Object-To-Subject-Raising and Lexical Rule
An Analysis of the German Passive

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Abstract

It is a much-debated issue whether one should assume separate lexical entries for participles used in passive and perfect constructions or whether there is just one lexical entry that is used in different ways depending on whether a passive or perfect auxiliary is present in the clause.

In previous work I criticized approaches trying to analyze the passive with one lexical entry for making empirically wrong predictions and suggested a lexical rule-based approach were two different lexical items for the participle are licensed.

In this paper I show how Heinz and Matiasek's (1994) formalizations of Haider's (1986) ideas can be extended and modified in a way that both modal infinitives and control constructions can be captured correctly. The suggested analysis needs only one lexical item for participles, base form infinitives, and *zu* infinitives irrespective of their usage in active or passive-like structures.

1   Introduction

Over the years there have been many suggestions in the HPSG literature for treating the German passive. Kiss (1992, S. 276), Hinrichs and Nakazawa (1998), Kathol (1998, S. 255), and Müller (2001) suggested lexical rule-based approaches, while (Kathol, 1991, 1994; Heinz and Matiasek, 1994; Lebeth, 1994; Pollard, 1994; Ryu, 1997; Müller, 1999) followed ideas by Haider (1986) and developed Object-To-Subject-Raising analyses.

The advantage of such raising analyses is that a single entry for the second participle is sufficient for both perfect tense and passive constructions. The auxiliary for the perfect (1a), passive (1b), or dative passive (1c) attracts the arguments of the embedded participle *geschenkt* ('given') in a way that is appropriate for the construction at hand.

(1)   a. Der Mann   hat den Ball   dem Jungen geschenkt.
the man$_{nom}$ has the ball$_{acc}$ the boy$_{dat}$ given

'The man gave the ball to the boy.'

b. Der Ball   wurde dem Jungen geschenkt.
the ball$_{nom}$ was   the boy$_{dat}$ given

'The ball was given to the boy.'

c. Der Junge   bekam den Ball   geschenkt.
the boy$_{nom}$ got   the ball$_{acc}$ given

'The boy got the ball as a present.'

The analysis is similar to the one in (Müller, 2002, Chapter 3). In comparison to (Müller, 2002, Chapter 3), I extended the discussion in Section 3.2 and added an analysis of agent phrases as adjuncts (Section 5). The XCOMP feature has been eliminated, since it is not necessary. On XCOMP see (Müller, To Appear b).

In the passive in (1b), the accusative object becomes the subject and the logical subject of the main verb is suppressed. In the dative passive, a dative object is promoted to subject.

The modal infinitive constructions in (2) show an alternation between active and passive argument realization that is similar to the alternations in (1a–b): In (2a) all arguments of the infinitive are realized and the sentence corresponds to an active sentence. In (2b), however, the subject of the active sentence is suppressed, as it is the case in passive sentences.

(2) a. Ihr   habt die Angelegenheit zu erledigen.
         you$_{nom}$ have the matter$_{acc}$ to settle
         'You have to settle the matter.'

     b. Die Angelegenheit ist von euch zu erledigen.
         the matter$_{nom}$ is by you to settle
         'The matter is to be settled by you.'

In (Müller, 2001) I pointed out that Heinz and Matiasek's approach to the passiv, the representation of valence, and to control is not compatible with this data. While Haider's proposal covers the data in (2), Heinz and Matiasek's proposal for (1) did not extend to (2). If one accounts for the diverse patterns of argument realizations in (1) with one lexical item for the participle, it seems to be desirable to account for the sentences in (2) with a single representation for the *zu* infinitive.

Since I believed that Heinz and Matiasek's approach could not be extended to deal with the data in (2), I formulated a lexical rule-based analysis that stipulates two distinct lexical entries per participle. A similar duplication of lexical entries has to be assumed for *zu* infinitives.

In this paper, I show that Heinz and Matiasek's approach can be adapted to Haider's proposals so that it also covers the modal infinitive constructions. The paper will be structured as follows: I will first discuss Haider's approach and Heinz and Matiasek's formalization of Haider's analysis, I then discuss the approaches by Kathol and Pollard, repeat some of my 2001 criticism, point out further problems, and then show how Heinz and Matiasek's approach can be modified to cover the modal infinitives.

2   Haider's Analysis

Haider suggests designating the argument of the verb that has subject properties. He refers to this argument as the designated argument (DA). He marks the designated argument in lexical entries by underlining the corresponding θ-role in the lexical entry of the verb. For intransitive verbs this looks as follows:

(3) a. V(θ) (tanzen = 'to dance', unergative)
     b. V(θ) (ankommen = 'to arrive', unaccusative)

For transitive verbs one gets the following representation:

(4)   a. V($\underline{\theta}$, θ) vs. V($\underline{\theta}$) (etwas essen 'eat something' vs. essen 'eat')
      b. V($\underline{\theta}$, θ) vs. V(θ) (etwas essen 'eat something' vs. gegessen werden 'be eaten')

Haider assumes the following rules:

(5)   a. the second participle blocks the DA
      b. *zu* blocks the external argument
      c. *haben* deblocks blocked arguments
      d. *sein* realizes non-blocked arguments

Contrary to my 2001 claims, both passive variants and modal infinitives can be explained with these simple rules. In the following sections I will discuss proposals for the analysis of the German passive that build on Haider's ideas.

