to provide.

1 GB Approaches

In many GB approaches to German syntax, a functional projection CP accounts for verb fronting (movement to C^0) in verb initial (V1) and verb second (V2) clauses. In verb final clauses with a lexical complementizer (c-VF clauses), the complementizer is in C^0 position, thus preventing verb movement. In V2 clauses, an XP constituent moves to the specifier position of the CP (Spec-CP). Embedded w-clauses have a moved XP w-constituent which functions as a complementizer. They are always verb final (w-VF) clauses. The four types of clauses are illustrated in (1) and are assigned the syntactic structure shown in figure 1.

(1) a. daß Hans das Buch kauft
that Hans the book buys
that Hans buys the book

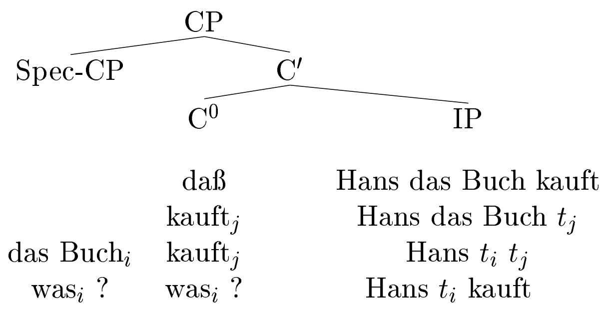
b. kauft Hans das Buch
buys Hans the book
does Hans buy the book

c. das Buch kauft Hans
the book buys Hans
Hans buys the book

d. (ich weiß nicht) was Hans kauft
(I don't know) what Hans buys
I don't know what Hans buys

[1] We are very grateful to Thilo Götz, Erhard Hinrichs, Tilman Höhle, Tibor Kiss, Detmar Meurers, Guido Minnen, Gerald Penn and Craig Thiersch for discussions and comments.

Figure 1: A GB structure for the German left periphery



The presence or absence of a complementizer in C^0 has been used to account for the verb movement facts in V1, V2 and c-VF clauses.[2] It is clear that w-VF clauses present a problem. If the w-constituent moves to Spec-CP, then verb movement to C^0 should be possible just as in V2 clauses. In case the w-constituent moves to C^0, an XP constituent occupies the X^0 position, which constitutes a violation of X-bar theory.[3]

To overcome these problems, a so-called Doubly Filled Comps filter (cf. (Stechow and Sternefeld 1988)) has been proposed which prevents the simultaneous presence of elements in both Spec-CP and C^0 in certain types of sentences. Müller and Sternefeld (1993) postulate an overt complementizer in w-VF clauses on S-structure which is then deleted at PF. Other approaches use feature checking devices like Specifier-Head-Agreement (as Lasnik and Saito (1992) do for English) which, depending on some parametric setting, either enforce or forbid simultaneous filling of Spec-CP and C^0.

2 Empirical Motivation

In this section, we point to three sets of data that are problematic to present approaches in GB and, as will be shown in section 3, to previous HPSG analyses. It will turn out that the analysis we propose in section 4 captures the given data by a shift to a word-level treatment of the Germanic left periphery.

As mentioned in (Höhle 1997), in Old English, Middle High German, Middle Low German, Modern Dutch and in some modern German dialects, the morphology of a fronted verb in V2 clauses depends on the kind of constituent that occupies the Vorfeld. As shown in (2), in Dutch V1 and V2 clauses with a second person singular subject, the verb has a special inflection if there is no Vorfeld or a non-subject stands in the Vorfeld.

(2) a. je **hebt/*heb** het boek gekocht
you (2sg.) have the book bought
(you have bought the book)

b. het boek **heb/*hebt** je gekocht.
(you have bought the book)

[2] This idea is generally attributed to den Besten (1983).

[3] The first approach is taken e.g. in (Rizzi 1990), the second in (Reis 1985). The general problem is discussed in (Stechow and Sternefeld 1988).

c. **heb/*hebt** je het boek gekocht?
(have you bought the book)

d. dat je het boek gekocht **hebt/*heb**
(that you have bought the book)

Another important empirical generalization concerns Verum Focus. Verum Focus is achieved by stressing the finite verb in V1 and V2 clauses. In c-VF clauses, the complementizer must be stressed, and, in w-VF clauses, the w-pronoun of the w-constituent which functions as a complementizer bears main stress (Höhle 1992). In (3), stress is indicated by italics, and Verum Focus is entailed in appropriate contexts.

(3) a. Hans *hat* das Buch gekauft

b. *Hat* Hans das Buch gekauft

c. *daß* Hans das Buch gekauft hat

d. *wess*en Buch Hans gekauft hat

Finally, in some German dialects, the left periphery of w-VF clauses may consist of a w-constituent and *daß*. As an apparent violation of the Doubly Filled Comps filter, this construction has been particularly puzzling for principled accounts of German sentence structure.

(4) (ich weiß nicht,) welches Buch daß der Hans gekauft hat
(I know not) which book that the Hans has bought
(I dont know which book Hans bought)

Sentences like (4) interact with the Verum Focus data in an interesting way: Verum Focus can only be achieved by stressing *daß*, but not by stressing the w-constituent, *welches Buch*, mirroring the facts in V2 clauses, (3a), where stressing the constituent in the Vorfeld cannot result in Verum Focus, but stressing the verb in the V2 position can.

