Separable Verb Prefixes In German

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1 Introduction

Verbal phenomena in German such as passive, modal flip, and topicalization of partial verb phrases have recently been the focus of the research in Head-Driven Phrase Structure Grammar formalism (HPSG) (Pollard and Sag, 1987; Pollard and Sag, 1994). In this paper I will add another verbal phenomenon of German to this list: verb prefixes.
In German, certain prefixes can be separated from their verb stem if the finite verb occupies the second or first position within the sentence as shown in examples (1a) and (1b), respectively. When separated, the prefix has to surface in core clause final position. If the main verb occupies a sentence-final position, the prefix has to precede the verb and both of them form a contiguous word as shown in (1c) and (1d).[1]

(1) a. `Peter ißt die Suppe` *auf*.
`Peter[NOM] eats the soup[ACC] up`

b. `Ißt Peter die Suppe` *auf* `?`
`Eats Peter the soup up`

c. `Peter soll die Suppe` *auf*`essen.`
`Peter should the soup up-eat`

d. `... daß Peter die Suppe` *auf*`ißt.`
`... that Peter the soup up-eat`

On the other hand, not all verb prefixes in German allow for this separation as can be seen in (2).

(2) a. `Peter` *über*`heizt seine Wohnung.`
`Peter over-heats his apartment.`

b. `*Peter heizt seine Wohnung` *über*.
`Peter heats his apartment over.`

c. *Über*`heizt Peter seine Wohnung?`
`over-heats Peter his apartment`

d. `Peter wird seine Wohnung wieder` *über*`heitzen.`
`Peter will his apartment again over-heat`

In the previous examples (1 - 2) the prefixes are prepositions. However, German allows all major parts of speech to become a separable verb prefix, as shown in (3) - (6) for adjectives, nouns, verbs, and adverbs, respectively.

(3) a. `Peter wird den Boden` *blank*`wischen.`
`Peter will the floor clean-wipe`

b. `Peter wischt den Boden` *blank*.
`Peter wipes the floor clean`

(4) a. `Peter wird` *brust*`schwimmen.`
`Peter will breast-swim`

b. `Peter schwimmt` *brust*.
`Peter swims breast`

(5) a. `Peter wird` *sitzen*`bleiben.`
`Peter will sit-remain`
Peter will remain seated.

b. `Peter bleibt` *sitzen*.
`Peter remains sit`
Peter remains seated. `(Uszkoreit, 1987, example 210a,b)`

[1] To enhance readability, prefixes will be in italics throughout the paper.

(6) a. `Peter wird` *weiter*`machen.`
`Peter will further-make`
Peter will continue.

b. `Peter macht` *weiter*.
`Peter makes further`
Peter continues.

The phenomenon of verb prefixes interacts with other verbal phenomena. For example, (7) shows that prefixes can be fronted. In (7d) the whole verb phrase is fronted. In (7e) only a partial verb phrase is fronted. Fronting only the prefix results in a ungrammatical sentence (7f). Similarly, fronting the verb or a partial verb phrase without the prefix yields an ungrammatical sentence, as shown in sentence (7g).

(7) a. `Peter schickt dem Professor das Buch` *nach*.
`Peter[NOM] sends the professor[DAT] the book[ACC] after`

b. `Schickt Peter dem Professor das Buch` *nach*?
`Sends Peter[NOM] the professor[DAT] the book[ACC] after`

c. `Peter muß dem Professor das Buch` *nach*`schicken.`
`Peter[NOM] must the professor[DAT] the book[ACC] after-send`

d. `Dem Professor das Buch` *nach*`schicken muß Peter.`
`the professor[DAT] the book[Acc] after-send must Peter[ACC]`

e. `Das Buch nachschicken muß Peter dem Professor.`
`the book[ACC] after-send must Peter[ACC] the professor[DAT]`

f. **Nach* `muß Peter schicken dem Professor das Buch.`
`after must Peter[ACC] send the professor[DAT] the book[Acc]`

g. `*Dem Professor schicken muß Peter das Buch` *nach*.
`the professor[DAT] send must Peter[NOM] the book[ACC] after`
Peter has to send the book to the professor

Verb prefixes are not confined to any particular set of verbs. We can find, for example, intransitive verbs with a prefix, as shown in (8).

(8) a. `Peter reist` *ab*.
`Peter travels off`
Peter departs.

The sentence in (9) shows that transitive verbs can also occur with a verb prefix. The same holds for the ditransitive verb *schicken* as given in (10).

(9) a. `Peter ruft Maria` *an*.
`Peter calls Maria up.`

(10) a. `Peter schickt Stefan das Geschenk` *nach*.
`Peter sends Stefan the present after`

Compound verbs[2] can be passivized, can occur in double infinitives and can undergo modal flip. Even verbs considered to be unaccusative can occur with a prefix.

Native speakers of German experience considerable difficulty judging word boundaries when the prefix is either a noun, adjective, adverb, or verb. However, judgments about boundaries involving a preposition acting as the prefix are reliable and favor no boundary between prefix and verb when adjacent. Further evidence for hypothesizing no boundary between adjacent prefix and verb can be observed at various linguistic levels.

[2]The term *compound verb* will be used to refer to verbs which consist of a prefix (separable or non-separable) and an underlying verb. For example, *nach*schicken (to send after) would be a compound verb in our terminology. *Schicken* would be the underlying verb and *nach-* the prefix (separable).

At the phonological level one can see that the prefix verb compound is stressed on the first component, as are all compounds in German. Accounting for this stress pattern is, of course, easiest if one assumes a compounding process.
Within derivational morphology one can observe that all german verbs can be nominalized using their infinitive forms. There are also nominalizations derived from a prefix and a verb. Unfortunately, German also allows deverbal nominalizations involving a verb and verbal complements, adjuncts, or adverbs. Thus the evidence is not conclusive. However, deverbal nominalizations generally only comprise one complement, adjunct or adverb. But it is possible to derive deverbal nominalizations which comprise the prefix and one additional item, as shown in (11) and (12). Note that within deverbal nominalizations consisting of a separable prefix and one other item, the prefix has to stay adjacent to the infinitive verb.

(11) a. das *Ab*treten
the scraping, the transfer, the wear down

b. der Fuß

c. das Fuß*ab*treten
the shoe-off-scraping

d. *das *Ab*fußtreten

(12) a. das *Ein*fahren
the in-run
the running in

b. der Motor

c. das Motor*ein*fahren
the engine-in-run

d. *das *Ein*motorfarhren

The Vorfeld, i.e. the position before the finite verb/auxiliary, can only be occupied by a single constituent, which can be a partial verb phrase. It is possible to topicalize the prefix together with the verb. Fronting a verb without prefix or fronting a prefix without verb is not possible. The prefix shows a different behavior from other verbal complements which allow topicalization with and without the main verb. If one assumes that prefix and verb do not form a compound, a problem arises because the fronting of a lone prefix or verb now has to be ruled out. The most straightforward way to explain these fronting facts is to assume that prefix and verb form a compound.

The process of compounding a verb stem with a prefix can change the valence properties of the underlying verb in the compound construction (cf. (Uszkoreit, 1987, page 110)). Consider the sentences in (13). The base verb *stecken* subcategorizes for an accusative noun phrase and a directional prepositional phrase. When the verb is compounded with a directional preposition, the directional prepositional phrase ceases to be subcategorized for, as is shown in (13c).

(13) a. Peter wird das Buch in die Tasche stecken.
Peter[NOM] will the book[ACC] into the pocket put
Peter will put the book into the bag.

b. *Peter wird das Buch stecken.
Peter[NOM] will the book[ACC] put

c. *Peter wird das Buch in die Tasche *ein*stecken.
Peter[NOM] will the book[ACC] into the pocket in-put

d. Peter wird das Buch *ein*stecken.
Peter[NOM] will the book[ACC] in-put
Peter will pocket the book. (Uszkoreit, 1987, examples 280 a,b,c,d)

In these examples, the prefix *ein-* deleted the prepositional phrase subcategorized for by the base verb. One can observe the opposite effect with the separable prefix *an-* when it combines with a verb expressing an action towards a person or object. The relevant examples are given in (14).

```
(14)   a.  Peter wird lachen.
           Peter[NOM] will laugh.
       b.  *Peter wird anlachen.
           Peter[NOM] will at laugh.
       c.  *Peter wird den Polizisten lachen.
           Peter[NOM] will the policeman[ACC] laugh
       d.  Peter wird den Polizisten anlachen.
           Peter[NOM] will the policeman[ACC] at laugh.
```

Here the base form of the verb is intransitive. When combined with the prefix, the compound requires an additional accusative noun phrase in its subcategorization frame.
Non-separable prefixes can alter the subcategorization requirements of the underlying verbs, as well. This is illustrated by the prefix *be-* in (15). The prepositional object of the verb becomes the direct object of the verb compound whereas the former direct object becomes an oblique prepositional phrase.

```
(15)   a.  Er streut Salz auf den Bürgersteig.
           He puts salt on the pavement.
       b.  Er bestreut den Bürgersteig (mit Salz).
           He on-puts the pavement (with salt).
           (Stiebels and Wunderlich, 1994, example 98 c,d)
```

Some of the compound verbs only occur in the compound construction with their prefixes and their meaning cannot be computed compositionally. Examples of these unproductive constructions are given in (16) and (17).

```
(16)   a.  Peter strengt sich an.
           Peter exerts self at
       b.  *Peter strengt sich
           Peter exerts self

(17)   a.  Peter stattet Maria einen Besuch ab.
           Peter pays Maria a visit up
       b.  *Peter stattet Maria einen Besuch
           Peter pays Maria a visit
```

On the other hand we have constructions which do seem to be productive. Consider the directional prepositions:

- hinein (into)
- hinaus (out)
- heraus (out)

and the following verbs of movement:

- rennen (to run)
- laufen (to run)
- gehen (to go).

Every possible combination of these prepositions with these verbs will yield a compound verb. Moreover, the directional preposition will force its directionality onto a verb normally not considered to be directional:

(18) a. `Peter kann sich überall` *hinein*`grinsen.`
`Peter[NOM] has self everywhere into-grin`
Peter can grin his way into any situation `(Uszkoreit, 1987, example 240)`

Newly coined verbs, moreover, combined with this prefix yield acceptable compounds:

(19) a. `Peter wird` *hinein*`schwuppeln.`
`(Uszkoreit, 1987, example 239)`

The distribution of separable verb prefixes in German has long been a standard argument in Transformational Grammar for assuming an underlying SOV order for German (Koster, 1975). A compound verb, consisting of a separable verb prefix and the underlying verb, starts in sentence-final position. A movement transformation moves then the finite verb into the second position leaving the prefix behind in sentence final position which results in the data as presented above. This data, of course, challenges theories such as HPSG that do not rely on movement operations. An additional problem for an HPSG analysis arises because certain prefixes change the subcategorization requirements of the verbs they form a compound with (cf. examples (13), (14) and (15)). This means that the prefix has to be able to get its hands on the verb's subcategorization frame at some point during the derivation of the sentence. This will be most difficult when prefix and verb are separated, of course.

