

The Passive as a Lexical Rule

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1 Introduction

In HPSG grammars for English (Pollard and Sag, 1987, p. 214–218) and in LFG (Bresnan, 1982), the passive is analyzed as a lexical rule. For German many authors followed Haider (1986a) and analyzed the passive as object-to-subject-raising (Kathol, 1991, 1994; Heinz and Matiasek, 1994; Lebeth, 1994; Pollard, 1994; Müller, 1999). The advantage of the raising analysis is that one entry for the participle is sufficient. The auxiliary for the perfect (1a), passive (1b), or dative passive (1c) attracts the arguments of the embedded participle 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.’

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

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subject. The situation is similar for bare infinitives in future tense constructions, middle constructions, and the causative passive, and for so-called modal infinitives, i.e., infinitives with *zu*. See (Müller, Submitted, Chapter 4) for a general discussion. Modal infinitives will be discussed below.

However, none of the proposed object-to-subject-raising analyses is without problems. I will discuss both the lexical rule-based approach to the German passive and the object-to-subject-raising analyses and suggest that the first is better suited to explain the empirical facts. The decision for lexical rules will have consequences for the analysis of (derivational) morphology, since *-bar*-derivation is a passive-like process.

2 Object-to-Subject-Raising

There are four proposals for object-to-subject-raising analyses for the German passive. The one that will be discussed first was suggested by Pollard (1994) and elaborated by me in my 1999 book.¹ This analysis assumes a separate specification of subjects and other complements for non-finite verbs as is assumed in this article also. The second analysis was originally developed by Haider (1986a) in the GB framework and partly transferred to HPSG by Heinz and Mathiasek (1994). Heinz and Mathiasek assume that both subjects and complements are always listed on the subcat list. Their approach will be discussed in section 2.2. The third approach was suggested by Lebeth (1994) and is also based on Haider's ideas. It will be discussed in section 2.2.1. In a subsection Kathol (1994, Chapter 7.3.3) discusses a further variant which will be examined in section 2.2.2.

2.1 Designating the Accusative

Pollard (1994) designates the argument that has the properties of an accusative object. For unergative verbs that take an accusative object, the designated argument is the direct object, for ergative verbs it is the subject. (2) shows the lexical entry for *geschenkt* as it is used in the analysis of all three sentences in (1).

$$(2) \text{ } geschenkt \text{ ('given' participle form):}$$

$$\left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ} \langle \text{NP}[_{str}] \rangle \\ \text{ACC} \langle \boxed{2} \rangle \\ \text{verb} \end{array} \right] \\ \text{SUBCAT}_{cat} \langle \boxed{2} \text{ NP}[_{str}], \text{NP}[_{dat}] \rangle \end{array} \right]$$

Pollard assumes that the subject of non-finite verbs is not represented on the subcat list, but as the value of a special feature SUBJ. I assume the dative to be a lexical case.

¹ Pollard's proposal is an elaboration of Kathol's ideas (1991). Kathol introduced a feature named *ERG* to single out the complement that has accusative properties. This feature is also used by Pollard. In his paper he unifies the analyses for the personal und impersonal passive and also discusses the remote passive. In what follows I will use the feature name *ACC* instead of *ERG* since this is more appropriate.

For the majority of verbs nominative and accusative are structural cases. *str* is the abbreviation for structural case. For a justification of this lexical/structural distinction see (Müller, To Appear), for case assignment see (Meurers, 1999). The following list gives some examples for ergative verbs and other non-ergative verbs:

- (3)
- | | SUBJ | ACC | SUBCAT |
|---------------------------|--|-----------------------------|--|
| a. ankommen (ergative): | $\langle \boxed{1} \text{ NP}[\textit{str}] \rangle$ | $\langle \boxed{1} \rangle$ | $\langle \rangle$ |
| b. tanzen (non-ergative): | $\langle \text{NP}[\textit{str}] \rangle$ | $\langle \rangle$ | $\langle \rangle$ |
| c. auffallen (ergative): | $\langle \boxed{1} \text{ NP}[\textit{str}] \rangle$ | $\langle \boxed{1} \rangle$ | $\langle \text{NP}[\textit{ldat}] \rangle$ |
| d. lieben (non-ergative): | $\langle \text{NP}[\textit{str}] \rangle$ | $\langle \boxed{1} \rangle$ | $\langle \boxed{1} \text{ NP}[\textit{str}] \rangle$ |
| e. helfen (non-ergative): | $\langle \text{NP}[\textit{str}] \rangle$ | $\langle \rangle$ | $\langle \text{NP}[\textit{ldat}] \rangle$ |