(5) a. (jetzt möchte ich wissen) mit wem *daß* du getanzt hast

b. #(jetzt möchte ich wissen) mit *wem* daß du getanzt hast

(5b) is, of course, a grammatical sentence in German, but the embedded clause cannot be interpreted as bearing Verum Focus.

3 A Brief Overview of Work in HPSG

This section contains some critical remarks on the treatment of the German left periphery in the most prominent studies of German in HPSG.

Verb placement by word order principles The traditional HPSG (and GPSG) analysis of verb placement in German is cast in terms of a boolean-valued feature, INV (Uszkoreit 1986, Pollard 1996). This feature is present on all and only verbs, and its only purpose is to account for word order. As a consequence, the complementary distribution of complementizers and finite verbs, one of the basic empirical insights of German topological clause structure, does not follow from the treatment of verb placement with INV.

In addition, approaches to verb placement on the basis of a boolean feature INV lack the intrinsic means to account for the morphological variation in fronted verbs discussed in section 2: Both *hebt* and *heb* appear in V2 clauses, i.e., as INV *plus*. To account for these facts, an enrichment of the possible values of the INV feature could be envisaged. One aspect of our approach as sketched in section 4 can be seen as an instance of such an enrichment.

Verb placement by movement Inspired by the traditional GB analysis, several proposals to account for verb placement by verb movement have been made in HPSG (Frank 1994, Kiss 1995).

Abstracting away from details of the respective analyses, the fronted verb is introduced into the syntactic structure by an ID schema. Its linear order with respect to the rest of the clause must be determined by an LP principle. For this purpose, (Kiss 1995) uses a feature, DIR, which, just like INV, exclusively serves the purpose of predicting word order. (Feldhaus 1997) discusses several possibilities to account for the complementary distribution of complementizers and fronted verbs in this scenario. None of them, however, makes reference to the information needed to impose the ordering restrictions.

The analysis in (Frank 1994) relies on a distinction between functional and lexical categories. Fronted verbs are functional, whereas non-fronted verbs are considered substantive. The precedence principle used to account for the fronted position of a finite verb in V1 and V2 clauses makes reference to this distinction. This constitutes a generalization of the concept of functional categories in HPSG introduced by (Netter 1994). In addition, Frank must introduce a separate boolean feature EXTENDED that marks a *category* object as being either the projection of a functional or a lexical head. The complementary distribution of complementizers and fronted verbs is, then, expressed by a principle that requires a functional word to subcategorize for a lexical projection.

In (Kiss 1995) and (Frank 1994), separate parts of the feature geometry account for the ordering and the distribution of fronted verbs.

Constituent fronting by an ID schema The use of a specialized ID schema can be considered the standard HPSG account of topicalization and w-movement, at least for V2 clauses (Pollard 1996, Kiss 1995). In these approaches, the topicalized constituent is syntactically realized as a nonhead daughter.

It seems natural to use the same ID schema for all clause types with a fronted constituent (V2 and w-VF). Treating the fronted constituent in w-VF clauses parallel to Vorfeld constituents in V2 clauses, however, conceptually obscures the fact that these constituents pattern with complementizers in a significant way. The traditional GB dilemma, thus, reappears.[4]

Explicit topological fields (Kathol 1995, Kathol 1996) incorporate a variant of the traditional theory of topological fields (Engel 1970, Höhle 1986) directly into HPSG. Kathol assigns topological fields (TOPO values) to elements in the linearization domain of a clause. He captures the complementary distribution of fronted verbs and complementizers by a uniqueness requirement on linearization domains of sentences: Elements bearing the TOPO value *cf* (complementizer-field, C-Feld) which characterizes finite verbs and complementizers at the left periphery may only occur once. Kathol, nevertheless, has a filler-head constellation for fronted constituents (in the case of long extraction), and the TOPO value of such constituents

[4]The problems of such an approach are concisely summarized in (Feldhaus 1997, p. 88).

can be either *vf* (Vorfeld) or *cf*.

Kathol's analysis covers the basic data. However, as he splits the left periphery into two independent topological fields, Vorfeld and C-Feld, all data where the element in one field is dependent on the element in the other appear problematic. Firstly, as finite verbs do not have access to the Vorfeld constituent at the word level, the morphological variation discussed in section 2 cannot be accounted for at this level. One possibility to remedy this deficiency is to impose a principle on clauses that refers to both the element in the Vorfeld and the inflection paradigm of the finite verb. As such a principle seems to conflate the levels of syntax and morphology in an undesirable way, this seems to be rather unattractive.

A second problem with splitting up the left periphery arises with data such as (4). If a fronted w-constituent co-occurs with *daß*, both left-peripheral fields, *vf* and *cf*, are filled. (Kathol 1995, p. 169 and p. 173) treats this distinction as a matter of parametric variation between standard German and Southern dialects, where the latter do not force the phonology of a marker to appear clause initially. The situations in which a complementizer can co-occur with a fronted constituent are, however, far more restricted than such a general parameter would suggest. In German dialects, *daß* and the relativizer *wo* are the only examples. Other complementizers, such as *weil* (*because*), never co-occur with a w-constituent to their left. To affirm the availability of a pre-complementizer constituent in German dialects, Kathol refers to the two constructions illustrated in (6).

(6) a. [An Mantl daß da Xaver kaffd hod] hod neamt glaubt
a coat that Xaver bought has has no-one believed
(No-one believed that Xaver bought a coat.)

b. [Das Bier wenn ich noch trink] bin ich gleich besoffen
the beer if I still drink am I soon drunk
(If I drink the beer, I will soon be drunk.)