3   Proposals for the Formalization of Haider's Ideas

3.1   Heinz and Matiasek

Heinz and Matiasek introduce a new list-valued feature DA. If a verb has a designated argument, i.e., if it is unergative, the DA list contains one element which is identical with an element in the SUBCAT list of the verb. The DA list is the empty list, if there is no designated argument, i.e., if the verb is unaccusative. (6) shows the representations for the prototypical verbs *ankommen* ('to arrive'), *tanzen* ('to dance'), *auffallen* ('to attract somebody's attention'), *lieben* ('to love'), *schenken* ('to give as a present'), *helfen* ('to help'):

(6)   DA   SUBCAT

      a. ankommen (unacc): $\langle\rangle$ $\left\langle \mathrm{NP}[str] \right\rangle$

      b. tanzen (unerg): $\left\langle \boxed{1}\,\mathrm{NP}[str] \right\rangle$ $\left\langle \boxed{1} \right\rangle$

      c. auffallen (unacc): $\langle\rangle$ $\left\langle \mathrm{NP}[str], \mathrm{NP}[ldat] \right\rangle$

      d. lieben (unerg): $\left\langle \boxed{1}\,\mathrm{NP}[str] \right\rangle$ $\left\langle \boxed{1}, \mathrm{NP}[str] \right\rangle$

      e. schenken (unerg): $\left\langle \boxed{1}\,\mathrm{NP}[str] \right\rangle$ $\left\langle \boxed{1}, \mathrm{NP}[str], \mathrm{NP}[ldat] \right\rangle$

      f. helfen (unerg): $\left\langle \boxed{1}\,\mathrm{NP}[str] \right\rangle$ $\left\langle \boxed{1}, \mathrm{NP}[ldat] \right\rangle$

ankommen and *auffallen* are unaccusative verbs while the other verbs are unergative.

   str is the abbreviation for structural case. *ldat* stands for lexical dative. I assume – simplifying a bit – that the first element in the SUBCAT list that has structural case gets nominative and all other elements in the SUBCAT list get accusative (for a formalization of case assignment see (Meurers, 1999)).

Heinz and Matiasek suggest the lexical rule in (7) which relates the lexical item of the second participle to the lexical item of the infinitive.

$$(7) \quad \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{VFORM} & bse \\ verb \end{bmatrix} \\ \text{DA} \; \boxed{1} \\ \text{SUBCAT} \; \boxed{1} \oplus \boxed{2} \end{bmatrix} \mapsto \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{VFORM} & ppp \\ verb \end{bmatrix} \\ \text{DA} \; \boxed{1} \\ \text{SUBCAT} \; \boxed{2} \end{bmatrix}$$

This lexical rule removes the designated argument from the SUBCAT list. Therefore this element cannot be realized in projections of the participle. (8) shows the result of the application of the rule to the verbs in (6):

(8)

		DA	SUBCAT
a.	angekommen (unacc):	$\langle\rangle$	$\langle \text{NP}[str] \rangle$
b.	getanzt (unerg):	$\langle \text{NP}[str] \rangle$	$\langle\rangle$
c.	aufgefallen (unacc):	$\langle\rangle$	$\langle \text{NP}[str], \text{NP}[ldat] \rangle$
d.	geliebt (unerg):	$\langle \text{NP}[str] \rangle$	$\langle \text{NP}[str] \rangle$
e.	geschenkt (unerg):	$\langle \text{NP}[str] \rangle$	$\langle \text{NP}[str], \text{NP}[ldat] \rangle$
f.	geholfen (unerg):	$\langle \text{NP}[str] \rangle$	$\langle \text{NP}[ldat] \rangle$

Heinz and Matiasek suggest the following lexical entry for the passive auxiliary:

(9) *werden* (Passive Auxiliary):
$$\begin{bmatrix} \text{DA} & \langle\rangle \\ \text{SUBCAT} & \boxed{1} \oplus \langle \text{V}[ppp, \text{DA} \langle\, [\,]\, \rangle, \text{SUBCAT} \; \boxed{1}] \rangle \end{bmatrix}$$

The passive auxiliary selects a participle which has a designated argument, i.e., an element in the DA list. This correctly predicts that the passive with unaccusative verbs is excluded, since unaccusative verbs have an empty DA list. Because of the coindexing of the SUBCAT value of *werden* ($\boxed{1}$) with the SUBCAT value of the embedded participle it is ensured that all non-blocked arguments of the participle are raised to the matrix predicate and can be realized as arguments of the matrix predicate at the surface.

In contrast to the passive auxiliary, the perfect auxiliary deblocks the designated argument. The SUBCAT value of the auxiliary is the concatenation of the DA value and of the SUBCAT value of the embedded participle:

(10) *haben* (Perfect Auxiliary):
$$\begin{bmatrix} \text{DA} & \boxed{1} \\ \text{SUBCAT} & \boxed{1} \oplus \boxed{2} \oplus \langle \text{V}[ppp, \text{DA} \; \boxed{1}, \text{SUBCAT} \; \boxed{2}] \rangle \end{bmatrix}$$

Heinz and Matiasek do not discuss modal infinitives, but they discuss control constructions and other raising constructions that involve *zu* infinitives. They assume that the subject of *zu* infinitives and the subject of infinitives without *zu* is represented in the SUBCAT list of the verb. This kind of representation was used in (Pollard and Sag, 1987) and (Pollard and Sag, 1994, Kapitel 1–8). Pollard and Sag (1994, Kapitel 9) followed Borseley's suggestions (1987) and represented the subject in a separate list—the SUBJ list. Borsley (1989) discusses Welsh data and suggests representing the subject of finite verbs like other arguments on the SUB-CAT list. Only subjects of non-finite verbs are represented under SUBJ. Pollard (1996) and other authors adapted this proposal for German grammars.