For ergative verbs like *ankommen* ('arrive') the ACC value is identical with the SUBJ value. For non-ergative verbs the ACC value is identical to the direct object if there is one and the empty list if there is no accusative object, as for instance *helfen* ('help'). (4) shows the lexical entry for the passive auxiliary which is similar to the one that was suggested by Pollard (1994).²

- (4) *werden* (passive auxiliary non-finite form):
- $$\left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ} \boxed{1} \\ \text{ACC} \boxed{1} \\ \textit{verb} \end{array} \right] \\ \text{SUBCAT} \boxed{2} \\ \text{VCOMP} \left\langle \begin{array}{l} \text{V}[\textit{ppp}, \textit{LEX}+, \text{SUBJ} \langle \text{NP}[\textit{str}]_{\textit{ref}} \rangle, \text{ACC} \boxed{1}], \\ \text{SUBCAT} \boxed{1} \oplus \boxed{2}, \text{VCOMP} \langle \rangle \end{array} \right\rangle \\ \textit{cat} \end{array} \right]$$

The \oplus stands for the concatenation of two lists. The lexical entry accounts for both the personal and the impersonal passive and blocks the passive with ergative verbs. The impersonal passive is formed with verbs like *tanzen* and *helfen*. The ACC value is the empty list, it can be subtracted from the subcat list of the embedded verb, the result being the original subcat list. In the case of an empty ACC value the subject of the embedded verb is suppressed, nothing else changes. If verbs have an element in ACC, the personal passive results. The ACC element is promoted to subject and it is subtracted from the subcat list of the embedded verb, where it was listed as object at the first position.

Sentences like (5) are problematic for object-to-subject-raising analyses. The agent in passive constructions, which may be expressed by a *von*-PP, has to be represented as a complement of the passive auxiliary, since it is not present in the subcat lists of the

²Pollard does not use VCOMP. VCOMP is a valance feature that was introduced by (Chung, 1993) for Korean and by Rentier (1994) for Dutch for the selection of verbs that form a complex with their head. See also (Müller, 1997) for an analysis of German verbal complexes. In (Müller, Submitted) I suggested selecting all complements that are part of a complex predicate via VCOMP.

participles (see (2) and (3), but also the valance lists discussed in the next section).³ As I mentioned in (Müller, 1999, p. 376), it cannot be explained why the PP can be fronted together with the participle. See (Müller, Submitted, Chapter 4.2.1.1.8) for a similar example with the middle construction.

- (5) a. Von Grammatikern angeführt werden auch Fälle mit dem Partizip
by grammarians mentioned get also cases with the participle
intransitiver Verben
intransitive verbs
'Grammarians also mention cases with the participle of intransitive verbs.'
- b. Von Riemsdijk entdeckt sind nun Daten, die zeigen, daß es möglich ist, eine
W-Phrase hinter *glauben* zu haben.
'Riemsdijk has now discovered data that demonstrate that it is possible to
have a W-phrase following *glauben*.'

Since German is assumed to be a V2 language, *von Grammatikern angeführt* should be one phrase. If the *von*-PP is not a complement of the main verb but a complement of the auxiliary, the sentences in (5) would have two constituents in the position before the finite verb. If one assumes a lexical rule for passive, the lexical rule can change the subject of a verb into a PP complement and the PP is then a complement of the main verb and can be fronted together with the main verb.

Another problem for Pollard's approach is that one needs the participles with passive argument structure anyway to account for sentences like those in (6).

- (6) a. weil er die Äpfel gewaschen ißt.
because he the apples washed eats
'because he eats the apples washed'
- b. So lange gilt die 39-Jährige als nicht suspendiert.
so long counts the 39 year old as not suspended
'The 39 year old woman is regarded as suspended for this period.'

For (6) a passive participle is needed that can be used as a predicate directly. In (6a) *gewaschen* is a participle that functions as a depictive secondary predicate, and in (6b) *gelten* selects *als* + predicate. There are no auxiliaries in (6) that could do an object-to-subject-raising.

2.2 Designating the Nominative

The alternative to Pollard's approach was first suggested by Haider (1986a) and later formalized by Heinz and Matiasek (1994) and Lebeth (1994) in an HPSG style. Later this analysis was extended to the causative passive with *lassen* by Gunkel (1999). Haider suggested designating one argument as the external argument. This designated argument is the subject of non-ergative verbs. Ergative verbs do not have a designated argument. The following list gives some examples:

³ An alternative would be to assume that the PP is an adjunct, but then one had to explain how the thematic linking is established. In lexical rule-based approaches to passive the PP is always treated as an optional complement.