Since it is not the case, however, that speakers who accept one of these constructions also accept all others, the parametric account is too general. In addition, the constructions in (6) differ from the w-*daß*-VF construction in a significant way. They may only occur in the Vorfeld of a matrix clause. This is a restriction that does not apply to w-*daß*-VF clauses. It is, thus, far from clear whether a unified analysis as envisaged by Kathol is adequate.

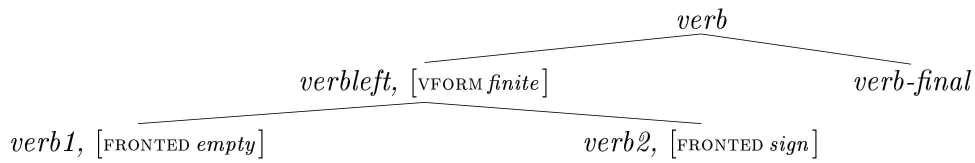
Even though Kathol can offer a solution to the kind of data under discussion by constraining the DOM lists of clauses, verbal morphology and special lexical elements like *daß* make a word-level approach seem more adequate to us, and more in line with the general lexicalist framework of HPSG.

4 An Analysis

We adopt an analysis of German sentence structure along the lines of (Pollard 1996)[5], and combine it with a word order module that provides ordering principles on word order domains which may go beyond local trees (Reape 1992, Richter and Sailer 1995). All complements will

[5]Partial VP-topicalization will not be considered. To include adjuncts, the analysis in (Kasper 1994) can be adopted. We do not claim that a flat analysis is the best way to treat German, but choose this analysis as a simple syntactic basis for an explicit formalization of principles. Since we are only interested in the left periphery of sentences, our independent analysis could be adapted to any other assumption about the syntactic structure of the Mittelfeld or the verbal complex, like, e.g., the binary branching structures in (Kathol 1995).

Figure 2: The sort hierarchy for the sort *verb*



be taken as sisters of the finite verb. We also postulate a trace for topicalized and wh-moved constituents, and the NONLOCAL FEATURE PRINCIPLE of Pollard and Sag (1994). In contrast to (Pollard 1996), we do not evoke a feature INV(erted) to treat verb movement. Furthermore, we do not use a HEAD FILLER SCHEMA to accommodate moved constituents to the syntactic structure of sentences. The most important change is an enrichment of the sort hierarchy subsumed by the sort *verb* and the introduction of a new head feature, FRONTED, which is defined on markers and on some subsorts of *verb* as shown in figure 2. The value of this new attribute is either *empty* or a *sign*. Word order at the left periphery of finite sentences is governed by a word order principle:

(7) FRONTED ORDERING PRINCIPLE (FOP): In a finite sentence, S, with word order domain D, the phonology of the unique word in D that bears the head feature FRONTED precedes the phonology of all other elements of D in the PHON value of S.

In effect, the FRONTED ORDERING PRINCIPLE says that, in each finite sentence, there must be exactly one word bearing a FRONTED feature, and the phonology of this word comes first in the phonology of the overall sentence. The word order domain of a finite sentence contains its immediate constituents.[6] Words with head value *verb-final* do not qualify as the 'unique word' of (7) and are subject to word order principles concerning the position of the phonology of the verbal complex relative to the topology of its clause.

Henceforth, we call the word of a finite sentence on which the head feature FRONTED is defined the *opener* of that sentence.

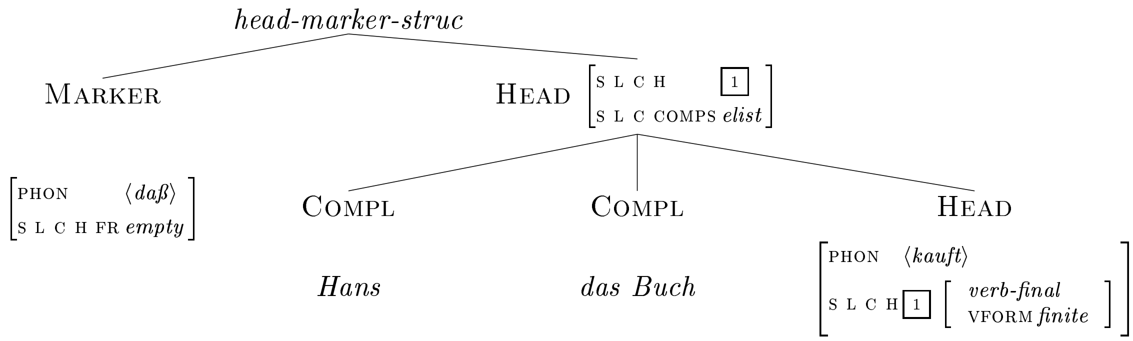
As mentioned in section 3, it seems desirable to treat the binding of nonlocal dependencies by the same means independent of whether a constituent is moved to the left periphery of a V2 clause or a w-VF clause. The HEAD-FILLER SCHEMA is, however, inadequate if we want to treat the syntactic structure of c-VF and w-VF clauses uniformly. We, therefore, introduce a new principle to discharge slashed elements, even though we presuppose the NONLOCAL FEATURE PRINCIPLE.