Such a modification of the representation of subjects of non-finite verbs in general has the advantage that the blocking and deblocking mechanisms which have been discussed in connection with the passive can be used for modal infinitives as well. How Heinz and Matiasek's analysis can be extended and modified so that it also covers modal infinitives will be discussed in section 4. Before doing so, I want to discuss the analyses that were suggested by Kathol, Pollard, and Ryu.

3.2 Kathol

Kathol (1994, Chapter 7.3.3) suggests the representations in (11) for participles and the lexical entries in (12) for the auxiliaries:

(11)

	EXT	SUBJ	COMPS
a. angekommen (unacc):	$\langle \boxed{1}\,\text{NP}[nom] \rangle$	$\langle \boxed{1} \rangle$	$\langle\rangle$
b. geschlafen (unerg):	$\langle \text{NP}[nom] \rangle$	$\langle\rangle$	$\langle\rangle$
c. geliebt (unerg):	$\langle \text{NP}[nom] \rangle$	$\langle \text{NP}[acc] \rangle$	$\langle\rangle$

(12)   a. *haben* (Perfect Auxiliary)

$$\begin{bmatrix} \text{SUBJ} & \boxed{3} \\ \text{COMPS} & \boxed{2} \oplus \boxed{1} \oplus \left\langle \text{V}[\text{SUBJ }\boxed{2}, \text{ EXT }\boxed{3}, \text{ COMPS }\boxed{1}] \right\rangle \end{bmatrix}$$
$$\wedge \boxed{2} \neq \boxed{3}$$

b. *sein* (Perfect Auxiliary)

$$\begin{bmatrix} \text{SUBJ} & \boxed{2} \\ \text{COMPS} & \boxed{1} \oplus \left\langle \text{V}[\text{SUBJ }\boxed{2}, \text{ EXT }\boxed{2}, \text{ COMPS }\boxed{1}] \right\rangle \end{bmatrix}$$

c. *werden* (Passive Auxiliary)

$$\begin{bmatrix} \text{COMPS} & \boxed{1} \oplus \left\langle \text{V}[\text{SUBJ }\left\langle \text{NP}[acc]_{\boxed{2}} \right\rangle, \text{ COMPS }\boxed{1}] \right\rangle \\ \text{SUBJ} & \left\langle \text{NP}[nom]_{\boxed{2}} \right\rangle \end{bmatrix}$$

Kathol follows Pollard (1996) in assuming that SUBJ is not a valence feature (p. 243), i.e., both the elements in EXT and those in SUBJ are blocked. The perfect auxiliary

haben in (12a) deblocks the elements in EXT and SUBJ. In perfect constructions with unaccusative verbs, the auxiliary *sein* in (12b) is used and only the element that is represented under EXT can be realized if the auxiliary verb is finite.

Kathol's proposal has the advantage that the nominative argument of all participles is represented uniformly under EXT. However, his representation is not without problems, since forms like *geliebt* do not have any element in the SUBCAT list at all. This predicts that the participle cannot be combined with complements. Since in Kathol's analysis, both the SUBJ element and the EXT element are deblocked by the finite auxiliary, the phrase *seine Frau* has to be analyzed as an argument of the auxiliary in (13). Therefore it is unclear why the NP can appear together with the participle in the position before the finite verb, a position wich is usually occupied by a single constituent.[1]

(13) Seine Frau geliebt hat er nie.
      his   wife loved   has he never
      'He never loved his wife.'

Furthermore, it remains unclear how subjectless verbs can be represented in a way that is compatible with the entry for *haben*. For the subjectless verb *grauen* ('to dread'), one would assume a representation like (14b):

(14) a. Dem Student   hat vor   der Prüfung gegraut.
         the   student$_{dat}$ has before the exam   dreaded
         'The student dreaded the exam.'
      b. gegraut (unerg):
         EXT $\langle\rangle$ SUBJ $\langle\rangle$ SUBCAT $\langle$NP[*dat*], PP[*vor*]$\rangle$

With such a lexical entry the embedding under *haben* is ruled out, since the value of EXT and SUBJ are identical. The only solution to this problem would be the stipulation of an empty subject for subjectless verbs. One would need further constraints to rule out such empty subjects at positions were overt referential or expletive subjects are required.

Apart from this problem, this approach cannot account for modal infinitives and incoherent infinitival constructions with one lexical entry: Since the accusative object is represented as an element of the SUBJ list, no VP can be formed. The only solution to this problem is to stipulate a separate lexical entry for *zu*-infinitives that can form a VP. As was discussed in the introduction of this paper, the avoidance of the stipulation of two separate entries for non-finite verbs is the goal of object-to-subject-raising analyses.