There are two main reasons to argue against the usage of lexical rules for the treatment of separable verb prefixes. First, lexical rules for compounds would presumably involve two items, i.e. the prefix and the verb, on the antecedent side of the rule whereas, to my knowledge, so far only lexical rules with one antecedent have been postulated. I do not want to increase the power of the lexical rule system just to handle certain separable verb prefixes in German. Second, there is independent motivation to limit the scope of lexical rules within an HPSG grammar, because they are an external device that disturbs the monotonicity of information as specified in the lexicon. A word syntactic approach (Krieger, 1993) will, of course, work fine when prefix and verb are surface adjacent to each other but the approach runs into problems when prefix and verb are separated.

To specify a treatment for all the phenomena involving verb prefixes shown in this section is clearly outside of the scope of this paper. The main interest will be the case in which prefix and verb are separated. This paper will be confined to productive separable prefixes, namely prepositions, and, in particular, to their behavior when a topicalization operation takes place.
The paper will focus on two separable verb prefixes, *ein-* and *an-*. Their properties were illustrated in examples (13) and (14). To contrast separable prefixes with non-separable prefixes, the non-separable prefix *be-* will also be considered. Examples were given in (15). Moreover, the coverage of the grammar fragment will be confined to declarative main clauses.

In section 2 I will briefly describe previous approaches to verb prefixes. The focus will mainly be on work by Stiebels and Wunderlich (1994) who show that separable prefixes have to be visible to syntactic operations. I will also review work by Ackermann and Webelhuth (to appear) who argue that functional and categorial information do not have to converge into a single morphological object but can, instead, be distributed asymmetrically over different objects. These two ideas will be central in my analysis.

In section 3 I will describe the treatment of german auxiliary constructions such as modal flip and clausal passive in HPSG. The idea behind this section is to motivate auxiliaries as raising constructions which in the case of a passive formation are even capable of changing the subcategorization requirements of the main verb for which they subcategorize. I will briefly describe an HPSG approach to passive constructions in which the passive formation is an *object-to-subject* raising achieved by the auxiliary ((Kathol, 1994) and (Pollard, 1994)). In my approach prefixes will be similar to auxiliaries since they raise the subcategorization requirements of the underlying verb, thereby changing the requirements if necessary.

In section 4 I will review approaches to morphological operations in HPSG systems, using as an example the *-bar*-affixation in German. The purpose of this section is to show how morphological processes are represented in HPSG. I will briefly describe work by Riehemann (1994) who is using an inheritance approach to derivational morphology and by Krieger (1993) who is using a word syntax to represent derivational processes. In the subsequent analysis I use a word syntactic approach for the case where prefix and verb form a contiguous compound.

In section 5 I will start to develop the grammar fragment, based mainly on ideas as specified by Baker (1994). This section will focus on the topicalization of partial verb phrases. I will introduce the relevant lexical, linear precedence and immediate dominance rules. I will conclude this section with two examples to illustrate these rules.

In section 6 I will finally describe the analysis which I will illustrate by several examples at the end of the section. In the last section I will point to some remaining problems.

2 Previous Work

In this section I briefly review work on verb prefixes in different grammar frameworks. Quite in the tradition of HPSG my final treatment of separable verb prefixes will be eclectic. In particular, I will base my analysis on the approach of (Stiebels and Wunderlich, 1994) and (Ackermann and Webelhuth, to appear). Both approaches question the traditional definition of word-hood. A lexical object does not have to converge on a single item but can be distributed onto several items each of which might have different functional and categorial information. As a consequence, depending on their functional and categorial status we should expect a different distributional behavior of these items.

2.1 A GB Approach

Within the Government and Binding (GB) framework (Chomsky, 1981), the distribution of verb and corresponding separable prefix is assumed to offer evidence for an SOV analysis of root clauses in German (Koster, 1975). Assuming that VP and IP are head-final, the verb moves first to the right I node to receive inflection information and subsequently moves to the C node. The subject NP moves to the specifier position of CP. An example for the D- and S-structure for the sentences *Peter gab das Buch zurück* is given in Figure (1).

$[_{CP}\ [_{C'}\ [_{IP}\ [_{NP}\ \text{Peter}]\ [_{I'}\ [_{VP}[_{V'}\ [_{NP}\ \text{das Buch}]\ [_{V^*}\ [_{P}\ \text{zurück}]\ [_{V}\ \text{geben}]]]]\ [_{I}\ \text{tense}]]]]]$

$[_{CP}\ [_{SPEC}\ \text{Peter}_j]\ [_{C'}\ [_{C}\ \text{gab}_i]\ [_{IP}\ [_{NP}\ \text{t}_j]\ [_{I'}\ [_{VP}[_{V'}\ [_{NP}\ \text{das Buch}]\ [_{V^*}\ [_{P}\ \text{zurück}]\ [_{V}\ \text{t}_i]]]]\ [_{I}\ \text{t}_i]]]]]$

Figure 1: D- and S-Structure for the sentence *Peter gab das Buch zurück*.

Besides offering evidence for an underlying SOV order in german root clauses, separable verb prefixes are an interesting line of research unto themselves, for investigating the interface between morphological and syntactic operations.
Stiebels and Wunderlich (1994) assume a strict borderline between morphology and syntax. Information built up during morphological processes should be opaque with regard to subsequent syntactic processes. However, for separable verb prefixes they have to assume some kind of syntactic transparency in order to account for their separation in cases where the finite verb occupies first or second position in the clause.[3]

Stiebels and Wunderlich (1994) view morphology as the formation of word forms out of smaller entities such as lexical stems and affixes. They define the output of the morphological component to be [+max], i.e. maximal in terms of morphology but minimal in terms of syntax (X^0). Correspondingly, a unit that can never surface as a possible word is classified as [+min].

Stiebels and Wunderlich (1994) assume that some languages have the property that one morphological object may comprise more than one morphological maximal object.[4] The internal structure of these objects, moreover, might be transparent to syntactic processes. To account for the exceptional behavior of verb compounds, Stiebels and Wunderlich (1994) propose a classification of these verbs according to their components' potential to occupy syntactic positions. Using the lexical features [±max] and [±min] a verb with a separable prefix is specified as $[Y^{+max}\ V]$ whereas a verb with an non-separable prefix is then specified as $[Y^{+min}\ V]$. Two principles ensure the correct behavior of separable verb prefixes within morphological and syntactic processes:

1. Particle constraint: $[Y^{+max}\ X]$ is only available for X = V.
2. Visibility: Y^{+max} must be visible in syntax.
   (Stiebels and Wunderlich, 1994, page 919)

[3] Stiebels and Wunderlich (1994) use the terms prefix and particle to refer to what I call non-separable and separable verb prefix, respectively. What I call compound verbs are called complex verbs in their account.
[4] For a related notion cf. section (2.3).

The particle constraint says that only verbal forms can have syntactically visible parts and the visibility constraint forces the separable verb prefix to stay at the word periphery for inflectional operations.

Note that [±max] and [±min] are not head features. Thus a structure such as [Y^{+max} V^{+max}] for example, will not bear the feature [+max]. The lexical integrity hypothesis can than be defined as:

No syntactical process can access a part of X^{+max}.

If inserted into a V^0 position, the verbal head in this construction will then project onto a maximal verb phrase whereas the non-head, the prefix, is forced to keep its morphologically defined status.

Classifying a separable prefix verb as [P^{+max} V^{+max}] Stiebels and Wunderlich (1994) can now account for the separation phenomena involving separable verb prefixes. They assume the traditional head-to-head movement of the verbal head from its base, the sentence-final position, to the C-node. As a consequence, the separable verb prefix is stranded.

An additional principle, the Principle of Separability, prevents the separation in the case in which the verbal head is topicalized.

Non-separable verb prefixes are, on the other hand, specified as [P^{+min} V^{+max}]. As a consequence, morphological operations do not have to observe the prefix's visibility constraint and, in addition, verb and prefix cannot be separated by Verb-Second or topicalization movements because the prefix is not visible to syntactic operations.

This analysis is important because it attributes a syntactic status to the separable prefix, an idea I will rely upon in my subsequent analysis. In my analysis, however, the separable prefix will not just be visible; it will play a more active role.

2.2 A GPSG Approach

Using the framework of Generalized Phrase Structure Grammar (GPSG) (Gazdar et al., 1985), Uszkoreit (Uszkoreit, 1987) applies a strongly lexical approach to the problem of verb prefixes. The value of the lexical feature `PREFIX` for each compound verb indicates the separable prefixes that the verb can occur with. Verbs that can occur with and without a separable prefix have two separate lexical specifications. In GPSG, verbs subcategorize for ID-rules which are further modified by meta-rules. In this process, the `PREFIX` value is copied to the left hand side of an ID-rule, represented by the nonterminal `SEPREF`. The terminal value of `SEPREF` will be the prefix. The actual position is accounted for by an LP-rule which ensures that the `SEPREF` will always follow all complements and adjuncts, i.e. will be sentence-final for verb-first and verb-second positions.

For the verb *an*rufen (to call up), for example, the PREFIX feature would be specified as *+an*. For the verb *rufen* (to yell) this feature would not been set. Both lexical entries subcategorize for the VP-Rule given in Figure (2). The meta rule in Figure (3) transforms rules like shown in Figure (2) into ID-rules. The

$$< 6,\ V^2 \rightarrow V, N^2_{+ACC} >$$

Figure 2: **GPSG immediate-dominance-rule double** (Uszkoreit, 1987, page 83).

corresponding example is given in Figure (4). By using another ID-rule SEPREF would finally expand to the prefix *an-*. The linear order of e.g. prefix and verb is specified by linear-precedence rules which we will skip here. Uszkoreit then assumes a simple phonological contraction process when the separable prefix surfaces adjacent as a sibling to the left of the verb stem.