(8) DEPENDENCY CANCELLATION PRINCIPLE (DCP): In a finite sentence, S, with word order domain, D, if D's opener has a FRONTED value of sort *sign*, then the TO-BIND SLASH value of the head-daughter is a singleton set whose element is token identical with the opener's FRONTED SYNSEM LOC value; otherwise, the TO-BIND SLASH value is the empty set.

Supposing the discussed changes to and additions of principles, all that is needed to account for the variation illustrated in (1) are the lexical entries for complementizers and finite verbs.

[6]For an exact specification of the pertinent relations and principles, see (Richter 1997). The relational theory of word order presented there is modeled after the linearization theory of (Richter and Sailer 1995). Our word order module crucially differs from (Kathol 1995) in that we make explicit reference to the *word*/*phrase* status of the elements whose phonologies are to be ordered.

Figure 3: The structure of a c-VF clause: *daß Hans das Buch kauft*



Complementizers For c-VF clauses, we assume a marker *daß (that)* as shown in (9). It selects a verb with an empty COMPS list and a HEAD value of sort *verb*. With the FRONTED ORDERING PRINCIPLE it follows (by virtue of the sort hierarchy in figure 2) that, in every *head-marker-structure*, the head daughter must be a verb of sort *verb-final*. The word order of the marker also follows from the FOP. Figure 3 [7] shows the syntactic structure of a c-VF clause.

(9) The marker *daß*:

$$\begin{bmatrix} \textit{word} \\ \text{PHON } \textit{daß} \\ \text{S L C} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{marker} \\ \text{FRONTED } \textit{empty} \\ \text{SPEC L C} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{VFORM } \textit{finite} \end{bmatrix} \\ \text{VAL COMPS } \textit{elist} \end{bmatrix} \end{bmatrix} \\ \text{MARKING } \textit{daß} \end{bmatrix} \end{bmatrix}$$

For w-VF clauses, we introduce the marker shown in (10).

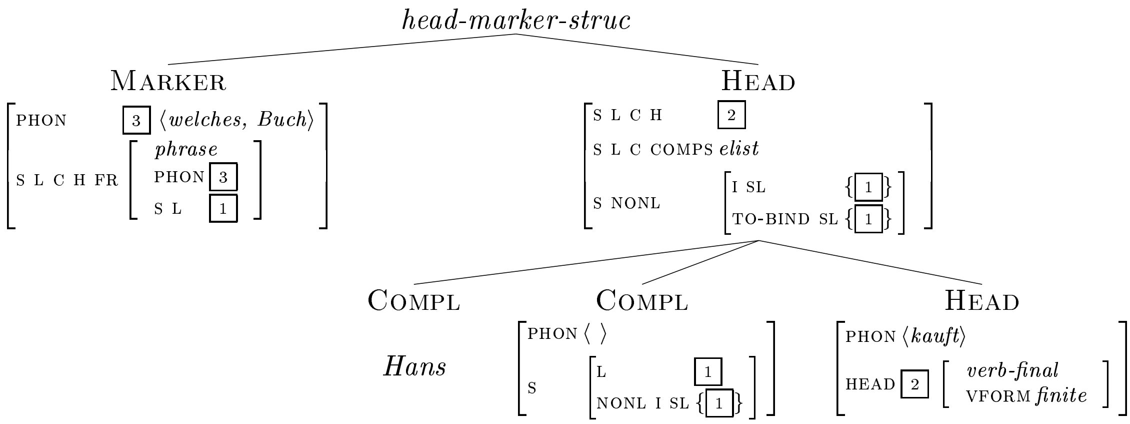
(10) The w-marker:

$$\begin{bmatrix} \textit{word} \\ \text{PHON } \boxed{1} \\ \text{S} \begin{bmatrix} \text{L C} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{marker} \\ \text{FRONTED} \begin{bmatrix} \textit{sign} \\ \text{PHON } \boxed{1} \\ \text{S} \begin{bmatrix} \text{L C H DEF } \textit{interrogative} \end{bmatrix} \end{bmatrix} \\ \text{SPEC} \begin{bmatrix} \textit{synsem} \\ \text{L C} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{verb} \\ \text{VFORM } \textit{finite} \end{bmatrix} \\ \text{VAL COMPS } \textit{elist} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\ \text{MARKING } \textit{w} \end{bmatrix} \\ \text{NONL} \begin{bmatrix} \text{INHER SLASH } \textit{eset} \\ \text{TO-BIND SLASH } \textit{eset} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Its MARKING value is *w*, and it selects a finite verb with its SPEC attribute. In addition, it has a *sign*-valued FRONTED attribute. Finally, the PHON value of the marker is identical to

[7] To keep the structures simple, we use the following abbreviations for features: S(YNSEM), L(OCAL), NONL(LOCAL), C(AT), H(EAD), FR(ONTED), V(AL), I(NHERITED), SL(ASH).

Figure 4: The structure of a w-VF clause: *welches Buch Hans kauft*



the PHON value of its FRONTED constituent. These four properties guarantee that exactly one constituent moves out of the finite verbal projection selected by its SPEC value into the FRONTED value. Moreover, the phonology of the moved constituent appears in the overall phonology. As shown in figure 4, the DEPENDENCY CANCELLATION PRINCIPLE ensures that the LOCAL value of the sign in FRONTED is identical to the element in the TO-BIND SLASH value of the head-daughter in the sentence.