(7)	DA	SUBCAT
a. ankommen (ergative):	$\langle \rangle$	$\langle \text{NP}[\textit{str}] \rangle$
b. tanzen (non-ergative):	$\langle \boxed{1} \text{NP}[\textit{str}] \rangle$	$\langle \boxed{1} \rangle$
c. auffallen (ergative):	$\langle \rangle$	$\langle \text{NP}[\textit{str}], \text{NP}[\textit{ldat}] \rangle$
d. lieben (non-ergative):	$\langle \boxed{1} \text{NP}[\textit{str}] \rangle$	$\langle \boxed{1}, \text{NP}[\textit{str}] \rangle$
e. helfen (non-ergative):	$\langle \boxed{1} \text{NP}[\textit{str}] \rangle$	$\langle \boxed{1}, \text{NP}[\textit{ldat}] \rangle$

Haider suggests a blocking of the designated argument for participles. The external argument is blocked and cannot be realized in a phrasal projection. Only the perfect auxiliary can deblock this argument. Heinz and Mathiassek suggest a lexical rule that produces the lexical entries in (8) for participles.

(8)	DA	SUBCAT
a. angekommen (ergative):	$\langle \rangle$	$\langle \text{NP}[\textit{str}] \rangle$
b. getanzt (non-ergative):	$\langle \boxed{1} \text{NP}[\textit{str}] \rangle$	$\langle \boxed{1} \rangle$
c. aufgefallen (ergative):	$\langle \rangle$	$\langle \text{NP}[\textit{str}], \text{NP}[\textit{ldat}] \rangle$
d. geliebt (non-ergative):	$\langle \boxed{1} \text{NP}[\textit{str}] \rangle$	$\langle \boxed{1}, \text{NP}[\textit{str}] \rangle$
e. geholfen (non-ergative):	$\langle \boxed{1} \text{NP}[\textit{str}] \rangle$	$\langle \boxed{1}, \text{NP}[\textit{ldat}] \rangle$

The designated argument is contained in the DA value of the participle, but not in the subcat list. The passive auxiliary takes over the subcat list, but does not reactivate the designated argument. In contrast the perfect auxiliary appends the DA value and the subcat value and therefore contains the designated argument of the embedded participle in its subcat list.

This approach has the advantage that participles always have a passive argument structure. They may therefore be input to adjective formation lexical rules that produce adjectives which can be used in an analysis of (6).

However, the approach really gets into difficulties when it comes to modal infinitives as in (9).

- (9) a. Die Angelegenheit ist von euch zu erledigen.
 the matter is by you to settle
 ‘The matter is to be settled by you.’
 b. Ihr habt die Angelegenheit zu erledigen.
 you have the matter to settle
 ‘You have to settle the matter.’

In general, for every active sentence there is a sentence with the *zu* infinitive and *haben* and for every passive sentence there is a sentence with the *zu* infinitive and *sein* (Bierwisch, 1963, p. 72).

Heinz and Mathiasek do not discuss this construction, but they are entirely parallel to the passive cases and this was also noted by Haider. The lexical entries for the infinitives are shown in (10).

(10)	DA	SUBCAT
a. anzukommen (ergative):	$\langle \rangle$	$\langle \text{NP}[\textit{str}] \rangle$
b. zu tanzen (non-ergative):	$\langle \text{NP}[\textit{str}] \rangle$	$\langle \rangle$
c. aufzufallen (ergative):	$\langle \rangle$	$\langle \text{NP}[\textit{str}], \text{NP}[\textit{ldat}] \rangle$
d. zu lieben (non-ergative):	$\langle \text{NP}[\textit{str}] \rangle$	$\langle \text{NP}[\textit{str}] \rangle$
e. zu helfen (non-ergative):	$\langle \text{NP}[\textit{str}] \rangle$	$\langle \text{NP}[\textit{ldat}] \rangle$

The designated argument is blocked and can only be reactivated by the *haben*. In connection with *sein* it stays blocked. The problem now is that all infinitives in (10) can be used in control constructions:

- (11)
- a. Er behauptet, spät anzukommen.
he claims late to.arrive
'He claims to arrive late.'
 - b. Er behauptet, nicht gern zu tanzen.
he claims not with.pleasure to dance
'He claims to not like dancing.'
 - c. Er behauptet, Frauen selten aufzufallen.
he claims women-DAT seldom to.attract.attention
'He claims to seldom attract the attention of women.'
 - d. Er behauptet, sie zu lieben.
he claims her to love
'He claims to love her.'
 - e. Er behauptet, Blinden zu helfen.
he claims blind to help
'He claims to help blind people.'

Since the subject of the embedded verb is not represented in a uniform way for the controlled verbs in (11), the controlling verb had to distinguish between ergative and non-ergative embedded verbs. Heinz and Mathiasek propose an analysis of control where the first element of the subcat list of the embedded verb is coindexed with the subject or an oblique complement of the matrix verb, but this analysis only works, if no designated argument reduction is assumed for infinitives. But such an argument reduction is necessary because of the modal infinitives discussed above.