3.3 Kathol and Pollard

Pollard (1994) elaborates Kathol's suggestions (1991) and designates the element that has accusative properties instead of designating the element with subject properties as was suggested by Haider (See also (Müller, 1999, Chapter 15.3) for an

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[1]For examples that seem to violate the V2 property of German see (Müller, To Appear a).

extension of Pollard's proposal.). For our example verbs, these authors assume the following representations:

$$
\begin{array}{llccc}
(15) & & \text{SUBJ} & \text{ERG} & \text{SUBCAT} \\
& \text{a. ankommen (unacc):} & \langle\, \boxed{1}\,\text{NP}[str]\,\rangle & \langle\boxed{1}\rangle & \langle\rangle \\
& \text{b. tanzen (unerg):} & \langle\,\text{NP}[str]\,\rangle & \langle\rangle & \langle\rangle \\
& \text{c. auffallen (unacc):} & \langle\,\boxed{1}\,\text{NP}[str]\,\rangle & \langle\boxed{1}\rangle & \langle\,\text{NP}[ldat]\,\rangle \\
& \text{d. lieben (unerg):} & \langle\,\text{NP}[str]\,\rangle & \langle\boxed{1}\rangle & \langle\,\boxed{1}\,\text{NP}[str]\,\rangle \\
& \text{e. schenken (unergative):} & \langle\,\text{NP}[str]\,\rangle & \langle\boxed{1}\rangle & \langle\,\boxed{1}\,\text{NP}[str],\ \text{NP}[ldat]\,\rangle \\
& \text{f. helfen (unerg):} & \langle\,\text{NP}[str]\,\rangle & \langle\rangle & \langle\,\text{NP}[ldat]\,\rangle \\
\end{array}
$$

For unaccusative verbs like *ankommen* ('to arrive') and *auffallen* ('to notice'), the element in ERG is identical with the element in SUBJ. For unergative verbs, the element in ERG is identical to the direct object if there is one (*lieben* ('to love')), or the ERG value is the empty list if there is no accusative object, as for instance in the case of *tanzen* ('to dance') and *helfen* ('to help').

At the heart of the passivization analysis of Pollard is the object-to-subject raising lexical entry for the passive auxiliary in (16).

(16) *werden* (Passive Auxiliary following (Pollard, 1994)):

$$
\begin{bmatrix}
\text{HEAD} & \begin{bmatrix} \text{SUBJ} & \boxed{1} \\ \text{ERG} & \boxed{1} \\ verb & \end{bmatrix} \\
\text{SUBCAT} & \boxed{2} \oplus \big\langle \text{V}[ppp,\ \text{SUBJ}\ \langle\,\text{NP}[str]_{ref}\,\rangle,\ \text{ERG}\ \boxed{1},\ \text{SUBCAT}\ \boxed{1} \oplus \boxed{2}]\big\rangle
\end{bmatrix}
$$

The passive auxiliary embeds a verb with the VFORM *ppp*, i.e. a participle. The auxiliary subtracts the value of ERG ($\boxed{1}$) from the SUBCAT list of the embedded verb. The rest of the arguments ($\boxed{2}$) is raised.

This lexical entry only allows the combination with verbs that have an ERG value which is a prefix of the SUBCAT list of the embedded verb. This is the case for verbs that have the empty list as ERG value (*tanzen*, *helfen*). For such verbs, $\boxed{1}$ is the empty list. The SUBJ value of the verbal complex that results when participle and auxiliary are combined is the empty list as well. The result is a subjectless construction, the so-called impersonal passive. If we embed a transitive verb like *lieben* under *werden*, an ERG list that contains one element is subtracted from the valence list of the embedded participle. In the case of *lieben*, the remaining list ($\boxed{2}$) is the empty list. Since the SUBJ list of the resulting verbal complex is identical to the ERG value of the embedded participle, we get for *geliebt wird* a verbal complex that has the accusative object of *lieben* as subject. This kind of construction is the so-called personal passive.

I showed in (Müller, 1999, p. 374) that passive sentences like (17) in which the subject is fronted together with the participle are problematic for this approach.

(17)   a. Zwei Männer erschossen wurden während des Wochenendes.
           two   men$_{nom}$ shot   were$_{pl}$ during   the weekend
           'Two men were shot during the weekend.'

       b. Ein verkanntes Meisterwerk   dem Musiktheater   zurückgewonnen
           a   misjudged masterpiece$_{nom}$ the   music.theater$_{dat}$ back.won
           ist da   nicht.
           is there not
           'The music theater has not exactly recovered a neglected masterpiece there.'

The object of *erschießen* in (17a) can be combined with the participle to form the phrase *zwei Männer erschossen*, but then it is not contained in the SUBCAT list any longer. The passive auxiliary *wurden* requires that the ERG value of the embedded participle is a prefix of its SUBCAT list which is not the case for the projection *zwei Männer erschossen*. Therefore the fronted projection cannot be analyzed as a filler of an unbounded dependency construction that fills the gap for a complement of *wurden* and hence the sentences in (17) are unanalyzable.

Before I turn to the analysis, I want to discuss Ruy's proposal in the next subsection.

3.4   Ryu

Ryu (1997) suggests two new features for distinguishing the external (EXTARG) and the internal argument (INTARG). These features are represented as parts of the argument structure of a verb. The argument structure is described by a feature description that consists of a list of referential indeces and the two features pointing to the external and the internal argument if there are any. (18) shows an example for the transitive verb *schlagen* ('to beat').