The w-marker imposes a restriction on the sign in FRONTED that says that it must be an interrogative w-constituent. As the FRONTED value contains a sign, whether it is a w-constituent or not is available in any adequate analysis of pied piping. To our knowledge, the following options have been proposed: (Pollard and Yoo 1997) proposes a feature percolation mechanism for the traditional nonlocal feature, QUE, specific for English, which would need to be modified for German, whereas (Feldhaus 1997) introduces a head feature MOOD and a complex transfer mechanism to account for the corresponding German data. In (10), we adopt a proposal by (Winhart 1997) that identifies w-constituents in German by the value *interrogative* of a head feature, DEF, which plays a prominent role in Winhart's comprehensive DP analysis. In particular, discussing criteria for functional categories established by (Abney 1987), she concludes that prepositions in German have certain functional qualities that are reflected by their inheriting head values from their complement, including the DEF value (Winhart 1997, p. 369). The w-marker, (10), thus licenses w-constituents as exemplified in (11) as its FRONTED value.

(11) a. (ich weiß nicht,) [was] Hans kauft.

b. (ich weiß nicht,) [welchen Hund] Karl gefüttert hat.

c. (ich weiß nicht,) [in welchem Dorf] Karl wohnt.

For dialects that exhibit a co-occurrence of *daß* and a w-constituent at the left periphery as illustrated in (4), we assume that the w-marker differs slightly from its standard German counterpart, (10), by having an additional idiosyncratic phonological contribution, *daß*. The only difference in the lexical entry concerns the description of the PHON value of the marker and is indicated in (12). The rest of the lexical entry is supposed to be identical with (10).

(12) $\begin{bmatrix} \text{PHON} & \boxed{1} \\ \text{S L C H} & \boxed{2} \end{bmatrix} \wedge \exists x \ \texttt{construct-phon}(\boxed{1}, \boxed{2}, {}^{x}[\langle \textit{daß} \rangle])$

As we will see immediately, the effect of the relation `construct-phon` in (12) is to concatenate the phonology of the w-constituent in FRONTED and the phonology *daß*. The resulting phonological string is the phonology of the dialectal w-marker. In (4), this is *welches Buch daß*.

The lexical treatment of the left periphery enables us to reduce the difference between standard German w-VF clauses and dialectal w-*daß*-VF clauses to lexical variation. The simplicity of the account is also motivated because, even for speakers of dialects, standard German w-VF clauses are grammatical and the standard and the dialectal variant are distributionally free variants of each other.

Finite Verbs We assume a lexical entry for finite verbs as illustrated in (13) for the verb *kauft* (buys). Note the parallels of the lexical entry of a finite verb with the dialectal w-marker.

(13) Lexical entry of a finite verb (*kauft*):

$$\begin{bmatrix} \textit{word} \\ \text{PHON } \boxed{1} \\ \text{S} \begin{bmatrix} \text{L} \quad \text{C HEAD } \boxed{2} \begin{bmatrix} \textit{verb} \\ \text{VFORM } \textit{finite} \end{bmatrix} \\ \text{NONL INHER SLASH } \textit{eset} \end{bmatrix} \end{bmatrix} \wedge \exists x \ \texttt{construct-phon}(\boxed{1}, \boxed{2}, {}^{x}[\langle \textit{kauft} \rangle])$$

The lexical entry for *kauft* uses the relation `construct-phon` in (14).[8]

(14) The definition of `construct-phon`:

$$\forall x \forall y \forall z \ \texttt{construct-phon}(x, y, z) \ \leftrightarrow \ \begin{array}{l} (\neg \ y\text{FRONTED} \sim \textit{sign} \wedge x \approx z \\ \vee \ \texttt{append}(y\text{FRONTED PHON}, z, x)) \end{array}$$

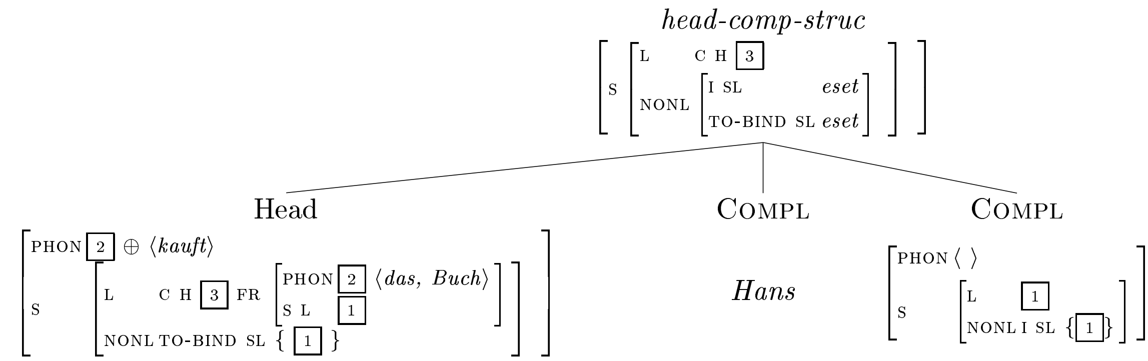
The lexical entries for finite verbs are underspecified with respect to the subsort of *verb*. Crucially, the PHON value of a finite verb in the model of the grammar is sensitive to the actual subsort of *verb*. This is expressed by the relation `construct-phon`. If a verb like *kauft* has a HEAD value of sort *verb-final* or *verb1*, its PHON value simply consists of the string *kauft*, since either FRONTED is not defined on its head or its value is not a *sign* (first line of 14). If its head is of sort *verb2*, the phonology of the FRONTED constituent is the initial part of the verb's PHON value (second line of 14).