One could try to save this approach by stipulating a SUBJ feature that contains the subject of both ergative and non-ergative verbs and that is used to establish the control relation only. The problem of this approach is the notion of phrase: The control verb (in incoherent constructions) can neither select for an infinitive with one single element on the subcat list, as was suggested by Heinz and Mathiasek nor can it select for a fully saturated projection of an infinitive. The first option does not work since the

designated argument of non-ergative verbs is blocked and there is either nothing left on the subcat list (*tanzen*) or the elements that are left have to be realized in a projection of the infinitive (*lieben, helfen*). The second option does not work since the subject of ergative verbs still is a member of the subcat list. The approach wrongly would predict that sentences like those in (12) are grammatical.

- (12) a. * Er behauptet, er spät anzukommen.
 he claims he late to.arrive
 b. * Er behauptet, er Frauen selten aufzufallen.
 he claims he women seldom to.attract.attention

So the only solution to this problem seems to be to stipulate special lexical entries for infinitives in incoherent control constructions. See Gunkel (1999, p. 144–145) for such an approach. But with this stipulation one has again a proliferation of lexical entries and avoidance of this was one of the main purposes of shifting the active/passive change into the auxiliaries.

2.2.1 Lebeth's Approach

Lebeth also assumes a designated argument. The designated argument is not contained in the subcat list of base lexical entries. It is introduced into the subcat list by the tem-pus morpheme, i.e., it is a member of the subcat list only for finite verbs. With this approach no argument reduction lexical rule is needed to license the participle, since the designated argument was not listed in the subcat list in the first place. Lebeth's approach suffers from the same problem that Heinz and Mathiassek's approach suffers from: since the logical subject of ergative and non-ergative verbs is represented differently, control relations cannot be established in a uniform way and the notion of maximal projection is not clear.

2.2.2 Kathol's Approach

Kathol (1994, Chapter 7.3.3) suggests the following representation for participles:

- | | EXT | SUBJ | SUBCAT |
|--------------------------------|---|----------------------------------|-------------------|
| (13) a. angekommen (ergative): | $\langle \boxed{1} \text{ NP[nom]} \rangle$ | $\langle \boxed{1} \rangle$ | $\langle \rangle$ |
| b. geschlafen (non-ergative): | $\langle \text{NP[nom]} \rangle$ | $\langle \rangle$ | $\langle \rangle$ |
| c. geliebt (non-ergative): | $\langle \text{NP[nom]} \rangle$ | $\langle \text{NP[acc]} \rangle$ | $\langle \rangle$ |

The logical subject of all participles is represented uniformly, but note that *geliebt* does not have any elements in the SUBCAT list. This falsely predicts that the participle cannot be combined with any complements.

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

Since in Kathol's approach the auxiliary *hat* deblocks both the external argument and the SUBJ element, *seine Frau* in (14) depends on the auxiliary and it is unclear what licenses this NP together with the participle in the *Vorfeld*. Apart from this problem this approach cannot account for incoherent infinitival constructions: It has the same problem that Heinz and Mathiassek's and Lebeth's approaches have.

2.2.3 Conclusion

In concluding this section about object-to-subject-raising approaches, it must be said that neither the object to subject raising approach of Pollard (1994) and the extensions that I suggested in (Müller, 1999, Chapter 15) nor the HPSG implementation of Haider's approach by Heinz and Mathiassek, Lebeth, and Kathol are satisfying. While the first approach cannot provide a unified treatment of passivization and adjective formation, the latter fail completely in accounting for modal infinitive constructions and for incoherent constructions with *zu* infinitives. In what follows I will provide an alternative analysis that uses lexical rules to derive several lexical entries per verb that all reflect the argument structure that later surfaces in the sentence.

3 Lexical Rules

Proponents of lexical rule-based analyses were not able to explain the so-called remote passive in a satisfying way: Kiss (1992) does not account for it at all, and Hinrichs and Nakazawa (1998) stipulate a special purpose lexical rule.

- (15) weil der Wagen oft [[zu reparieren versucht] wurde].
 because the car often to repair tried was
 'because it was often tried to repair the car.'

In remote passive constructions the object of a verb that is embedded under the passive participle becomes subject of the clause. This was explained by the assumption that *zu reparieren* (16) and *versucht* (17) form a verbal complex (18), and the object of this verbal complex is promoted to the subject of the complete verbal complex by its head, the auxiliary *werden*.