Albeit, Uszkoreit recognizes regularities and the productivity of certain prefix verb combinations he does not exploit them because "of the lack of a fully developed theory of the lexicon in GPSG" (Uszkoreit, 1987,

$$V^2 \rightarrow X \quad \Longrightarrow V^2_{+\alpha} \rightarrow X, SEPREF_{+\alpha} \qquad \text{where } \alpha \in \{ab, an, ..., zu\}$$

Figure 3: **GPSG Meta-Rule** (Uszkoreit, 1987, page 83).

$$V^2 \rightarrow V_{+an}, N^2_{+ACC}, SEPREF_{+an}$$

Figure 4: **GPSG VP-Rule** (Uszkoreit, 1987, page 84).

page 97). His analysis, moreover, fails to account for the potential of some prefixes to change the subcategorization requirements of the underlying verbs.

2.3 An LFG Approach

Ackermann and Webelhuth (to appear) start with the assumption that categorial and lexical semantic heads do not have to converge in a single, morphologically integrated object. They claim, moreover, that a proper syntactic analysis has to be able to refer to both structural/categorial and functional information. Complex predicates such as object idioms or verbs with a separable prefix have to be analyzed in two dimensions, i.e. their functional and their categorial dimension. The functional dimension of a complex predicate can be expressed either *synthetically* or *analytically*, where the latter describes the case where semantic and morphosyntactic heads of a complex predicate do not converge into a single form.
Working in the framework of Lexical Functional Grammar (Bresnan, 1982), Ackermann and Webelhuth (to appear) then introduce an additional grammatical PREDICATE function to allow a reference to the functional role of an entity rather than its categorial status. This function is associated with the predicate of a clause. To clarify this point let us consider an example from German.

As mentioned in section 2.1 many GB analyses assume an underlying SOV order for German main clauses where Verb Second is achieved by moving the categorial finite verb into the second position. Ackermann and Webelhuth (to appear), however, claim an underlying SOP order where the P denotes the PREDICATE function. When the predicate is expressed as an integrated entity (synthetic), Verb Second requires the whole entity to move into second position. On the other hand, when the predicate is expressed analytically, as is the case for a finite auxiliary and a non-finite main verb construction, only the segment which is categorially a V has to appear in second position and the non-finite main verb stays in its sentence-final base position. In this analysis, German is characterized as requiring a clause to conclude with a predicate. This requirement then interacts with the Verb Second constraint. Possible conflicts are resolved in favor of Verb Second.

The treatment of separable prefixes is specified in a similar way.[5] If prefix and verb are formed synthetically we have the case of non-separable verb prefixes. The PREDICATE function is associated with the whole construction.
In the case of an analytic prefix verb construction, the PREDICATE function is expressed with the prefix. Verb Second then requires the underlying verb which bears the categorial information to move, leaving the prefix stranded, thereby also satisfying the SOP order.

Following the ideas developed by Ackermann and Webelhuth (to appear), I will specify in my analysis separable prefix verb compounds analytically, i.e. information about the verb compound is distributed among the prefix and the verb. In contrast to the account of Ackermann and Webelhuth (to appear), altering of the sucategorization frame of the verb will not necessarily take place in the lexicon. I allow alteration of subcategorization information at the syntactic level as well, in the case where prefix and verb are separated.

[5] Ackermann and Webelhuth (to appear) use the term preverb or preverbal morph to refer to what I call verb prefix.

3 Syntactic Verbal Phenomena in German

In this section I will first show how auxiliaries are specified as raising constructions in HPSG to account for phenomena such as modal flip. Subsequently, I will show that this raising potential of the auxiliary can also be used to alter the subcategorization requirements of the main verb in passive constructions. As the following sections will show, my analysis of verb prefixes will heavily rely on these ideas.
Most of the following claims are only valid if we require that linear order and constituent structure coincide, i.e. if we do not allow a decoupling of the linear representation from the combinatorial structure of a phrase as it is done in recent extensions to HPSG (cf. (Reape, 1994; Kathol and Pollard, 1995), and (Manning, 1995)).

3.1 Auxiliary, Double Infinitive, and Modal Flip

In German subordinate clauses, the finite verb is sentence-final (e.g. (20b)). But a finite auxiliary which takes two non-finite verbal complements can surface before them, as shown in (20c). Note that in this sentence the main verb is separated from its complements, indicating that the auxiliary first combines with the infinitives thereby inheriting the main verb's complement requirements. This idea is sustained by the ungrammaticality of (20d) where a complement is inserted between the finite auxiliary and the main verb.[6] In (20a) the main verb together with two infinitives are topicalized. Note that the *Vorfeld*, i.e. the position in front of the finite verb in a declarative sentence, is considered to allow only a single constituent which gives additional evidence that the infinitive main verb and the auxiliaries form a complex before the subcategorization requirements of the verb are saturated (cf. section 5).

(20) a. `Gelesen haben müßen wird Peter das Buch (bis Freitag).`
`Read has[inf] must[inf] will Peter[NOM] the book[ACC] (by Friday)`
Peter will have to have read the book (by Friday).

b. `Peter glaubt daß er ein Buch schenken müßen wird.`
`Peter[NOM] believes that he[NOM] a book[ACC] donate[INF] must[INF] will`
Peter believes that he will have to donate a book.

c. `Peter glaubt daß er ein Buch wird schenken müßen.`
`Peter[NOM] believes that he[NOM] a book[ACC] will donate[INF] must[INF]`

d. `*Peter glaubt daß er wird ein Buch schenken müßen.`
`Peter[NOM] believes that he[NOM] will a book[ACC] donate[INF] must[INF]`

In (Hinrichs and Nakazawa, 1989), (Hinrichs and Nakazawa, in press), and (Hinrichs and Nakazawa, 1994) it is argued that auxiliaries are raising words that subcategorize for a main verb and thereby attract all the verb's complements. A lexical entry for the auxiliary *wird* is specified in Figure (5).[7] This *argument attraction* ensures that *wird* will have the same subject as the subcategorized verb and the auxiliary will also inherit all of the verb's complements. For main clauses, the finite auxiliary and the non-finite main verb are clearly discontinuous. This discontinuity requires a flat sentence structure where the auxiliary saturates all of its subcategorization requirements at once. A rule which will accomplish this will be given in section 5.

In the case of *wird*, the verb's subject and complement values are structure-shared with the auxiliaries subject and complement value, respectively. However, it is conceivable that this argument attraction can actually change the grammatical relations of the subcategorized verbs. I will elaborate upon this idea in the next section.

[6] There are exceptions, e.g. a quantified complement interspersed between the finite auxiliary and the non-finite verbal complements (cf. (Hinrichs and Nakazawa, 1989; Hinrichs and Nakazawa, in press; Hinrichs and Nakazawa, 1994; Baker, 1994)). This data is not directly relevant for our treatment of separable verb prefixes and we will not consider these otherwise very interesting facts about German syntax.

[7] I will use "+" to denote the construction of a list (CONS) by inserting an element at the beginning of a list (cons). "&" will be used to indicate list-append.

$$\begin{bmatrix} \text{HEAD} \begin{bmatrix}\text{VFORM } \textsc{bse} \\ \text{AUX } + \end{bmatrix} \\ \text{SUBJ } <\boxed{1}> \\ \text{COMPS } \boxed{2} \ \& \left\langle \begin{bmatrix} \text{HEAD} & \begin{bmatrix}\text{VFORM } \textsc{bse} \vee \textsc{prt}\end{bmatrix} \\ \text{SUBJ} & <\boxed{1}\text{NP}> \\ \text{COMPS} & \boxed{2} \\ \text{LEX } + & \end{bmatrix} \right\rangle \end{bmatrix}$$

Figure 5: AVM for *wird*. The auxiliary subcategorizes for a verb and raises the verb's complements, i.e. $\boxed{2}$, and the verb's subject, i.e. $\boxed{1}$ (Baker, 1994, page 33, simplified).

3.2 Passives

Though prefix verbs can clearly undergo passivization, I will not investigate this phenomenon further in this paper. Instead, the aim of this section is to illustrate the potential of the passive auxiliary to alter the subcategorization requirements of its subcategorized participles. I will rely on a similar idea in the treatment of verb prefixes.

Previously (Pollard and Sag, 1987), the passivization operation was attributed to a lexical rule that took a verb with its active subcategorization frame as its input and produced a participle with its subcategorization requirements altered accordingly. A more formal account of this kind of rule is given in Figure (6).

$$
{}_{base\wedge trans}\begin{bmatrix} \text{SYN} \mid \text{LOC} \begin{bmatrix} \text{COMPS} < [\,]_{\boxed{2}},\ldots > \\ \text{SUBJ } \boxed{1} \end{bmatrix} \\ \text{SEM} \mid \text{CON } \boxed{3} \end{bmatrix}
$$
$$
\Downarrow
$$
$$
{}_{passive}\begin{bmatrix} \text{SYN} \mid \text{LOC} \begin{bmatrix} \text{COMPS} < [\text{PP}]_{\boxed{1}} > \\ \text{SUBJ } \boxed{2} \end{bmatrix} \\ \text{SEM} \mid \text{CON } \boxed{3} \end{bmatrix}
$$

Figure 6: (Pollard and Sag, 1987, page 215, simplified and adopted to new notation, distinguishing between subject and other verbal complements)

Instead of using an external lexical rule, one proposal in (Pollard, 1994) and (Kathol, 1994) is to use the raising potential of auxiliaries to account for German passive constructions. A lexical entry of the personal passive auxiliary *werden* is specified as in Figure (7).

$$
\begin{bmatrix} \text{SUBJ} < \text{NP[NOM]}_{\boxed{1}} > \\ \text{COMPS } \boxed{2} \;\&\; < {}_{participle\ II}\begin{bmatrix} \text{SUBJ} < \text{NP} > \\ \text{COMPS NP[ACC]}_{\boxed{1}} + \boxed{2} \end{bmatrix} > \end{bmatrix}
$$

Figure 7: AVM for *werden* accounting for personal passive (Kathol, 1994). The passive auxiliary *werden* subcategorizes for a participle thereby raising the direct object denoted by tag $\boxed{1}$ of the verb's COMPS-list to its SUBJ specification. All other complements of the verb, denoted by tag $\boxed{2}$, are raised to the COMP-list of the auxiliary. The verb's subject ceases to be subcategorized.

A participle with an active subcategorization frame (as given e.g. Figure (8)) will match with the entry as given in Figure (7). The auxiliary will raise and thereby change the subcategorization requirements of the subcategorized participle, thus accounting for the grammaticality of the personal passive construction as shown (21b).

```
(21)  a. Peter schenkt seiner Freundin ein Buch.
         Peter[NOM] donates his friend[DAT] a book[ACC]
      b. Ein Buch wird seiner Freundin geschenkt.
         A book[NOM] is his friend[DAT] given
```

This kind of treatment of the *werden*-passive is interesting for the treatment of separable verb prefixes because, in my analysis, I will treat verb prefixes as raising constructions which can, similarly to the passive

$$
{}_{\textit{participle II}}\begin{bmatrix} \text{SUBJ} \left\langle \text{NP[NOM]} \right\rangle \\ \text{COMPS} \left\langle \text{NP[ACC], NP[DAT]} \right\rangle \end{bmatrix}
$$

Figure 8: AVM for a participle with a still active subcategorization frame, e.g. *geschenkt*.

auxiliary *werden*, alter the subcategorization requirements of the underlying verb.