(18)   Argument Structure of *schlagen* ('to beat') according to (Ryu, 1997, p. 376):

$$
\begin{bmatrix}
\text{EXTARG} & \langle\, \boxed{1} \,\rangle \\
\text{INTARG} & \langle\, \boxed{2} \,\rangle \\
\text{ARGS} & \langle\, \boxed{1} \,\rangle \oplus \langle\, \boxed{1} \,\rangle
\end{bmatrix}
$$

He suggests the following lexical entries for the passive auxiliary *werden* (p. 377, p. 379):

(19) *werden* (Auxiliary for the Personal Passive, finite form):

$$
\begin{bmatrix}
\text{SUBJ } \left\langle \text{NP}[\textit{nom}]_{\boxed{2}} \right\rangle \\[2ex]
\text{COMPS } \left\langle \text{PP}[\textit{von}]_{\boxed{1}} \right\rangle \oplus \boxed{4} \oplus \left\langle
\begin{bmatrix}
\text{HEAD} & \begin{bmatrix} \text{VFORM } \textit{psp} \\ \textit{verb} \end{bmatrix} \\[2ex]
\text{COMPS} & \left\langle \text{NP}[\textit{acc}]_{\boxed{2}} \right\rangle \oplus \boxed{4} \\[2ex]
\text{ARGSTR} & \begin{bmatrix} \text{EXTARG} & \langle \boxed{1} \rangle \\ \text{INTARG} & \langle \boxed{2} \rangle \\ \text{ARGS} & \langle \boxed{1} \rangle \oplus \langle \boxed{2} \rangle \oplus \boxed{3} \end{bmatrix}
\end{bmatrix}
\right\rangle
\end{bmatrix}
$$

(20) *werden* (Auxiliary for the Impersonal Passive, finite form):

$$
\begin{bmatrix}
\text{SUBJ } \langle \rangle \\[2ex]
\text{COMPS } \left\langle \text{PP}[\textit{von}]_{\boxed{1}} \right\rangle \oplus \boxed{4} \oplus \left\langle
\begin{bmatrix}
\text{HEAD} & \begin{bmatrix} \text{VFORM } \textit{psp} \\ \textit{verb} \end{bmatrix} \\[2ex]
\text{COMPS} & \boxed{4} \\[2ex]
\text{ARGSTR} & \begin{bmatrix} \text{EXTARG} & \langle \boxed{1} \rangle \\ \text{INTARG} & \langle \rangle \\ \text{ARGS} & \langle \boxed{1} \rangle \oplus \boxed{3} \end{bmatrix}
\end{bmatrix}
\right\rangle
\end{bmatrix}
$$

Examples like (17a) and (21) are problematic for Ryu's account since he assumes the argument structure to be represented at lexical items only.[2]

(21) Einem Jungen geschenkt wurde das Buch   dann doch   nicht.
     a   boy$_{dat}$ given   was   the book$_{nom}$ then after.all not
     'After all, the book was not given to a boy.'

In (17a) and (21), the position before the finite verb is occupied by a complex constituent. This complex constituent is a filler of a nonlocal dependency. *wurde* is combined with a trace and the selectional requirements of the passive auxiliary are identified with the properties of that trace. Since the argument structure is not projected, the constituent *einem Jungen geschenkt* is either incompatible with the trace or the grammar overgenerates: If the value of ARGSTR of phrases is *none* or something similar, the analysis fails since the restrictions on the trace are incompatible with the filler. If the value of ARGSTR of phrases is not constrained, the grammar wrongly admits sentences like (22) in which the participle of an unaccusative verb is fronted together with an argument.

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[2]For a discussion of problems that arise if one projects the argument structure see (Müller, 2002, p. 201).

(22)   * Dem Mann aufgefallen wurde nicht.
        the man noticed   was   not
        Intended: 'The man did not notice somebody.'

(22) can be analyzed as an impersonal passive since the requirement that the embedded participle has to have an element in EXTARG cannot be enforced since this information is not present at the projection *dem Mann aufgefallen*.

Turning to another problem, the following sentence causes problems for auxiliary-based analyses that treat the agent PP as argument, since the PP had to be an (optional) argument of the auxiliary.[3]

(23)   Von Grammatikern angeführt werden auch Fälle mit dem Partizip
        by grammarians   mentioned get   also cases with the participle
        intransitiver Verben ...[4]
        intransitive verbs

        'Grammarians also mention cases with the participle of intransitive verbs.'

As was mentioned already, fronting in German is generally understood as involving only a single constituent. The example in (23) shows that partial VPs can include the agent PP. Since Ruy assumes that the PP is a dependent of the auxiliary, he cannot explain why it appears together with the participle *angeführt* ('mentioned') before the finite verb.

Having discussed previous proposals and their shortcomings, I now present a new proposal that extends and modifies Heinz and Matiasek's proposal and solves the mentioned puzzles.