- (16) *reparieren* (entry for base form and *zu* infinitive):

HEAD	SUBJ \langle NP[<i>str</i>] \rangle	
	ACC \langle 2 \rangle	
	<i>verb</i>	
SUBCAT	\langle 2 NP[<i>str</i>] \rangle	
VCOMP	\langle	
<i>cat</i>		

(17) *versuchen* (entry for base form and *zu* infinitive):

$$\left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ} \langle \text{NP}[\text{str}] \rangle \\ \text{ACC} \boxed{2} \\ \text{verb} \end{array} \right] \\ \text{SUBCAT} \boxed{3} \\ \text{VCOMP} \langle \text{V}[\text{inf}, \text{LEX}+, \text{SUBJ} \langle \text{NP}[\text{str}] \rangle, \text{ACC} \boxed{2}, \text{SUBCAT} \boxed{3}] \rangle \\ \text{cat} \end{array} \right]$$

(18) *zu reparieren versucht*:

$$\left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ} \langle \text{NP}[\text{str}] \rangle \\ \text{ACC} \langle \boxed{2} \rangle \\ \text{verb} \end{array} \right] \\ \text{SUBCAT} \langle \boxed{2} \text{NP}[\text{str}] \rangle \\ \text{VCOMP} \langle \rangle \\ \text{cat} \end{array} \right]$$

In what follows, I will propose a lexical rule that can account for the personal and impersonal variants of the normal passive and for the remote passive as well. The rule uses the feature ACC to designate the accusative element. This feature is equivalent to Pollard's ACC feature.⁴

$$(19) \left[\begin{array}{l} \text{SYNSEM|LOC|CAT} \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ} \langle \text{NP}[\text{str}] \boxed{1} \text{ref} \rangle \\ \text{ACC} \boxed{2} \end{array} \right] \\ \text{SUBCAT} \boxed{2} \oplus \boxed{3} \end{array} \right] \\ \text{stem-verb} \end{array} \right] \rightarrow \left[\begin{array}{l} \text{SYNSEM|LOC|CAT} \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{VFORM} \text{passive-part} \\ \text{SUBJ} \boxed{2} \\ \text{ACC} \boxed{2} \end{array} \right] \\ \text{SUBCAT} \boxed{3} \oplus \langle \text{PP}[\text{von-durch}] \boxed{1} \rangle \end{array} \right] \\ \text{lexical-sign} \end{array} \right]$$

I follow Krieger and Nerbonne (1993), Copestake and Briscoe (1992) and Meurers (1995; 2000, chapter 4) in assuming Description Level Lexical Rules (DLR). Such lexical rules are fully integrated into the HPSG formalism. DLRs are similar to unary branching dominance schemata. (19) can be rewritten as (20):

⁴A less general rule that produces similar results was suggested by Kathol (1998, p. 255). Kathol does not use the ACC feature in his rule. His rule does not extend to the cases discussed below.

$$\begin{array}{l}
(20) \quad \left[\begin{array}{l} \text{SYNSEM|LOC|CAT} \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{VFORM } \textit{passive-part} \\ \text{SUBJ } \boxed{2} \\ \text{ACC } \boxed{2} \end{array} \right] \\ \text{SUBCAT } \boxed{3} \oplus \langle (\text{PP}[\textit{von-durch}] \boxed{1}) \rangle \end{array} \right] \\ \text{LEX-DTR} \left[\begin{array}{l} \text{SYNSEM|LOC|CAT} \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ } \langle \text{NP}[\textit{str}] \boxed{1} \textit{ref} \rangle \\ \text{ACC } \boxed{2} \end{array} \right] \\ \text{SUBCAT } \boxed{2} \oplus \boxed{3} \end{array} \right] \\ \textit{stem-verb} \end{array} \right] \\ \textit{passive-lr-derived-lexical-sign} \end{array} \right]
\end{array}$$

Note that (20) differs from (19) in that the lexical rule has a type (*passive-lr-derived-lexical-sign*). Therefore it is possible to capture generalizations over lexical rules. See section 6.

The output this rule produces for (16) is shown in (21).

(21) *repariert* (passive participle):

$$\left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ } \boxed{1} \langle \text{NP}[\textit{str}] \rangle \\ \text{ACC } \boxed{1} \\ \textit{verb} \end{array} \right] \\ \text{SUBCAT } \langle \rangle \\ \text{VCOMP } \langle \rangle \\ \textit{cat} \end{array} \right]$$

The passive auxiliary is a raising verb that selects a passive participle and raises both its subject and its complements (Kiss, 1992).

(22) *werden* (passive auxiliary):

$$\left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ } \boxed{1} \\ \text{ACC } \boxed{1} \\ \textit{verb} \end{array} \right] \\ \text{SUBCAT } \boxed{2} \\ \text{VCOMP } \langle \text{V}[\textit{pass-part}, \text{SUBJ } \boxed{1}, \text{SUBCAT } \boxed{2}] \rangle \\ \textit{cat} \end{array} \right]$$

The result of an application of (19) to the entry for *versuchen* is shown in (23).