4 Morphological Verbal Phenomena in German

I showed in section 1 that there are both productive and idiosyncratic verb prefix combinations. This phenomenon is well known from other morphological processes. In (Riehemann, 1994), the -*bar*-adjectives (-able) are examined, and exhibit a similar behavior, that is we can find productive combinations, subregularities, and exceptions. Riehemann uses a hierarchical lexicon with multiple inheritance to capture the regularities efficiently and also to link exceptions to these productive patterns. Exceptions are not just listed separately but share subregularities with fully productive processes.
Traditionally, it is assumed that the *bar*-affixes can attach to all transitive verbs to form an adjective. Through this process, the accusative object is promoted – analogously to the passivization process – to become the subject of the adjective compound, as shown in (22a) and (22b). We can also find the -*bar*-affix attached to verbs with dative objects or even to intransitive verbs, however, as shown in (22c) and (22d).

(22) a. `Sie bemerkten die Veränderung.`
`They noticed the change`

b. `Die Veränderung ist bemerk`*bar*`.`
`The change is noticalbe`

c. `unausweich`*bar*
`inescapable`

d. `unausbleib`*bar*
`inevitable (Riehemann, 1994)`

Instead of listing these exceptions separately in the lexicon, they are linked to the hierarchical lexicon at an appropriate level, to represent the information that they share with productive *bar*-affixation processes. For example, for all suffixed words, the suffix – in the case at hand, the -*bar*-suffix – follows the stem. This can readily be expressed in the hierarchical lexicon as shown in Figure (9). An example of a regular -*bar*-affixation is given in Figure (10). Note that this schema is supposed to arise from a generalization about existing -*bar* adjectives.

$$_{suffixed}\begin{bmatrix}\text{PHONOLOGY } \boxed{1}+\textsc{suffix} \\ \text{MORPH-B } \left\langle \begin{bmatrix}\text{PHON } \boxed{1}\end{bmatrix} \right\rangle\end{bmatrix}$$

Figure 9: AVM to represent suffixation (Riehemann, 1994, page 21).

In this setup, the -*bar* adjectives have an internal structure but they are specified purely descriptively (cf. (Lebeth, 1994)).
Prefix verbs can undergo further derivational operations as shown in (23) where the prefix verb is first transformed into an adjective using the -*bar*-affix. The following step transforms the adjective into a noun using the affix -*keit*.

(23) a. *vor*`zeigen (to present)` → *vor*`zeigbar (presentable)`
→ *Vor*`zeigbarkeit (present-ability)`

b. *über*`setzen (to translate)` → *über*`setzbar (translatable)`
→ *Über*`setzbarkeit (translatability)`

c. *zusammen*`fassen (to summarize)` → *zusammen*`fassbar (summarize-able)`
→ *Zusammen*`fassbarkeit (summarize-ability))`

$$\left[\begin{array}{ll} \text{PHONOLOGY} & \boxed{1}+\textsc{bar} \\ \text{MORPH-B} & \left\langle {}_{trans\text{-}verb}\left[\begin{array}{ll} \text{PHON} & \boxed{1} \\ \text{SYNSEM} \mid \text{LOC} & \left[\begin{array}{l} \text{CAT} \mid \text{VAL} \mid \text{COMPS} <\text{NP}_{[acc]}{:}\boxed{2}\ .\ \ \boxed{3}> \\ \text{CONT} \mid \text{NUC}\ \boxed{4} \left[\begin{array}{l}\text{ACT} \\ \text{UND}\ \boxed{2}\end{array}\right]\end{array}\right]\end{array}\right] \right\rangle \\ \text{SYNSEM} \mid \text{LOCAL} & \left[\begin{array}{ll} \text{CATEGORY} & \left[\begin{array}{ll} \text{HEAD} & \textsc{adj} \\ \text{VALENCE} & \left[\begin{array}{l} \text{SUBJ} <\text{NP}{:}\boxed{2}> \\ \text{COMPS}\ \boxed{3}\end{array}\right]\end{array}\right] \\ \text{CONTENT} \mid \text{NUCLEUS} & \left[\begin{array}{l} \text{RELN}\ \diamond \\ \text{ARG1}\ \boxed{2} \\ \text{ARG2}\ \boxed{4}\end{array}\right]\end{array}\right]\end{array}\right]_{reg\text{-}bar\text{-}adj}$$

Figure 10: AVM for productive *-bar*-Affixation. The feature MORPH-B lists the morphological bases participating in the morphological process. The *-bar* suffix is introduced syncategorematicaly. It is not specified as an independent sign. The verb's object $\boxed{2}$ is promoted to become the subject of the adjective. The semantics of the verb is placed within the scope of the possibility operator $\diamond$ in the specification of the adjective's semantics. (Riehemann, 1994, page 20).

(24) a. *ein*brechen (to break in) → *Ein*brecher (the burglar)
b. *über*setzen (to translate) → *Über*setzer (the translator)
c. *zusammen*fassen (to summarize) → *Zusammen*fassung (the summary)
d. *über*setzen (to translate) → *Über*setzung (the translation)

Complex word forms such as *Über+setz+bar+keit* (translatability) (cf. examples in 23 and 24) would, then, presumably require verbal, adjectival, and nominal paradigms as their ancestors in the inheritance network which might result in unwieldy lexicons. Note, for example, that in (Riehemann, 1994), the inheritance approach only covers the *bar*-affixation which, in addition, is introduced syncategorematicaly.
Although a formulation of separable prefixes using an inheritance approach is readily conceivable I will apply a word syntax (Krieger, 1993) for the specification of separable prefixes. The main reason – besides the possible disadvantage of an unwieldy lexicon when using a purely inheritance based approach – is that a word syntactic approach might allow us to point to similarities in the behavior of separable prefixes at different linguistic levels. For example, the separation potential of separable verb prefixes does not only surface at the syntactic level but can be observed at the morphological level as well, as shown below:

(25) a. **zu-infinitive**
*ein*zustecken
in-to-put
to pocket

b. zu *über*treiben
to exaggerate

(26) a. **gerundivum**
*ein*zusteckende
zu *über*treibende

(27) a. **past-participle**
ein`gesteckten`
über`triebenden`

In all of these cases, the separable prefix *ein-* has to stay at the left periphery of the word and is hence "separated" from its verb-stem by the affixes, *-zu-* and *-ge-*. Note that the non-separable prefix *über-* must stay adjacent to the verb stem.

Krieger (1993) applies the machinery from the HPSG syntax component to specify a word syntactic approach to derivational morphological operations. He uses rules and principles for a word grammar similar to principles specified for phrasal and sentential grammars. Words will now have an internal structure reflecting their derivation within this word grammar. A simplified example is given in Figure (11). Because of the

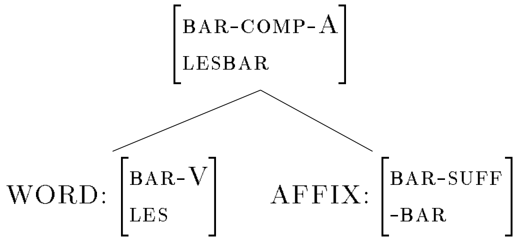

Figure 11: **Word Syntax:** (Krieger, 1993, page 4).

similarity between the principles developed for syntax and the principles developed by Krieger for affixation, it is sufficient to briefly mention these principles and outline their main task. These principles will be used in the subsequent analysis of separable verb prefixes.

I will start with the immediate dominance schema Morphological Affix-Word Rule (MAWR) which licenses complex words. The specification is given in Figure (12).

$$_{complex}\begin{bmatrix} \text{SYN} \mid \text{LOC} \mid \text{SUBCAT} \mid \text{LEX} + \\ \begin{bmatrix} \text{DTRS} & _{\textit{affix-word-struct}}\begin{bmatrix} \text{AFFIX } \textit{affix} \\ \text{WORD } \textit{part-of-speech} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Figure 12: Morphological Affix-Word Rule (MAWR) (Krieger, 1993, page 10). This schema licenses complex words consisting of an affix and a word.

To propagate head features from the head daughter we use a Morphological Head Feature Principle (MHFP). Similarly, to propagate semantic information, a Morphological Semantics Principle (MSP) is used. To specify how a morphological functor category saturates its subcategorization requirements, we have a Morphological Subcategorization Principle (MSCP), which, in contrast to its syntactic counterpart, only has to account for the binary case. Its specification is given in Figure (13). Krieger employs two extra principles to specify linear order of affix and word (morphotactics) and their final surface realization (morphophonemics). Because the main interest in this paper lies in the syntactic behavior of verb prefixes, I will omit the descriptions of these principles.

As the following sections will show, I will use a morpho-syntactic approach to account for the case in which prefix and verb form a contiguous compound.

$$
{}_{complex}\begin{bmatrix}\text{DTRS }\textit{affix-word-struc}\end{bmatrix}
$$

$$
\Downarrow
$$

$$
{}_{complex}\begin{bmatrix}
\text{SYN} \mid \text{LOC} \mid \text{SUBCAT } \boxed{1} \\
\begin{bmatrix}
\text{DTRS} & \begin{bmatrix}
\text{AFFIX} & \begin{bmatrix}
\text{SYN} \mid \text{LOC} \mid \text{SUBCAT } \boxed{1} \\
\text{MORPH} \mid \text{SUBCAT } \boxed{2}
\end{bmatrix} \\
\text{WORD } \boxed{2} &
\end{bmatrix}
\end{bmatrix}
\end{bmatrix}
$$

Figure 13: Morphological Subcategorization Principle (MSCP) which only has to cover the binary case: a morpheme combining with a word (Krieger, 1993, page 14).

5 The Grammar Fragment

In this section I review some recent HPSG analyses of verbal phenomena to establish a framework in which I will locate my subsequent analysis of separable verb prefixes. The main focus will be the fronting of partial verb phrases to the Vorfeld.