4 The Analysis

As mentioned in Section 3.1, I assume that the subject of *zu* infinitives is represented in the SUBJ list as was suggested by Borsley (1989) and Pollard (1996). If we want to have syntactically identical lexical entries for the perfect auxiliary *haben* and for the *haben* that forms modal infinitive constructions and if we use different features for representing the blocked subject of *zu* infinitives (SUBJ) and of the underlying subject (DA), the auxiliary has to deblock both the SUBJ and DA elements. The lexical entry for *haben* would look like (24):

(24)   *hab-* (Perfect Auxiliary and Modal Infinitive, Preliminary):
$$\left[\text{SUBCAT } \boxed{1} \oplus \boxed{2} \oplus \boxed{3} \oplus \left\langle \text{V}[ppp, \text{ SUBJ } \boxed{1}, \text{ DA } \boxed{2}, \text{ SUBCAT } \boxed{3}] \right\rangle \right]$$

The problem with this approach is that unergative verbs like *tanzen* ('to dance') have a surface subject that is simultaneously the designated argument. Therefore both the SUBJ list and the DA list would contain an element. If we deblock both

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[3]See (Müller, 1999, p. 376) and (Müller, 2001, p. 250).
[4]In the main text of (Askedal, 1984, p. 28).

elements simultaneously we get a list that contains the subject of the unergative verb twice. This problem could be solved technically by stipulating that the DA value of *zu* infinitives is always the empty list. Instead of this ad hoc solution I suggest that blocked elements are always presented in the same list. Participles and infinitival forms are derived from stem entries by lexical rules. For participles the element that is identified as the designated argument in the stem entry is removed from the SUBCAT list and represented as element of SUBJ. For infinitives the first element in the SUBCAT list of the stem that has structural case is represented in the SUBJ list. The respective lexical rules are given in (25) and (27): (25) is the rule that blocks the designated argument and (27) blocks the syntactic subject:

$$
(25) \quad \begin{bmatrix} \text{SYNSEM}|\text{LOC}|\text{CAT} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{DA} \;\boxed{1} \\ verb \end{bmatrix} \\ \text{SUBCAT} \; \boxed{1} \oplus \boxed{2} \end{bmatrix} \end{bmatrix} \mapsto
$$

$$
\begin{bmatrix} \text{SYNSEM}|\text{LOC}|\text{CAT} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{VFORM} \; ppp \\ \text{SUBJ} \quad \boxed{1} \\ verb \end{bmatrix} \\ \text{SUBCAT} \; \boxed{2} \end{bmatrix} \end{bmatrix}
$$

The lexical rule (25) licenses lexical items with the values in (26):

(26)		SUBJ	SUBCAT
	a. angekommen (unacc):	$\langle\rangle$	$\left\langle \text{NP}[str] \right\rangle$
	b. getanzt (unerg):	$\left\langle \text{NP}[str] \right\rangle$	$\langle\rangle$
	c. aufgefallen (unacc):	$\langle\rangle$	$\left\langle \text{NP}[str], \text{NP}[ldat] \right\rangle$
	d. geliebt (unerg):	$\left\langle \text{NP}[str] \right\rangle$	$\left\langle \text{NP}[str] \right\rangle$
	e. geschenkt (unerg):	$\left\langle \text{NP}[str] \right\rangle$	$\left\langle \text{NP}[str], \text{NP}[ldat] \right\rangle$
	f. geholfen (unerg):	$\left\langle \text{NP}[str] \right\rangle$	$\left\langle \text{NP}[ldat] \right\rangle$

The forms in (26) differ from those in (8) only in the feature that is used to represent the blocked argument, i.e. SUBJ instead of DA. I assume that the DA of the input lexical sign is also represented at the output lexical sign in addition to the SUBJ value.

Turning to rule (27), the relational constraint *first-np-str* divides the list $\boxed{1}$ in two parts $\boxed{2}$ and $\boxed{3}$. $\boxed{2}$ contains the first NP with structural case, if there is any, and $\boxed{3}$ contains the remaining elements of $\boxed{1}$.

(27) $\begin{bmatrix} \text{SYNSEM|LOC|CAT} & \begin{bmatrix} \text{HEAD} & \textit{verb} \\ \text{SUBCAT} & \boxed{1} \end{bmatrix} \end{bmatrix} \mapsto$

$\begin{bmatrix} \text{SYNSEM|LOC|CAT} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{VFORM} & \textit{inf-or-bse} \\ \text{SUBJ} & \boxed{2} \\ \textit{verb} \end{bmatrix} \\ \text{SUBCAT} & \boxed{3} \end{bmatrix} \end{bmatrix}$

$\wedge$ *first-np-str*($\boxed{1}$, $\boxed{2}$, $\boxed{3}$)

The lexical rule (27) licenses the infinitival forms in (28):

(28)   SUBJ   SUBCAT

    a. anzukommen (unacc): $\langle \text{NP}[str] \rangle \; \langle \rangle$

    b. zu tanzen (unerg): $\langle \text{NP}[str] \rangle \; \langle \rangle$

    c. aufzufallen (unacc): $\langle \text{NP}[str] \rangle \; \langle \text{NP}[ldat] \rangle$

    d. zu lieben (unerg): $\langle \text{NP}[str] \rangle \; \langle \text{NP}[str] \rangle$

    e. zu schenken (unerg): $\langle \text{NP}[str] \rangle \; \langle \text{NP}[str], \text{NP}[ldat] \rangle$

    f. zu helfen (unerg): $\langle \text{NP}[str] \rangle \; \langle \text{NP}[ldat] \rangle$

The lexical rule in (27) ignores the DA value of the input lexical entry. Instead the first argument of the verb that has structural case is represented as SUBJ element in the output sign of (27). Therefore the representation of unaccusative verbs in (26) differ from those in (28).