(23) *versucht* (attraction version, passive participle):

$$\left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ } \boxed{2} \\ \textit{verb} \end{array} \right] \\ \text{SUBCAT } \boxed{3} \oplus \langle (\text{PP}[\textit{von-durch}] \boxed{1}) \rangle \\ \text{VCOMP } \langle \text{V}[\textit{inf}, \text{LEX+}, \text{SUBJ } \langle \text{NP}[\textit{str}] \boxed{1} \rangle, \text{ACC } \boxed{2}, \text{SUBCAT } \boxed{2} \oplus \boxed{3}] \rangle \\ \textit{cat} \end{array} \right]$$

The interesting thing about this result of the rule application is that the ACC value of the verb that is embedded under *versucht* is subtracted from the embedded verb's subcat list and only the remainder of this list is raised. The accusative object of the verb that is embedded under *versucht* is the subject of the passive participle. After the combination of (23) with (16) one gets (24).

(24) *zu reparieren versucht* (verbal complex):

$$\left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ} \langle \text{NP}[\textit{str}] \rangle \\ \textit{verb} \end{array} \right] \\ \text{SUBCAT} \langle (\text{PP}[\textit{von-durch}]) \rangle \\ \text{VCOMP} \langle \rangle \\ \textit{cat} \end{array} \right]$$

The object of *zu reparieren* ($\boxed{2}$ in (16)) is subtracted from the complete subcat list of the embedded verb. Since the embedded verb had only one element on its subcat list, the result ($\boxed{3}$ in (23)) is the empty list. The only element in the subcat list of *zu reparieren versucht* is the optional PP for the agent.

The preliminary rule in (19) cannot account for the sentences in (25).

- (25) a. Keine Zeitung wird ihr zu lesen erlaubt.⁵
 no newspaper was her to read allowed
 'She is not allowed to read any newspapers.'
- b. Der Erfolg wurde uns nicht auszukosten erlaubt.⁶
 the success was us not to.enjoy permitted
 'We were not permitted to enjoy our success.'

The reason is that *erlauben* is an object control verb that takes a dative object.

(26) *erlauben* (entry for base and *zu* infinitive):

$$\left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ} \langle \text{NP}[\textit{str}] \rangle \\ \text{ACC} \boxed{2} \\ \textit{verb} \end{array} \right] \\ \text{SUBCAT} \langle \text{NP}[\textit{dat}] \rangle \oplus \boxed{3} \\ \text{VCOMP} \langle \text{V}[\textit{inf}, \text{LEX}+, \text{SUBJ} \langle \text{NP}[\textit{str}] \rangle, \text{ACC} \boxed{2}, \text{SUBCAT} \boxed{3}] \rangle \\ \textit{cat} \end{array} \right]$$

Since the dative object is at the first position in the subcat list of *erlauben*, a possibly raised object of the embedded verb cannot be subtracted from the beginning of this list. The rule in (19) is generalized to (27).

⁵Stefan Zweig. *Marie Antoinette*. Leipzig: Insel-Verlag. 1932, p. 515, quoted from (Bech, 1955, p. 309). That this is an instance of remote passive was noted by Askedal (1988, p. 13).

⁶(Haider, 1986b, p. 110)

$$(27) \left[\begin{array}{l} \text{SYNSEM|LOC|CAT} \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ} \langle \text{NP}[\text{str}] \boxed{1} \text{ref} \rangle \\ \text{ACC} \boxed{2} \end{array} \right] \\ \text{SUBCAT} \boxed{3} \end{array} \right] \\ \text{stem-verb} \end{array} \right] \rightarrow \left[\begin{array}{l} \text{SYNSEM|LOC|CAT} \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{VFORM } \textit{passive-part} \\ \text{SUBJ} \boxed{2} \end{array} \right] \\ \text{SUBCAT} (\boxed{3} \ominus \boxed{2}) \oplus \langle (\text{PP}[\textit{von-durch}] \boxed{1}) \rangle \end{array} \right] \\ \text{lexical-sign} \end{array} \right]$$

The ‘ \ominus ’ in $A \ominus B = C$ stands for a relation where C is equal to A , iff B is the empty list. Otherwise C is the list that deletes the first part in A that is identical to B . (28) lists the cases that are relevant for the present discussion.

$$(28) \begin{aligned} \langle a, b, c \rangle \ominus \langle \rangle &= \langle a, b, c \rangle \\ \langle a, b, c \rangle \ominus \langle a \rangle &= \langle b, c \rangle \\ \langle a, b, c \rangle \ominus \langle b \rangle &= \langle a, c \rangle \end{aligned}$$