We will first consider the structure of a V1 clause as in (1b). The finite verb, *kauft*, in the word order domain has a HEAD value of sort *verb1* and is, thus, specified for FRONTED and, due to the FOP, it is phonologically realized at the beginning of the sentence. Because its FRONTED value is *empty* (by virtue of the signature given in figure 2), the PHON value of the verb is simply *kauft*.

In the verb second sentence (1c), the PHON value of the finite verb is *das Buch kauft*. In contrast to the w-marker, V2 verbs do not restrict their FRONTED constituents to w-constituents. By analogy to the treatment of the w-marker, there is a nonlocal dependency relation between the FRONTED value of the verb and the the sentence it occurs in. This is enforced, again, by the DEPENDENCY CANCELLATION PRINCIPLE given in (8). In the case of (1c), the opener itself is the head-daughter of the sentence. Its TO-BIND SLASH element is, therefore, identical with the LOC value of its fronted constituent. In figure 5, the structure of sentence (1c) is shown.

[8]To formalize relations in HPSG, we employ RSRL (Richter, Sailer and Penn 1998), which extends (King 1994)'s SRL to allow for (bounded) quantification and relations and provides a model theory for HPSG grammars similar to the one sketched in (Pollard 1998).

Figure 5: The structure of a V2 clause: *das Buch kauft Hans*



In the present approach, the morphological variation exhibited by fronted verbs in, e.g., Dutch can be expressed directly in the lexicon, as the requisite information about both the subject and the Vorfeld constituent are lexically available to V2 verbs. The pertinent lexical entries have the following restrictions:

(15) a. *hebt*: if there is a FRONTED attribute, then the LOCAL values of the sign in FRONTED and that of the element in the SUBJ list are identical.

b. *heb*: there is a FRONTED feature, and if it is *sign*-valued, then the LOCAL values of the sign in FRONTED and that of the element in the SUBJ list are **not** identical.

As can be checked, these lexical specifications will account for the data in (2): *hebt* occurs in all VF clauses and only in V2 clauses with the clausemate subject as topicalized constituent. *heb* occurs only in *verbleft* clauses, i.e., V1 and V2 clauses, and only where the FRONTED value is not the clausemate subject, by being either *empty* or a different constituent.

The data on Verum Focus presented in section 2 can also be accounted for in a natural way. The head feature FRONTED on markers and finite verbs in V1 and V2 clauses designates openers as a natural class of words. Verum Focus can, thus, be characterized by a generalization over words: In German, Verum Focus can occur if the opener of a finite sentence is focused. The opener is focused by stressing its idiosyncratic phonological contribution, if there is any, or else by stressing the phonology of the w-pronoun of its FRONTED constituent. It is interesting to note that in w-VF sentences with a complex w-constituent like (3d), Verum Focus is not achieved by stressing the focus exponent of the phrase, which would be *Buch*, but rather by stressing the w-phrase, *wessen*. Stress on *Buch* results in a very different and unrelated effect. In other words, there is a clear distinction between stressing the phonetically invisible w-marker by way of its w-constituent FRONTED value and stressing the w-constituent itself.

For the dialectal data in (5), our generalization on Verum Focus predicts the data correctly: Because the dialectal w-complementizer in (12) has an idiosyncratic phonological contribution, *daß*, it is this contribution that receives stress in order to focus the opener. This corresponds to V2 clauses, where it is stressing the idiosyncratic phonological contribution of the finite verb that may trigger Verum Focus.

5 On the Syntactic Status of Complementizers

In the foregoing section, we revised the treatment of the left periphery of German finite sentences fundamentally. Two features of the classical HPSG analysis went unquestioned, though, and should be examined in light of our new analysis: (Pollard and Sag 1994) consider English complementizers to be (i) functional, and (ii) to be nonheads. In their analysis both aspects are simultaneously expressed by treating complementizers as markers. This architecture was imported to the linearization-based HPSG analysis of German of (Kathol 1995). The idea behind the marker analysis is that English complementizers are thought of as being a distinguished variety of functional category in (Pollard and Sag 1994)[9], and that markers are functional. We investigate the issues of functionality and their status as nonheads separately.

Complementizers as functional categories In seminal work on functional categories in GB theory, (Abney 1987) provides five characteristic properties of functional categories. Using Abney's criteria for functional categories, it is important to note that these properties are not defining but only salient for the classification of the tested elements, i.e., there is a significant gray area between functional and substantive elements, and elements of either class may exhibit some of these properties while lacking others. Also, some of the characteristic properties are deemed more important than others. In the following discussion, we check how the markers of section 4 behave with respect to (Abney 1987, p.64–65)'s criteria.

Three of these criteria are straightforwardly satisfied: Firstly, complementizers in German constitute a closed lexical class. Secondly, they permit only one complement: VP (together with IP and NP) belongs to the type of complements functional categories select. Thirdly, they are phonologically inseparable from their complement. The fourth criterion (second in Abney's ordering) is more interesting. It says that functional elements are generally phonologically and morphologically dependent; sometimes they might be phonologically null. For the two typical complementizers of German complement clauses, *daß* and *ob*, this is clearly not the case. Interestingly, though, the crucial new lexical entry of the present proposal meets this criterion. The w-marker, (10), itself is phonologically empty and only becomes visible through the w-constituent it hosts.