Verb Second describes the fact that in German and other languages, e.g. Dutch and Yiddish, the finite verb occupies the second position in matrix sentences. Constituents occupying the first position, the *Vorfeld*, are either topicalized or adjuncts (Uszkoreit, 1987; Nerbonne, 1994; Pollard, 1994; Baker, 1994).
In subordinate clauses we have a sentence-final finite verb.[8] To account for these basic word order facts of German within an HPSG framework an additional boolean head feature INV is introduced. INV+ indicates that the verb precedes subject and complements, whereas INV– indicates that it follows them. The INV feature interacts with linear precedence rules (LP-rules), three of which are given in Figure (14), (15), and (16).

$$\begin{bmatrix} \text{HEAD} & {}_{verb}\begin{bmatrix}\text{INV+}\end{bmatrix} \\ \text{LEX+} & \end{bmatrix} \prec {}_{phrase}\begin{bmatrix}\,\end{bmatrix}$$

Figure 14: **Linear Precedence Rule I:** Verbs specified as INV+ precede their subjects and complements (Baker, 1994, page 21, simplified).

$${}_{phrase}\begin{bmatrix}\,\end{bmatrix} \prec \begin{bmatrix} \text{HEAD} & {}_{verb}\begin{bmatrix}\text{INV–}\end{bmatrix} \\ \text{LEX+} & \end{bmatrix}$$

Figure 15: **Linear Precedence Rule II:** Verbs specified as INV– follow their subjects and complements (Baker, 1994, page 22, simplified).

The INV feature also interacts with a small set of Immediate Dominance rules (ID-rule). The grammar fragment for may analysis comprises the following rule schemata:

1. The *FILLER-HEAD*: This schema combines a FILLER and a phrasal head which is specified as an INV+ sentence. The filler has to precede the verb which will therefore be in second position (Pollard, 1994, Schema 6).
2. Schema R2′, shown in Figure (17), allows a verb to combine with a subset of its complements.

Topicalization in German has attracted a lot of attention in GB (Haider, 1990; Webelhuth, 1985; Webelhuth, 1990), GPSG (Uszkoreit, 1987; Nerbonne, 1986) and HPSG (Nerbonne, 1994; Baker, 1994). Within HPSG, the main idea, as described in (Nerbonne, 1994) and (Baker, 1994), is to invoke a lexical rule that changes the lexical specification of auxiliaries so that they have a partial verb phrase (PVP) in their SLASH value, i.e. the PVP subcategorizes for a subset of the verbal head's complements. The remaining complements are raised into the subcategorization requirements of the auxiliary. This rule is given in Figure (18).

Following (Borsley, 1987; Pollard and Sag, 1994; Baker, 1994) I assume two different subcategorization features, SUBJ and COMPS, which replace the SUBCAT feature (Pollard and Sag, 1987). Distinguishing

[8] For an exception to this rule of thumb see section 3.

$$\begin{bmatrix} \text{HEAD} \; {}_{verb}\begin{bmatrix}\text{INV+}\end{bmatrix} \\ \text{LEX+} \end{bmatrix} \prec \begin{bmatrix}\text{HEAD} \; {}_{verb}\begin{bmatrix}\text{INV}-\end{bmatrix}\end{bmatrix}$$

Figure 16: **Linear Precedence Rule III:** Verbs specified as INV+ precede verbs specified as INV− (Baker, 1994, page 22, simplified).

between subject (SUBJ) and complements (COMPS) allows a straightforward definition of phrases such as S, NP, VP and predicative adjectives as having an empty COMPS-list. Moreover, the distinction permits the description of heads which have a complement but no subject. This becomes relevant, for example, in specifying non-predicative prepositions. Finally, having a distinguished SUBJ feature makes it easy to disallow subject traces.

Baker uses the distinguished SUBJ-features to represent non-agentive subjects. The possibility of non-agentive subjects surface within a fronted PVP is accounted for by Baker's proposal that these nominative arguments of unaccusative verbs are underlying complements in the lexicon. This is demonstrated in sentence (28a). There still remains a problem with stipulating an empty SUBJ value for these verbs because nothing in the /-PVP-rule can now prevent the fronting of all complements within the fronted PVP, resulting in the ungrammatical sentences (28b) and (28c). Note that so far at least, the non-empty SUBJ is forced to stay in a non-fronted position. Unfortunately, I will not offer a solution to this problem.

(28) a. `Ein wirklicher Fehler[NOM] unterlaufen war ihm[DAT] noch nie.`
`a real mistake occur was to him still never`
He never made a real mistake.' `(Uszkoreit, 1987, example 14a)`

b. `*Ihm ein wirklicher Fehler unterlaufen war noch nie.`

c. `*Ein wirklicher Fehler ihm unterlaufen war noch nie.`

I also assume that for finite verbs the subject, instead of being specified with the SUBJ-feature, is specified as the least oblique item on the verb's COMP list (cf. (Pollard and Sag, 1994; Baker, 1994)). This can be achieved easily with a lexical rule that moves the entity from the base verbs' SUBJ slot into the first position of the finite verb's COMP list. The idea behind this requirement is to allow, in the case of a finite main verb, a basically free word order in the middle field of the items specified in the COMPS-list which can include the subject.

Following (Baker, 1994), I stipulate the subcategorized verb to be lexical (LEX+) still, i.e. it has not satisfied any of its subcategorization requirements.[9] This feature will prevent spurious ambiguities which would otherwise arise because the verb might satisfy some of its subcategorization requirements before combining with the auxiliary.

I end this section with a few examples, showing the interaction of raising, the R2′ schema, and the linear precedence rules. My subsequent analysis of separable verb prefixes will be embedded into this framework. Examples including separable prefixes will be given in section 7.

The distribution of the head feature INV is exemplified in Figure (19).[10]

[9] Recall that LEX is not a head feature and is therefore not propagated by the Head Feature Principle.

[10] Instead of displaying a parse tree with all the relevant information, I display the examples in smaller chunks, i.e. I show a parse to give a global picture and a couple of AVMs showing parts of the tree in more detail. It is important to note that the tags have wide scope, i.e. they are global within one example.

The syntax tree for the sentence, *Ein Märchen erzählen kann er seiner Tochter*, is given in Figure (20). The tags $\boxed{4}$ and $\boxed{5}$ in Figure (20) refer to the AVMs given in Figures (21) and (22), respectively. The AVM for the lexeme *kann* is given in Figure (23).

$$\left[\text{COMPS } <C'_0,\ \ldots,\ C'_p>\right] \ \Rightarrow\ \text{HEAD}\left[\text{COMPS } <C_0,\ \ldots,\ C_n>\right],\ C''_0,\ \ldots,\ C''_q \quad (n \geq 0 \text{ and } q, p \leq n)$$

Figure 17: **R2′**: Head Complement rule, or flat rule. An unsaturated phrase whose daughters are one head daughter and one or more complement daughters. The head daughter is a word (Baker, 1994, page 24).

$$\left[\text{LOCAL}\ \left[\text{CATEGORY}\ \left[\begin{array}{l}\text{HEAD}\ {}_{verb}\left[\text{AUX+}\right] \\ \text{COMPS}\ \boxed{1}\&\boxed{2}\&<{}_{category}\left[\begin{array}{l}\text{HEAD}\ {}_{verb}\left[\text{VFORM}\ \textsc{bse} \vee \textsc{prt}\right] \\ \text{LEX+} \\ \text{COMPS}\ \boxed{2}\end{array}\right]>\end{array}\right]_{category}\right]_{local}\right]_{synsem}$$

$$\Downarrow$$

$$\left[\begin{array}{l}\text{LOCAL}\ \left[\text{CATEGORY}\ \left[\begin{array}{l}\text{HEAD}\ {}_{verb}\left[\text{AUX+}\right] \\ \text{COMPS}\ \boxed{1}+\boxed{2}\end{array}\right]_{category}\right]_{local} \\ \text{NONLOCAL}\ \left[\text{SLASH}\ \left\{{}_{vp}\left[\begin{array}{l}\text{HEAD}\ {}_{verb}\left[\text{VFORM}\ \textsc{bse} \vee \textsc{prt}\right] \\ \text{COMPS}\ \boxed{2}\end{array}\right]\right\}\right]_{nonlocal}\end{array}\right]_{synsem}$$

Figure 18: /-PVP Lexical Rule (Baker, 1994, page 38). The antecedent of this rules specifies an auxiliary subcategorizing for a verb and the verbs complements denoted by tag $\boxed{2}$. In the consequent, the auxiliary has a verb phrase in its slash value where the tag $\boxed{2}$ denotes the unsaturated complements of this verb phrase. It is important to note that the tags have narrow scope. The tag $\boxed{2}$ in the antecedent and the tag $\boxed{2}$ in the consequent are different entities and refer to different structures. Note that the auxiliary subcategorizes for an non-finite verb, i.e. the subject is still specified under SUBJ. For unaccusative verbs SUBJ will be the empty list. The nominative argument is specified within the COMPS-list.

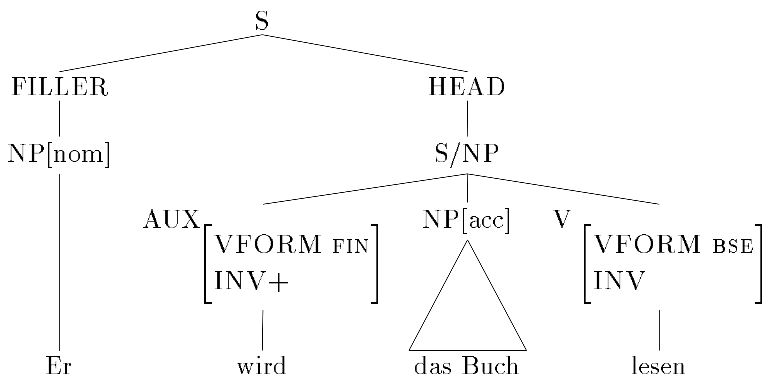

Figure 19: Example I: Distribution of the head feature INV in a declarative matrix clause. The auxiliary specified as INV+ has to precede all its sisters, the accusative noun phrase and the base verb. The base verb has to follow its sisters because of its specification as INV−. The Head Complement Rule R2'combines the constituents within S/NP. The FILLER-HEAD ID-schema combines the FILLER (NP[nom]) and HEAD (S/NP) (Baker, 1994, page 19).