(29) *erlaubt* (attraction version, passive participle):

$$\left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ} \boxed{2} \\ \text{verb} \end{array} \right] \\ \text{SUBCAT} ((\langle \text{NP}[\textit{dat}] \rangle \oplus \boxed{3}) \ominus \boxed{2}) \oplus \langle (\text{PP}[\textit{von-durch}] \boxed{1}) \rangle \\ \text{VCOMP} \langle \text{V}[\textit{inf}, \text{LEX+}, \text{SUBJ} \langle \text{NP}[\textit{str}] \boxed{1} \rangle, \text{ACC} \boxed{2}, \text{SUBCAT} \boxed{3}] \rangle \\ \text{cat} \end{array} \right]$$

In the rule (27) the subcat list of the input is not split by \oplus as in (19), but instead \ominus is used in the output to subtract the ACC value, possibly coming from an embedded sign. The entry for *auszukosten* has the same syntactic features as the one for *zu reparieren* which was given in (16). The combination of (29) with this entry yields (30).

(30) *auszukosten erlaubt* (attraction version, passive participle):

$$\left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ} \langle \text{NP}[\textit{str}] \rangle \\ \text{verb} \end{array} \right] \\ \text{SUBCAT} \langle \text{NP}[\textit{dat}] \rangle \oplus \langle (\text{PP}[\textit{von-durch}]) \rangle \\ \text{VCOMP} \langle \rangle \\ \text{cat} \end{array} \right]$$

This is exactly what is needed to analyze (25). Note that the rule in (27) does not apply to ergative verbs although ergative verbs are unifyable with the left hand side of the rule. The rule does not produce a result, since the subtraction in the right hand side of the rule fails. This is even clearer if (27) is given in DLR notation: \ominus is just a constraint attached to a feature description.

After having shown how a lexical-rule-based account works, I will now discuss some putative arguments against lexical rules.

4 Binding Data

Binding principles in HPSG are formulated with reference to the relation (local) o-command (Pollard and Sag, 1994, Chapter 6). The definitions are as follows:

Def. 1 *Let Y and Z be synsem objects with distinct LOCAL values, Y referential. Then Y locally o-commands Z just in case Y is less oblique than Z .*

Obliqueness is defined in reference to the following hierarchy:

SUBJECT	=>	DIRECT	=>	INDIRECT	=>	OBLIQUES	=>	GENITIVES	=>	OBJECTS OF
		OBJECT		OBJECT						COMPARISON

Def. 2 *Let Y and Z be synsem objects with distinct LOCAL values, Y referential. Then Y o-commands Z just in case Y locally o-commands X dominating Z .*

Using these definitions what ‘binds’ means can be defined.

Def. 3 *Y (locally) o-binds Z just in case Y and Z are coindexed and Y (locally) o-commands Z . If Z is not (locally) o-bound, then it is said to be (locally) o-free.*

The binding principles are as follows:

Principle 1 (HPSG Binding Theory)

Principle A *A locally o-commanded anaphor must be locally o-bound.*

Principle B *A personal pronoun must be o-free.*

Principle C *A nonpronoun must be o-free.*

In Müller (1999, Chapter 20) I have shown that the HPSG Binding Theory as it is has some fundamental problems. Evidence from binding data should therefore be treated with care: In the absence of a working Binding Theory, binding data has the same status as coordination data.

In what follows I will nevertheless discuss some binding data that was used by Kathol (1994, p. 252) to argue for an object-to-subject-raising analysis.

- (31) Otto wird von sich selbst geliebt.
 Otto is by self loved
 ‘Otto loves himself.’

He assumes that the *von*-PP is an argument of the auxiliary. Since in an object-to-subject raising analysis the subcat list of the embedded verb is still present, it is also relevant for Binding Theory: The logical subject of *geliebt* locally o-commands the object (*Otto*). The logical subject is realized by the *von*-PP which is an oblique complement of the matrix verb. The subject of the auxiliary is the object of the embedded verb.

- (32) a. geliebt: NP_i, NP_j
 b. wird geliebt: NP_j, PP_i

So, since all phrases locally o-command each other, we have a contradiction. Kathol claims that this is the reason for (31) being ungrammatical. I do not agree with his judgement, since (31) can be uttered in an appropriate context. And (33) indeed is an instance of an analogous construction.

- (33) Das schon, aber ich will mich von mir besser verstanden fühlen.⁷
 that already but I want me from me better understood feel
 ‘Yes, but I want to feel I understand myself better.’

This means that Kathol’s example actually seems to support the lexical rule analysis. To analyze the phrase that expresses the logical subject as an adjunct is not a solution since in German adjuncts are not exempt from Binding Theory as in English.