The stem entries for the auxiliaries have the form in (29) and (30):

(29) *werd-* (Passive Auxiliary):
$\begin{bmatrix} \text{HEAD|DA} & \langle \rangle \\ \text{SUBCAT} & \boxed{1} \oplus \left\langle \text{V}[ppp, \text{DA} \langle \text{NP}[str]_{ref} \rangle, \text{SUBCAT} \boxed{1}] \right\rangle \end{bmatrix}$

werden selects a participle with a designated argument. Therefore a passivization of unaccusative verbs like *ankommen* and *auffallen* is excluded.

The fronting of the participle together with the subject as in (17) is without problems for this approach, if one assumes that case assignment works as suggested by Meurers (1999): The participle can be combined with all or with some of its arguments. The remaining arguments are taken over by the auxiliary. Since the subject is blocked in the lexical entry for the participle already, the blocking has not to be done by the auxiliary and the conflicts that arise in Kathol's and Pollard's approach do not arise.

The lexical entry for the stem of *haben* in (30) deblocks the designated argument, when a participle is embedded or the syntactic subject which is blocked in the case of *zu* infinitives:

(30) *hab-* (Perfect Auxiliary and Auxiliary for Modal Infinitive Constructions):

$$\begin{bmatrix} \text{HEAD}|\text{DA} & \boxed{1} \\ \text{SUBCAT} & \boxed{1} \oplus \boxed{2} \oplus \left\langle \text{V}[\textit{ppp-or-inf}, \text{SUBJ } \boxed{1}, \text{SUBCAT } \boxed{2}] \right\rangle \end{bmatrix}$$

The auxiliary *sein* does not unblock blocked arguments:

(31) *sein* (Perfect Auxiliary and Auxiliary for Modal Infinitive Constructions):

$$\begin{bmatrix} \text{HEAD}|\text{DA} & \langle \rangle \\ \text{SUBCAT} & \boxed{1} \oplus \left\langle \text{V}[\textit{ppp}, \text{SUBCAT } \boxed{1}] \right\rangle \end{bmatrix}$$

The participles of unaccusative verbs like *ankommen* and *auffallen* do not have blocked arguments so that nothing needs to be unblocked in perfect constructions.

I want to complete the analysis by discussing subjectless verbs: A verb like *grauen* ('to dread') does neither have a syntactic subject nor a designated argument. The participle and the infinitive form are represented as follows:

(32)   SUBJ DA   SUBCAT

a. gegraut (unerg): $\langle \rangle$ $\langle \rangle$ $\left\langle \text{NP}[\textit{ldat}], \text{PP}[\textit{ldat}] \right\rangle$

b. zu grauen (unacc): $\langle \rangle$ $\langle \rangle$ $\left\langle \text{NP}[\textit{ldat}], \text{PP}[\textit{ldat}] \right\rangle$

These forms have to be excluded in passive constructions or passive-like constructions:

(33)   a.   * Dem Student   wird (vom   Professor) vor   der Prüfung gegraut.
            the   student$_{dat}$ gets by.the professor before the exam   dreaded
            Intended: '(The professor is threatening so that) the student dreads
            the exam.'

       b.   * Dem Student ist vor   der Prüfung zu grauen.
            the   student is before the exam   to dread
            Intended: 'Somebody has to thread so that the student dreads the
            exam.'

(33a) is excluded since the lexical entry for *werden* in (29) requires the embedded participle to have a designated argument. To exclude examples like (33b), one has to further specify the lexical entry for the modal *sein*. The modal *sein* has to be specified parallel to the passive auxiliary *werden*: It has to be required that the embedded *zu* infinitive has a referential designated argument.

In contrast to the examples in (33), subjectless constructions are possible in perfect constructions and in raising constructions, as the examples in (34) show:

(34)   a. Dem Student   hat vor   der Prüfung gegraut.
           the   student$_{dat}$ has before the exam   dreaded
           'The student dreaded the exam.'

        b. Dem Student scheint vor   der Prüfung zu grauen.
           the   student seems   before the exam   to dread
           'The student seems to dread the exam.'

The lexical rule in (27) produces the right result for the words in (32): Since the SUBCAT list does not contain a NP with structural case, ② is the empty list and hence the SUBJ value of the infinitive form is the empty list. The raising verb *scheinen* ('seem') and the perfect auxiliary *haben* just insert the SUBJ value of the embedded verbal complex into their own SUBCAT list. Since the SUBJ value is the empty list in the case of *zu grauen*, nothing is raised.

5   Agent Expressions

In passive constructions, the agent is usually expressed by a PP headed by *von* or *durch*. In lexical rule-based analyses the PP that expresses the agent is often treated as an argument of the passive lexical item (see for example (Pollard and Sag, 1987, p. 216)). As I showed in Section 3.4, treating the agent PP as argument is not possible for auxiliary-based approaches, since the auxiliary had to introduce the agent PP into valence lists and this makes wrong predictions as far as fronting of participles and agent PPs is concerned.