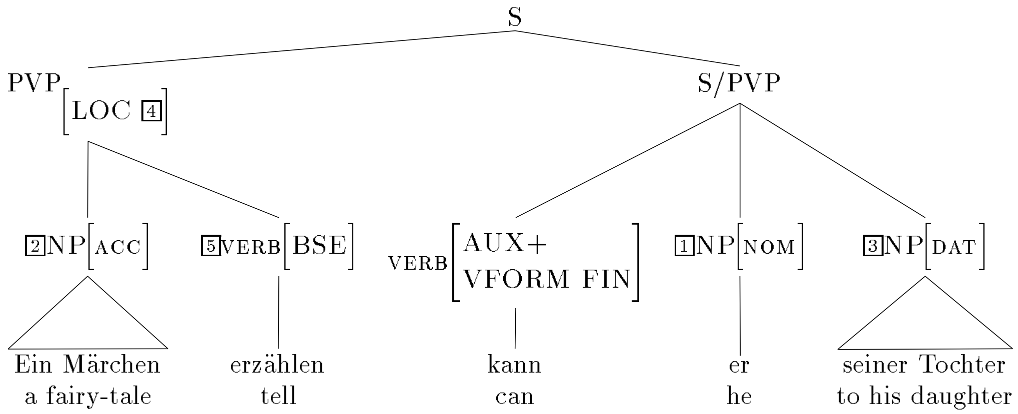

Figure 20: Example III: Syntax tree for the sentence *Ein Märchen erzählen kann er seiner Tochter* (Baker, 1994, page 39).

$$\boxed{4}\,{}_{vp}\left[\begin{array}{l}\text{HEAD }\boxed{5}\\ \text{SUBJ } <\boxed{1}>\\ \text{COMPS } <\boxed{3}>\end{array}\right]$$

Figure 21: AVM for the partial verb phrase (PVP) *ein Märchen erzählen* (Baker, 1994, page 36). The verb satisfies only its accusative noun phrase from its subcategorization requirements using Schema R2′. The dative noun phrase, denoted by tag $\boxed{3}$ and the subject denoted by tag $\boxed{1}$ are still to be discharged.

$$\boxed{5}\,{}_{category}\left[\begin{array}{ll}\text{HEAD} & {}_{verb}\left[\text{VFORM } \mathrm{BSE}\right]\\ \text{SUBJ } <\boxed{1}\text{NP}[\mathrm{NOM}]> & \\ \text{COMPS } <\boxed{2}\text{NP}[\mathrm{ACC}],\boxed{3}\text{NP}[\mathrm{DAT}]> & \end{array}\right]$$

Figure 22: AVM for the verb *erzählen* (Baker, 1994, page 36).

$${}_{synsem}\left[\begin{array}{ll}\text{LOC} & {}_{local}\left[\begin{array}{ll}\text{HEAD} & {}_{verb}\left[\begin{array}{l}\text{VFORM } \mathrm{FIN}\\ \text{AUX+}\end{array}\right]\\ \text{COMPS } <\boxed{1},\boxed{3}> & \end{array}\right]\\ \text{NONLOC} & {}_{nonlocal}\left[\text{SLASH } \left\{\boxed{4}\right\}\right]\end{array}\right]$$

Figure 23: AVM for the verb *kann* (Baker, 1994, page 36). The auxiliary passes a partial verb phrase in its SLASH value, denoted by tag $\boxed{4}$. The auxiliary takes over some of the subcategorization requirements of the verb, denoted by tags $\boxed{1}$ and $\boxed{3}$ Note that this auxiliary is finite. Therefore the subject is expressed as the least oblique item on its COMP list.

6 An HPSG Analysis of Separable Verb Prefixes

Before I finally embark on my analysis, let me restate the premises, we are using as points of departure. In section 5, it was illustrated that, in the HPSG treatment of word order in German, the finite verb starts in the second position. There is no movement. Because finite auxiliary and the non-finite verb are, therefore, clearly discontinuous we have to assume a flat verb phrase structure, in which the auxiliary raises all of the subcategorized verb's subcategorization requirements.

Topicalization relies on a /-PVP-rule which essentially copies a partial verb phrase into the auxiliary's non-local slash-value. The FILLER-Head rule then ensures that this partial verb phrase is sentence-initial.

There are several good reasons not to assume that the separable verb prefix starts on the subcategorization list of the underlying verb.

First, the prefix behaves differently from other verb complements. For example, it cannot be topicalized without the verb, nor can it be modified.

Second, while verb complements can, in general, be scrambled, this is not the case for the prefix which has to stay at the right sentence periphery when the finite base verb occupies the first or second position; and it must form a contiguous compound when the base verb occupies a sentence-final position.

Third, derivational verb affixes are considered to be functor categories which take the underlying verb as an argument. This became evident in the work of (Riehemann, 1994; Krieger, 1993) on morphological operations such as *-bar*-affixation. Specifying verb prefixes as arguments on the verbs' subcategorization requirements would therefore attribute a completely different status to these verb prefixes. Treating them as functors instead underlines their similarity with derivational verb affixes.

Fourth, I have shown already that the combination of verb prefix and verb can change the subcategorization requirements of the underlying verb. To account for this subcategorization alteration we have two choices:

1. Following (Stiebels and Wunderlich, 1994) and (Ackermann and Webelhuth, to appear), we could claim that compound verbs already underwent all necessary subcategorization alterations prior to entering syntax. In order to explain, then, the distributional behavior of the verb prefixes Stiebels and Wunderlich (1994) have to invoke many additional principles (Particle Constraint, Visibility Constraint, and the Principle of Separability). The same obtain for (Ackermann and Webelhuth, to appear), who have to introduce the additional PREDICATE function and, presumably, additional lexical rules to account for the subcatgorization alteration.
2. Prefixes are stipulated to be functor categories, meaning that they subcategorize for the verb they form a compound with. These functors, however, are impoverished in the sense that most of their informational content is inherited by the verb they subcategorize for. In this regard they are similar to auxiliaries as specified by (Hinrichs and Nakazawa, 1989), (Hinrichs and Nakazawa, in press), and (Hinrichs and Nakazawa, 1994). This stipulation will account nicely for the distributional behavior of the verb prefixes and will also account for the alterations of subcategorization requirements. This analysis, moreover, will not require additional machinery in the form of ID-Schemata or LP-rules.
   The alternative, a lexical rule approach, would require a lexical rule for each pattern of subcategorization alteration. For example, to account for the alteration invoked by the verb prefixes *an-* and *ein-*, two different lexical rules would be required.

These observations argue for the following analysis:

1. Verb prefixes are functor categories subcategorizing for the underlying verb. In particular, verb prefixes do not originate on the verb's subcategorization list.

2. Verb prefixes raise the verbs' subcategorization requirements.

3. In the case where verb prefix and verb are discontinuous the alteration of subcategorization requirements is delayed to the syntactic level.

With these points in mind, we must explain three cases:

1. The prefix is immediately to the left of the verb and they form a contiguous string.

2. The prefix is sentence-final, whereas the underlying verb occupies the second position.

3. The prefix and the base verb are topicalized.

Let us start with the most basic problem, where separable prefix and verb are adjacent and form a contiguous string. In this case, we apply a straightforward, word syntactic approach. The lexical specification of the prefix *an-* is given in Figure (24). The prefix subcategorizes for an intransitive base verb and raises its subject into the SUBJ subcatgorization requirement of the resulting compound. In addition, the compound subcategorizes for an accusative noun phrase, extending the subcategorization requirements of the underlying verb to account for the data given in (14).
The subcategorized verb is specified as INV− and BSE, that is, it is at the right sentence periphery and in its base form. This specification will ensure that the contiguous string comprising prefix and verb is in sentence-final position. I require both the base verb and the compound to be lexical, the reason for which will become apparent later. This specification will be expanded by the morphological principles as developed

$$
\left[\begin{array}{ll}
\text{MORPH} & \left[\begin{array}{ll}
\text{FORM} & \text{“AN-”} \\
\text{COMPS} & < \left[\begin{array}{ll}
\text{CAT} & \left[\begin{array}{ll}
\text{LEX} & + \\
\text{HEAD} & \boxed{2}\left[\begin{array}{l}\text{VFORM BSE} \\ \text{INV}-\end{array}\right] \\
\text{SUBJ} & <\boxed{1}> \\
\text{COMPS} & <>
\end{array}\right] \\
\text{CONTENT} & \boxed{3}
\end{array}\right] >
\end{array}\right] \\
\text{SYNSEM} \mid \text{LOCAL} & \left[\begin{array}{ll}
\text{CAT} & \left[\begin{array}{ll}
\text{LEX} & + \\
\text{HEAD} & \boxed{2} \\
\text{SUBJ} & \boxed{1} \\
\text{COMPS} & <\text{NP[ACC]}_{\boxed{4}}>
\end{array}\right] \\
\text{CONTENT} & \left[\begin{array}{l}
\text{TOWARDS} \\
\text{ARG1 } \boxed{3} \\
\text{ARG2 } \boxed{4}
\end{array}\right]
\end{array}\right]
\end{array}\right]
$$

Figure 24: Word syntactic specification for the separable prefix *an-*. The prefix subcategorizes for an uninverted intransitive verb in its base form. The verb's subcategorization requirements are raised and extended by an accusative noun phrase. In its expanded form, this specification will account for the contiguous compound, cf. Figure (25).

by (Krieger, 1993) which were listed in section 4. The fully expanded version is given in Figure (25).

In the second case, the underlying finite verb occupies the first or second position and the separable prefix is sentence-final. Verb and prefix are clearly discontinuous, similar to the behavior of a finite auxiliary and a non-finite verb which gave rise to a flat verb phrase structure. It is in this case that we begin to rely on the ideas by (Ackermann and Webelhuth, to appear; Stiebels and Wunderlich, 1994), and where it becomes clear why I described the behavior of auxiliaries both in active and in passive constructions.

Remember that in (Stiebels and Wunderlich, 1994), separable prefixes were specified as [+max], i.e. as morphological maximal and syntactical minimal (X^0), which means that they are not opaque to syntactic processes. In (Ackermann and Webelhuth, to appear), it was claimed that functional and categorial information do not necessarily converge.

Combining these ideas we end up with a specification for the prefix *an-*, as given in Figure (26). In this specification, the separable prefix syntactically subcategorizes for the verb (visibility of the prefix in syntax). In contrast to its definition in Figure (24), the prefix *an-* does not inherit the head features of its subcategorized verb (divergence of functional and categorial information). Note that it is the information in the head, namely INV+, that will force the verb into Verb Second position leaving the prefix stranded. Instead, the prefix is specified as INV–. Surprisingly, specifying the prefix as INV– is sufficient to account for its distribution, i.e. its sentence-final position in this case. We do not need additional LP-rules. The LP-rules stated in Figure (14), (15), and (16) are already accounting for the surface distribution of separable prefixes. Finally, note that the raising properties of both specifications of the prefix *an-* are basically identical.