The fifth is the most important and classical criterion for functional categories and deserves closer attention. It says that functional elements semantically lack a direct link to the world and instead make a second-order semantic contribution to the meaning of their complement, thereby passing on the descriptive content of their complement. As functors, they mark grammatical or relational aspects and take predicates as complements, rather than picking out a class of objects in the world. This semantic characterization of functional elements agrees with the common view that German *daß* and *ob* semantically function as declarative and interrogative operators, respectively, which determine the semantic type of the overall expression. The same observation holds for the w-marker, since complex w-constituents functioning as complementizers in German are usually analyzed as introducing some sort of interrogative operator. The potential for Verum Focus that comes with the complementizer position is also usually linked to its functional status, and agrees with the semantic criterion for functional elements. The w-marker, moreover, gives an elegant lexicalist explanation for why w-constituents only and necessarily function as complementizers connected to an interrogative operator and for

[9] In fact, the distinction between substantive or lexical categories and functional categories has a long-standing tradition in linguistics. The corresponding distinction between nouns or verbs and 'connecting words' can already be found for Greek in Aristotle's *Poetics* (XX).

Verum Focus when they occur at the left periphery of finite VF clauses.

On the basis of the unequivocal results of Abney's empirical criteria, we conclude that the marker analysis of complementizers is justified to the extent that markers are thought of as functional elements.[10] For the moment, we accept the premise of (Pollard and Sag 1994) that one way to distinguish functional words is by simply assigning them a HEAD value that is a subsort of *func*, and we ask whether German complementizers, analyzed as an instance of such words, should be heads or nonheads of the sentences they introduce.

Complementizers as nonheads Possible answers to the question of whether German complementizers should be regarded as heads or nonheads partially depend on the general syntactic framework, the theories of scrambling and long movement, and the particular way of spelling out the analysis of functional elements in the context of a particular grammar of German. In (van Eynde 1997), a distinction between *major* and *minor* categories has been elaborated. Van Eynde argues that the major/minor distinction cuts across syntactic categories. The crucial difference between major and minor categories is that words of minor categories do not project, i.e., they cannot occur as the head daughter in a phrase. They can, however, restrict the syntactic head they combine with with the attributes MOD or SPEC. In the case of determiners, for example, English *one* should be treated as major, *a*, however, as minor. A parallel example is given for nouns using Dutch full and reduced personal pronouns.

Van Eynde claims that the functional/substantive dichotomy should be replaced by the major/minor distinction. Since the notion of functional categories, based on the traditional semantic criterion, is well-estabilshed and descriptively useful, we keep the distinction between functional and substantive categories. It is, on the other hand, worth considering the possibility of a cross-classification of functional/substantive and major/minor categories. In the classical cases, functional categories appear as minor, whereas the prominent examples of substantive categories are major.

Keeping this terminological differentiation in mind, we briefly investigate the different options for German complementizers. First, we concentrate on evidence that the verb is actually the syntactic head in *daß/ob* clauses and w-VF clauses, and then we consider other types of complementizers, as *bevor* (*before*).

Markers, as nonheads, select their complement with a *synsem*-valued SPEC feature instead of a list-valued COMPS feature, which expresses the appropriate generalization over functional elements that they always take exactly one complement. To express this with a COMPS list would be more accidental, and the selection with a special SPEC feature seems more natural. On the other hand, it has been argued that complementizers participate as semantic functors, so they should be the semantic heads of head marker phrases, parallel to HPSG's head adjunct phrases. This change can easily be effected, and we assume an according SEMANTICS PRINCIPLE for the analysis of the previous section. Note that this move mirrors GB's distinction between 'c-projection' (syntactic (category) projection) and 's-projection' (semantic projection), which is defined in terms of tree configurations, and aims at reconciling the intuition that the verb should be the syntactic head of the sentence with a tree-configurational theory of functional elements (Abney 1987, p.57). By assuming that verbs are the heads of V1, V2,

[10] To our knowledge, (Kiss 1995) is the only proposal in the context of HPSG to argue that German complementizers are not functional. (Kiss 1995) bases its view on three criteria for functional categories, attributing them to (Fukui 1986) and (Abney 1987). Only two of these three are from Abney, and (Kiss 1995, p.192) mysteriously and crucially misrepresents Abney's main criterion as saying that functional elements have no semantic content at all, thus reaching an otherwise untenable conclusion. The origin of Kiss' third criterion remains unclear to us but could be related to Fukui. Since Fukui's main diagnostics (Fukui 1986, p.31) are closely tied to GB-internal considerations, they are not relevant to the present paper (but see section 6).

c-VF and w-VF clauses, syntactic selection of these clauses by their matrix verb could often be expressed nondisjunctively in syntax, provided there is an articulate semantic theory that distinguishes between the different requirements of the matrix verb, e.g., *fragen* only takes interrogative finite VF sentential complements, whereas *sagen* comes with all types of finite sentential complements except V1. An analysis that can treat all types of complement clauses uniformly in syntax should certainly be preferred as the most simple approach.[11]

In fact, there are observations concerning unembedded clauses that can be interpreted as supporting the view that the finite verb is always the head of VF complement clauses. The data in (16a–16c) show that all VF clause types that may occur as complement clauses also exist as unembedded sentences with illocutionary force. In this respect they pattern with V1 and V2 clauses, and we could assume that finite clauses headed by verbs may in general occur as unembedded utterances.