     The treatment of the PP as adjunct seems to be the obvious way to solve this problem, but note that sentences like (35) are ungrammatical with the reading where the *von*-PP expresses the logical subject of the participle:[5]

(35)   # Grammatiker haben auch andere Fälle von Grammatikern / sich
        grammarians have   also   other   cases by   grammarians   self
        angeführt.
        mentioned

Since the participle is assumed to be the same lexical entry in perfect and passive constructions, the *von*-PP can modify the participle in perfect constructions also. In sentences like (35), we therefore have both the logical subject of the active sentence (*Grammatiker*) and the *von*-PP that is used to express the logical subject in passive sentences. Two ways of solving this problem suggest themselves: First, one can assume some version of a coherence principle, as is assumed in LFG (Bresnan, 1982). This principle ensures that every grammatical function of a predicate is realized exactly once. However, it is not easy to see how such a principle could be formalized and integrated into HPSG. The problem is that we cannot refer to grammatical functions. In an HPSG grammar one has valence information and the

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[5] '#' is used to mark sentences that are ungrammatical with the structure under discussion, but have a reading in which they are grammatical.

dependent elements are linked to the semantic contribution in a certain way. In (35) the NP *Grammatiker* and the PP *von Grammatikern* do not satisfy the same valence requirement, since only the NP is treated as an argument. Since reflexive pronouns in adjuncts may refer to an NP in the same clause, it is impossible to rule out (35) on the basis of the fact that two phrases in the sentence are coindexed with the agent role of *anführen*.

Manning and Sag (1998) discuss a lexical rule-based analysis of the passive and suggest different argument structures for active and passive forms. In an auxiliary-based approach the argument structure would be determined by the auxiliary. It cannot be encoded in the lexical item of the participle since there is just one such item and the binding properties in active and passive sentences differ in the languages discussed by Manning and Sag (1998). In the analysis of sentences like (35) the active argument structure will be used and therefore Binding Theory cannot rule out this example: The *von* PP is just an adjunct PP containing a reflexive, a case that is possible in general and cannot be excluded by Binding Principles.

Höhle (1978, Chapter 7) showed that the expression of the agent is not limited to *von* phrases and that general inference mechanisms and reference to world knowledge are used to infer the agent. Consider the following example from (Höhle, 1978, p. 148):

(36) Der Verletzte wurde zwischen zwei Sanitätern   zum
      the injured   was   between two first-aid.attendents to.the
      Krankenwagen gebracht.
      ambulance   brought

      'The injured was brought to the ambulance between two first-aid attendents.'

(36) entails that the first-aid attendents brought him to the ambulance. Examples like (37a) are semantically deviant, since the agent seems to be expressed both in the *von* PP and in the locative PP.

(37) a. # Der Verletzte wurde von Karl zwischen zwei Sanitätern
            the injured   was   by Karl between two first-aid.attendents
            zum   Krankenwagen gebracht.
            to.the ambulance   brought

            'The injured was brought to the ambulance by Karl between two first-aid attendents.'

      b.   Der Verletzte wurde von Karl zwischen zwei Ziegenböcken zum
            the injured   was   by Karl between two billy.goats   to.the
            Krankenwagen gebracht.
            ambulance   brought

            'The injured was brought to the ambulance by Karl between two billy goats.'

Nevertheless it would be nice to have a grammar internal way to rule out sentences like (35) without referring to some unformailized inference procedure and there

is a very simple trick that can be used to cope with such examples: One can use the REALIZED feature that was suggested by Przepiórkowski (1999) in connection with case assignment. Raising verbs can only raise elements that are not marked REALIZED+. In our case the constraint on subject raising verbs is shown in (38):

(38) Constraint on Subject Raising Verbs:

$$\left[\text{SUBCAT} \ \boxed{1} \oplus \boxed{} \oplus \text{V[SUBJ} \ \boxed{1} \ \textit{list-of-non-realized-synsems]} \right]$$

The agent preposition *von* simply marks the element in the DA list of the modified verb as realized and coindexes the designated argument of the modified verb with the NP that is the argument of the preposition:

(39) Agent Preposition *von*:

$$\left[\begin{array}{l} \text{HEAD} \quad \left[\begin{array}{l} \text{MOD|LOC|CAT|HEAD} \ \left[\begin{array}{l} \text{DA} \ \left\langle \left[\begin{array}{ll} \text{LOC|CONT|IND} & \boxed{1} \\ \text{REALIZED} & + \end{array} \right] \right\rangle \\ \textit{verb} \end{array} \right] \\ \textit{prep} \end{array} \right] \\ \text{SUBCAT} \ \left\langle \text{NP[}\textit{ldat}\text{]}_{\boxed{1}} \right\rangle \end{array} \right]$$

When a *von* PP is combined with the participle, the designated argument is marked as realized. Since the element that is represented under SUBJ is identical to the designated argument (see lexical rule (25)), the element in SUBJ is also marked as realized and since all (subject) raising verbs require the raised elements to be REALIZED−, double realizations of logical subjects as in (35) are correctly excluded.

6 Conclusion

I have developed an analysis of the German passive that for the first time accounts for the passive and for modal infinitives with one lexical item per participle and one lexical item for the *zu* infinitive. In comparison to earlier proposals, the analysis has no problem with partial fronting data.

The analysis is part of a fragment of German, that was implemented with the TRALE system (Meurers, Penn and Richter, 2002).

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