The similarity of this specification to the specification for auxiliaries as given in Figures (5) and (7) should be apparent. Auxiliaries subcategorize for a lexical verb as do prefixes, raising and possibly changing the verb's subcategorization requirements. The linear order of finite auxiliaries and separable prefixes, however, is complementary. This is an immediate consequence of the distribution of the INV feature in the specifications of separable prefixes, verbs, and auxiliaries.

The only difference between the specifications of the separable prefix *an-* and the separable prefix *ein-* lies in their different raising behavior. Therefore only the specification which allows the separation of prefix and verb is given. The corresponding entry is given in Figure (27). Recall that the prefix *ein-* in this case deletes the directional prepositional phrase in the subcategorization requirements of the underlying verb. The specification for the non-separable case should be obvious. The corresponding data was given in (14).

The specification of non-separable prefixes is a generalization of the specification of separable prefixes in the case where they are not separated. The corresponding entry for the non-separable prefix, *be-*, is given in Figure (28). The main difference is that the subcategorized verb is not specified for the INV feature. As a consequence, the prefix can form a contiguous compound with finite and non-finite verbs. Being the only specification for the prefix *be-*, this specification will classify the prefix as non-separable. The *be*-prefix inverts the subcategorization requirements of the underlying verb. The prepositional object of the underlying verb becomes the accusative object in the compound. The accusative object of the underlying verb becomes the prepositional object in the compound.

Having specified separable and non-separable prefixes as shown above, we can now adopt Baker's account for topicalization. Note that only non-finite verbs can be topicalized. The only case in our grammar which allows prefix and verb to be separated is where the underlying verb is finite and is specified as INV+. Because of this, topicalization of a verb will only be possible if verb and prefix form a contiguous compound, which is exactly what we want. Fronting only the prefix is ruled out because the respective prefix will not be "visible" to the corresponding syntactic process.

Both compounds and underlying verbs, were specified as lexical (LEX+). Following (Baker, 1994) this feature will prevent spurious ambiguities because the compound verb (or the underlying verb) is now not allowed to saturate any of its subcategorization requirements before it combines with potential auxiliaries (or the prefix).

Before I give a couple of examples, let me briefly mention two points. First, unfortunately, nothing so far in the specifications of verbal prefixes reflects their original part of speech, i.e. preposition. Second, for separable prefixes I have to provide two different lexical specifications. However, given one of them, the other one can be easily inferred, which suggests that these redundancies can either be captured by a lexical rule or by an appropriately designed type hierarchy in the lexicon. A first approximation of such a lexical rule is given in in Figure (29). Note that this lexical rule would be enough to account for all separable prefixes. Moreover, this lexical rule would take only one lexical specification as input to produce the altered specification. Also, this lexical rule does not alter the subcategorization requirements. This is still achieved by the raising potential of the prefix.

$$
\left[\begin{array}{l}
\text{MORPH} \mid \text{FORM } \textsc{realize-surface}(\text{AN-, LACHEN}) \\
\text{SYNSEM} \mid \text{LOC} \left[\begin{array}{l}
\text{CAT} \left[\begin{array}{l} \text{LEX } + \\ \text{HEAD } \boxed{2} \\ \text{SUBJ } \boxed{1} \\ \text{COMPS } \boxed{3} \end{array}\right] \\
\text{CONTENT } \boxed{6}
\end{array}\right] \\
\text{DTRS} \left[\begin{array}{l}
\text{AFFIX} \left[\begin{array}{l}
\text{MORPH SUBCAT} \left\langle \left[\begin{array}{l}
\text{FORM ``}\textsc{an-}\text{''} \\
\text{COMPS} \left\langle \left[\begin{array}{l}
\text{LEX } + \\
\text{HEAD } \boxed{2} \left[\begin{array}{l} \text{VFORM BSE} \\ \text{INV} - \end{array}\right] \\
\text{SUBJ } \langle \boxed{1} \rangle \\
\text{COMPS } \langle \rangle \\
\text{CONTENT } \boxed{7}
\end{array}\right] \right\rangle
\end{array}\right] \right\rangle \\
\text{SYNSEM} \mid \text{LOCAL} \left[\begin{array}{l}
\text{CAT} \left[\begin{array}{l} \text{LEX } + \\ \text{SUBJ } \boxed{1} \\ \text{COMPS } \langle \text{NP[ACC]}_{\boxed{5}} \rangle \\ \text{HEAD } \boxed{2} \end{array}\right] \\
\text{CONTENT } \boxed{6} \left[\begin{array}{l} \text{TOWARDS} \\ \text{ARG1 } \boxed{7} \\ \text{ARG2 } \boxed{5} \end{array}\right]
\end{array}\right]
\end{array}\right] \\
\text{WORD} \left[\begin{array}{l}
\text{MORPH} \mid \text{STEM ``}\textsc{lachen}\text{''} \\
\text{SYNSEM} \mid \text{LOC} \left[\begin{array}{l}
\text{CAT} \left[\begin{array}{l} \text{LEX } + \\ \text{HEAD } \boxed{2} \left[\begin{array}{l} \text{VFORM BSE} \\ \text{INV -} \end{array}\right] \\ \text{SUBJ } \boxed{1}\text{NP}_{\boxed{4}} \\ \text{COMPS } \langle \rangle \end{array}\right] \\
\text{CONTENT } \boxed{7} \left[\begin{array}{l} \text{RELN } \textit{lachen} \\ \text{AGENT } \boxed{4} \end{array}\right]
\end{array}\right]
\end{array}\right]
\end{array}\right]
\end{array}\right]
$$

Figure 25: Word syntactic specification for the compound *anlachen*. This structure arises through the application of the Morphological Subcategorization Principle and the additional principles as stated in section 4. Because this paper is not concerned with morphophonemics, the details of the *REALIZE-SURFACE* function are skipped. For more detailed information cf. (Krieger, 1993).

$$
\left[\begin{array}{ll}
\text{CAT} & \left[\begin{array}{l}
\text{LEX } + \\
\text{PHON ``}\textsc{an}\text{''} \\
\text{HEAD} \mid \text{INV -} \\
\text{SUBJ } \boxed{1} \\
\text{COMPS NP[ACC]}_{\boxed{3}} + < \left[\begin{array}{ll}
\text{CAT} & \left[\begin{array}{l}
\text{LEX } + \\
\text{HEAD } \boxed{2} \left[\begin{array}{l} \text{VFORM FIN} \\ \text{INV } + \end{array}\right] \\
\text{SUBJ } \boxed{1} \\
\text{COMPS } <>
\end{array}\right] \\
\text{CONTENT } \boxed{4} &
\end{array}\right] >
\end{array}\right] \\
\text{CONTENT} & \left[\begin{array}{l}
\text{TOWARDS} \\
\text{ARG1 } \boxed{4} \\
\text{ARG2 } \boxed{3}
\end{array}\right]
\end{array}\right]
$$

Figure 26: Specification for the separable prefix *an-*. This specification differs from the specification in Figure (24) in the following respects: First, subcategorization of the verb by the prefix is defined on the syntactic level instead of the morpho syntactical. Second, the prefix subcategorizes for an inverted finite verb in contrast to an uninverted non-finite verb. Third, the prefix does not inherit the verb's HEAD features. Instead, it is specified as INV−. Last, prefix and verb do not form a contiguous word.

$$
\left[\begin{array}{ll}
\text{CAT} & \left[\begin{array}{l}
\text{LEX } + \\
\text{PHON ``}\textsc{ein}\text{''} \\
\text{HEAD} \mid \text{INV -} \\
\text{SUBJ } \boxed{1} \\
\text{COMPS } \boxed{3} + < \left[\begin{array}{ll}
\text{CAT} & \left[\begin{array}{l}
\text{LEX } + \\
\text{HEAD } \boxed{2} \left[\begin{array}{l} \text{VFORM FIN} \\ \text{INV } + \end{array}\right] \\
\text{SUBJ } \boxed{1} \\
\text{COMPS } < \boxed{3}\text{NP[ACC], PP[}\textsc{dir}\text{]}_{\boxed{4}} >
\end{array}\right] \\
\text{CONTENT } \boxed{5} &
\end{array}\right] >
\end{array}\right] \\
\text{CONTENT } \boxed{6} &
\end{array}\right]
$$

Figure 27: Specification for the separable prefix *ein-*. The main difference between this specification and the specification of the separable prefix *an-* lies in the different effect the prefix has on the subcategorization requirements of the underlying verb. In this case the directional prepositional phrase ceases to be subcategorized for in the compound. The semantics of the compound $\boxed{6}$ is derived from the semantics of the subcategorized verb $\boxed{5}$ by substituting the semantics of the PP $\boxed{4}$ with some existential quantified entity that is not further specified. This is, of course, only a first approximation of the underlying semantics.

$$\begin{bmatrix} \text{MORPH} & \begin{bmatrix} \text{FORM} \ \text{“\textsc{be-}”} \\ \text{COMPS} < \begin{bmatrix} \text{CAT} & \begin{bmatrix} \text{LEX} \ + \\ \text{HEAD} \ \boxed{1} \\ \text{SUBJ} \ <\boxed{2}> \\ \text{COMPS} \ <\text{NP[ACC]}_{\boxed{3}}, \ \text{PP}_{\boxed{4}}> \end{bmatrix} \\ \text{CONTENT} & \boxed{5} \end{bmatrix} > \end{bmatrix} \\ \text{SYNSEM} \mid \text{LOCAL} & \begin{bmatrix} \text{CAT} & \begin{bmatrix} \text{LEX} \ + \\ \text{HEAD} \ \boxed{1} \\ \text{SUBJ} \ \boxed{2} \\ \text{COMPS} \ <\text{NP[ACC]}_{\boxed{4}}, \ \text{PP[MIT]}_{\boxed{3}}> \end{bmatrix} \\ \text{CONTENT} & \boxed{5} \end{bmatrix} \end{bmatrix}$$

Figure 28: Specification for the non-separable prefix, *be-*. The subcategorized verb is underspecified for the INV feature, allowing the prefix to form a compound both with INV− and INV+ verbs. Being the only specification for the prefix *be-* it will always form a contiguous compound, i.e. the prefix is non-separable. Note that the linking of semantic roles with items on the COMPS-list of the subcategorized verb ($\boxed{3}$,$\boxed{4}$) is inverted by the raising process ($\boxed{4}$,$\boxed{3}$).