(16) a. Daß du mir ja pünktlich kommst!

b. Ob Manfred morgen wohl pünktlich kommt?

c. Wen du mal wieder alles gesehen haben willst!

d. *Weil/*indem/*bevor Maria zu spät kommt.

At the same time, these sentences indicate problems with a uniform extension of our marker analysis of subordinating conjunctions to non-complement clauses, i.e., if the heads of adverbial finite VF clauses like (16d) are not verbs, then they might be used as evidence that there exist major categories among German complementizers. Adverbial finite VF clauses cannot occur in isolation (16d). In addition, since adverbial clauses semantically modify their matrix clause, in traditional HPSG the head of the adverbial clause should bear the respective MOD feature. Given the apparent semantics of the subordinating conjunctions in (16d), it would be plausible to assume that they are a class of adverbial lexical elements that are the syntactic heads of the finite clauses they introduce, semantically modify their matrix expression with their head feature MOD, and select their VP complement with the COMPS list. Bearing in mind the caveat of van Eynde, their status as major or minor categories is independent of their status as functional categories. In particular, they too satisfy four of Abney's five criteria. To integrate this new class of complementizers with the analysis developed in section 4, we would need to postulate that they bear the head feature FRONTED with value *empty* and enter the word order domain of sentences like the complementizers *ob* and *daß*. Intuitively, this means that they share certain functional aspects with complementizers that introduce complement clauses and finite verbs at the left periphery, and they count as openers of finite sentences. It can be checked that, under these assumptions, the FRONTED ORDERING PRINCIPLE yields the correct predictions without any modifications, irrespective of the fact that these subordinating conjunctions are analyzed as the heads of their clauses.

We, therefore, propose to express the traditional distinction between complementizers introducing complement clauses and complementizers introducing adverbial clauses by their categorial head value. While both types of complementizers might be functional, we treat the former as minor, and therefore as markers and nonheads, but the latter as major and

[11] An interesting consequence of one particular head analysis of German complementizers can be seen in the analysis of (Feldhaus 1997): c-VF clauses are analyzed as complementizer phrases, whereas w-VF clauses are verb projections. This leads to a categorial distinction between w-VF clauses and South German w-*daß*-VF clauses, and forces each verb that takes an interrogative complement clause to bear a disjunctive specification. In our analysis, no such disjunction is needed.

the syntactic head of the adverbial clause. To test and refine these preliminary distinctions, the differences in syntax and semantics between different types of complementizers must be further investigated in light of the descriptive means of HPSG.

6 A Comparison to the GB Architecture

Our analysis of the left periphery of finite clauses exhibits some striking correspondences to standard GB approaches. A *word* that has a FRONTED feature can be regarded as standing in C^0 position. The FRONTED value of such a *word* corresponds to Spec-CP position. FRONTED is *empty* in the case of an empty Spec-CP position, and FRONTED has a *sign* value if a constituent moves to Spec-CP. In that respect, the FRONTED feature as a functional property of words is reminiscent of three of Fukui's properties of functional heads. (Fukui 1986, p.31) says that functional heads can have specifier positions, these specifier positions are noniterable, and the elements occupying the specifier position are moved from within the complement of the functional head.

On the other hand, a lexicalized analysis does not run into GB-specific problems such as accounting for the projection level of the element in Spec-CP or C^0. The complementary distribution of finite verbs and complementizers at the left periphery in V1, V2, and c-VF clauses is accounted for by the FRONTED ORDERING PRINCIPLE. The problem of w-VF clauses is solved by lexically specifying a complementizer that shares its phonology with the phonology of its FRONTED constituent. The positional effect of GB's functional category, C, is achieved by a new feature FRONTED on certain lexical elements. In a semantic analysis, the semantic effects associated with the functional category C can be lexically incorporated into openers. Verb movement is accounted for by a word order principle that is sensitive to the presence or absence of the feature FRONTED on words.

The present approach leads directly to a generalization of the traditional model of topological fields of German sentences (Engel (1970) and Höhle (1986)). Traditionally, it specifies a unique pattern for each sentence type. At the same time, these patterns only differ with respect to the left periphery. In Höhle's terminology and ignoring the fields for coordinating particles and left dislocation, VF clauses begin with the C field, V1 clauses with the FINIT field, and V2 clauses with a K field and a FINIT field. Under the present analysis, the left periphery is uniformly occupied by openers that distinguish all three possibilities. As a consequence, all sentence types are treated uniformly, while, for each sentence, its sentence type can be succinctly identified by the properties of its opener alone.

7 Conclusion

We have presented a uniform lexicalized treatment of the left periphery of German sentences. The traditional topological fields characterizing the left periphery are subsumed under a class of lexical elements that are distinguished by a new head feature. This head feature is responsible for the order of those words, and may host an additional constituent whose properties are, thus, accessible to lexical restrictions such as morphological variation and Verum Focus imposed by the host word. The apparent violation of the Doubly Filled Comps filter in w-*daß* constructions in substandard dialects of German is reduced to lexical variation, and the additional lexical entry needed to analyze these data patterns with finite verbs. Moreover, the parallel behavior of both V2 verbs and the dialectal w-marker with respect to Verum Focus is predicted as a consequence of their parallel structure. Comparing our theory to previous approaches in GB and HPSG, we have argued that the lexical approach captures generalizations that have usually presented a problem to analyses in both frameworks.

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