$$\left[\begin{array}{ll} \text{MORPH} & \left[\begin{array}{ll} \text{FORM } \boxed{1} & \\ \text{COMPS} < & \left[\begin{array}{ll} \text{CAT} & \left[\begin{array}{ll} \text{HEAD} & \left[\begin{array}{l}\text{VFORM BSE}\\ \text{INV -}\end{array}\right] \\ \text{SUBJ } \boxed{2} & \\ \text{COMPS } \boxed{3} & \end{array}\right] \\ \text{CONTENT } \boxed{4} & \end{array}\right] > \end{array}\right] \\ \text{SYNSEM} \mid \text{LOCAL} & \left[\begin{array}{ll} \text{CAT} & \left[\begin{array}{l}\text{SUBJ } \boxed{5}\\ \text{COMPS } \boxed{6}\end{array}\right] \\ \text{CONTENT } \boxed{7} & \end{array}\right] \end{array}\right]_{\textit{verb-prefix-morphem}}$$

$$\Downarrow$$

$$\left[\begin{array}{ll} \text{CAT} & \left[\begin{array}{ll} \text{LEX} + & \\ \text{PHON } \boxed{1} & \\ \text{HEAD} \mid \text{INV -} & \\ \text{SUBJ } \boxed{5} & \\ \text{COMPS } \boxed{6} \ \& < & \left[\begin{array}{ll} \text{CAT} & \left[\begin{array}{ll} \text{HEAD} & \left[\begin{array}{l}\text{VFORM FIN}\\ \text{INV} +\end{array}\right] \\ \text{SUBJ } \boxed{2} & \\ \text{COMPS } \boxed{3} & \end{array}\right] \\ \text{CONTENT } \boxed{4} & \end{array}\right] > \end{array}\right] \\ \text{CONTENT } \boxed{7} & \end{array}\right]_{\textit{word-prefix-lexeme}}$$

Figure 29: Lexical Rule to relate the morphologically specified entries with their corresponding syntactic specification. Indices $\boxed{2}$, $\boxed{3}$, and $\boxed{4}$ ensure that the prefix subcategorizes for the same verb at the syntactic level as at the morphological level, part from different HEAD features. At the syntactic level, the prefix still subcategorizes for the main verb, plus the list, possibly altered, of the verb's complements (indices $\boxed{5}$ and $\boxed{6}$). The changed semantics is indicated to with index $\boxed{7}$

7 Examples

In this section I give some examples. Consider the sentence *Peter lacht den Polizisten an*, the derivation of which is given in Figure (30). The separable prefix *an-* subcategorizes for the intransitive verb *lacht*, viz.

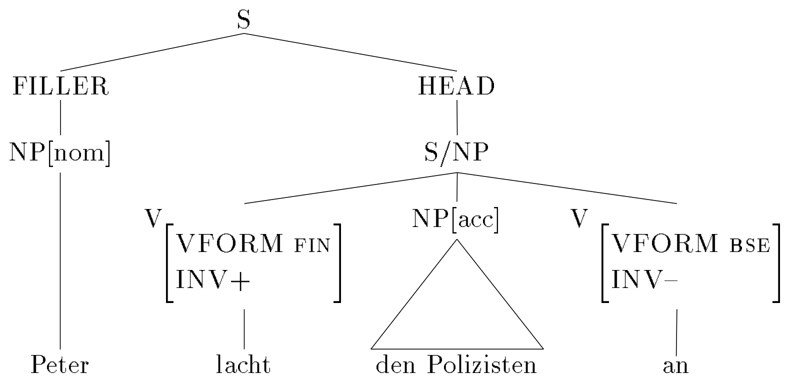

Figure 30:

Figure (26).The prefix raises the verbs subject to its own SUBJECT slot and subcategorizes for an additional accusative noun phrase. The verb specified as INV+ has to precede all of its sister nodes, whereas the prefix specified as INV– has to follow all of its sisters.

Next consider the sentence *Anlachen wird Peter den Polizisten* where the compound verb is topicalized. The corresponding derivation is given in Figure (31). The non-finite compound *anlachen* is formed by the

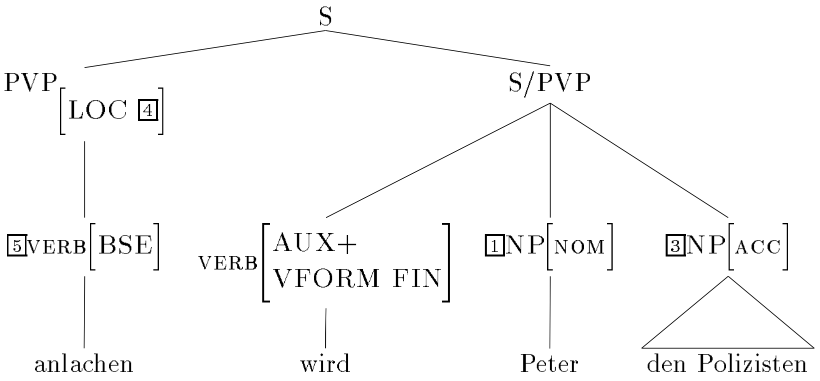

Figure 31:

morphosyntactic rule which was given in Figure (24) and Figure (25). In this compounding process the prefix *an-* again raises the subject of the underlying verb into its own subject requirements and extends the COMPS-list by an additional accusative noun phrase. The finite auxiliary *wird* passes the partial verb phrase, consisting in this case only of the compound, into its SLASH value. This is achieved by the /-PVP-rule. The auxiliary takes over the compound's subcategorization requirements for the subject (*Peter*) and the accusative noun phrase. The partial verb phrase is discharged in its topic position.

8 Conclusion

The distribution of separable verb prefixes in German has long been an argument in Transformational Grammar for assuming an underlying SOV order in German matrix clauses. Verb Second is, then, achieved by a head-to-head movement of the finite verb starting from its sentence-final base position. This movement leaves the prefix stranded, in which case verb and prefix are clearly discontinuous. This discontinuity is interesting because combining prefix and verb to a compound can change the subcategorization requirements of the underlying verb. This means that at some point during the derivation the prefix has to its hands on the verb's subcategorization requirements. This will be, of course, most difficult to explain when prefix and verb are discontinuous, in particular for a grammar theory without movement operations, such as HPSG.

In this paper I showed how a non-movement grammar theory can account for the distribution of separable prefixes. I assume that the prefix, as a functor category, subcategorizes for the verb it is forming a compound with. At the same time, the prefixes raises and possibly changes the verb's sucategorization requirements. In this respect it is very similar to the specification of active and passive auxiliary in German in HPSG.

For a given separable prefix, I stipulate two lexical specifications. A morphosyntactic specification covers the case where prefix and verb form a contiguous compound. The second specification accounts for the case in which prefix and verb are discontinuous. In this latter case the prefix is visible and active in syntax. In this point I agree with the analysis of Stiebels and Wunderlich (1994) who also claim that the prefix has to be visible in syntax. I also indicate how to relate the specifications by means of a simple lexical rule.

In my account the distribution of the INV feature regulates the surface order of prefix and verb. For example, in the case the finite verb occupies the second position in the sentence, it will be specified as INV+ while the prefix which has to stay sentence-final is specified as INV−. In this divergence of information I agree with Ackermann and Webelhuth (to appear) who claim that information does not necessarily have to converge into one item but can be distributed asymmetrically onto the items in an analytical expression.
My account, however, differs from both (Stiebels and Wunderlich, 1994) and (Ackermann and Webelhuth, to appear), in that I delay the alteration of subcategorization requirements. In my account, the alteration takes place at the syntactic level in the case where prefix and verb are discontinuous and on the morphosyntactic level in the case where prefix and verb form a contiguous compound. In contrast, in (Stiebels and Wunderlich, 1994) and (Ackermann and Webelhuth, to appear), the alteration of subcategorization information is assumed to be completed when the lexical items enter the syntactic level, meaning the alteration is completely executed within the lexicon.

By delaying possible alterations and treating prefixes as raising constructions I can make use of ID-schemata and LP-rules which were previously motivated independently, whereas (Stiebels and Wunderlich, 1994), for example, has to introduce additional principles (Particle Constraint, Visibility Constraint, and the Principle of Separability).

Moreover, with this specification I can show the similarities between active and passive auxiliary and prefixes. Syntactically, both of them are raising constructions which semantically modify the meaning of the verb that they are subcategorizing for. The meaning of both the auxiliary and the verb prefix are impoverished.

In this approach, *-bar*-affixation, the prefixation of the non-separable prefix *be-*, and the specification for the separable prefix *an-* or *ein* are very similar processes. In all of these cases, the prefix, as a functor, takes the verb as an argument and raises and possibly changes the verb's subcategorization requirements. The only difference is that the first two operations happen to be derived only by morphosyntactic rules, whereas the latter is partially derived by syntactic rules. In addition, recall that the principles used in the morphosyntax of Krieger (1993) are very similar to the principles as used in the syntactic component of the HPSG grammar. Thus, the phenomenon of separable verb prefixes is firmly grounded within several other phenomena. On the morphosyntactic level separable verb prefixes share most of their properties with other verb affixes. On the syntactic level they share several of their properties with auxiliaries. These similarities of verb prefixes to auxiliaries and other verb affixes are reflected in their corresponding specifications.

These analyses leave open the question of how to deal with one exceptional pattern. The construction in question allows fronting of only the "prefix", and moreover, its modification. Consider the sentences in (29).

(29) a. `*Er fährt den Pfahl.`
`He drives the stake`

b. `Er fährt den Pfahl (ganz)` *um*.
`He runs the stake (completely) down`
`(Stiebels and Wunderlich, 1994, example 95 a,b)`

c. `Ganz` *um* `hat er den Pfahl gefahren.`
`Completely down has he the stake run`

d. `Es wird the Pfal ganz` *um*`fahren.`
`He will the stake completely runs down`

On the syntactic level, the original intransitive verb is extended by a direct object and the "prefix". On the semantic level, the "prefix" denotes a result state which is predicated over the added direct object. Note that in this construction, the "prefix" allows modification which is not the case for separable prefixes, which suggests that it should be analyzed as an XP and not as an X^0. X^0, on the other hand, seems to be the most straightforward category for separable prefixes. My analysis fails to account for the potential of these"prefixes" to be fronted and modified. Fronting only the non-finite verb, however, yields at least questionable results:

(30) a. `??Fahren wird er den Pfal` *um*
`Runs will he the stake down`

b. `?Fahren wird er den Pfal ganz` *um*
`Runs will he the stake completely down`

c. *Um*`fahren wird er den Pfal (ganz).`
`Down-runs will he the stake (completely)`

These resultive constructions will have to be the subject of further research. Another important area to be looked into, is to relate the separability of verb prefixes at the syntactic level to their separability at the morphological level. By choosing a word syntactic approach in my analysis, the morphological component already shares a lot of its machinery with the syntactic component which could facilitate this.

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