5 The Accessibility of the Argument Structure

The sentences in (34), which are discussed in (Müller, Submitted, Chapter 5) in more detail, show that depictive predicates can refer to the logical subject of a passivized predicate even if this is not realized by a PP.

- (34) a. Das Buch wurde nackt gelesen.
 the book was naked read
 ‘The book was read naked.’
 b. Das Buch ist nackt zu lesen.
 the book is naked to read
 ‘The book has to be read naked.’

Subjects, objects, and other complements are possible antecedents for depictive predicates. Since these elements may be non-overt, they must be represented at some place where they can be accessed by the depictive predicate. This suggests that the complete argument structure is still present in syntax. Hence an object-to-subject-raising analysis seems to be the better alternative here, as all dependents are represented in the lexical entry for the participle. In a lexical rule-based approach one has to use a feature that contains the complete argument structure or analyze adjuncts as complements to allow reference to the logical subject of a passive participle. However, the advantage of the object-to-subject-raising analysis is only an apparent one. Consider examples like those in (35).

- (35) a. Jedes nackt geputzte Fenster muß extra bezahlt werden.
 every naked cleaned window must separately pay get
 ‘Every window that has been cleaned naked has to be paid separately.’
 b. das nackt zu lesende Buch
 the naked to read book
 ‘the book that is to be read naked’

⁷Helge Schneider, Spiegel, 30/99, p. 176

The adjectival forms are derived by a lexical rule or by a head affix combination. The result is a lexical entry that has SUBJ and subcat values that are different from the input of the rule or from the embedded verbal stem, respectively. The logical subject of the verb stem is neither represented in the SUBJ, nor in the subcat list in the resulting sign. This means that the object-to-subject-raising analysis also has to represent the argument structure separately from valence and SUBJ representations.⁸ Such a separate representation was suggested independently for various reasons. The feature for the representation of the argument structure is called ARG-ST.

So the possibility of depictive predicates to refer to non-overt material does not provide arguments for either analysis.

6 Generalizations

In auxiliary based approaches to passive, the generalizations about passive are represented in the part of the type hierarchy that describes lexical entries for auxiliaries.

(36) Supertype of all passive auxiliaries:

$$\left[\begin{array}{l} \text{HEAD} \quad \left[\begin{array}{l} \text{ACC } \boxed{1} \\ \text{verb} \end{array} \right] \\ \text{VCOMP} \quad \left\langle \begin{array}{l} \text{V}[\text{non-fin}, \text{LEX+}, \text{SUBJ } \langle \text{NP}[\text{str}]_{\text{ref}} \rangle], \text{ACC } \boxed{1}, \\ \text{SUBCAT } \boxed{2}, \text{VCOMP } \langle \rangle \end{array} \right\rangle \\ \text{cat} \end{array} \right] \\ \wedge \boxed{} = \boxed{2} \ominus \boxed{1}$$

The type in (36) contains the generalization that all passive auxiliaries form a verbal complex with the verb they embed. Whatever the value of ACC is has to be subtractable from the subcat list of the embedded verb. In this general type, the result of the subtraction is not coreferent with any other value in the description. Therefore the tag is empty.

The type in (37) is the supertype of the auxiliaries for the normal *werden* passive, the stative passive formed with *sein*, the modal infinitive formed with *sein* and the *lassen* passive.

(37) Supertype of all passive auxiliaries except the dative passive:

$$\left[\begin{array}{l} \text{SUBCAT } \boxed{} \oplus \boxed{2} \oplus \langle (\text{PP } \boxed{3}) \rangle \\ \text{VCOMP} \quad \left\langle \text{V}[\text{SUBJ } \langle \text{NP } \boxed{3} \rangle], \text{ACC } \boxed{1}, \text{SUBCAT } \boxed{4} \right\rangle \\ \text{cat} \end{array} \right] \\ \wedge \boxed{2} = \boxed{4} \ominus \boxed{1}$$

Together with the constraints that are inherited from (36), this corresponds to (38).

⁸This is not true for the analysis that uses the designated argument. But this analysis was dismissed because of problems with modal infinitives and incoherent constructions.

(38) Supertype of all passive auxiliaries except the dative passive + inherited constraints:

$$\left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{ACC} \boxed{1} \\ \text{verb} \end{array} \right] \\ \text{SUBCAT} \boxed{} \oplus \boxed{2} \oplus \langle (\text{PP} \boxed{3}) \rangle \\ \text{VCOMP} \left\langle \begin{array}{l} \text{V}[\text{non-fin}, \text{LEX+}, \text{SUBJ} \langle \text{NP}[\text{str}] \boxed{3} \rangle], \text{ACC} \boxed{1}, \\ \text{SUBCAT} \boxed{4}, \text{VCOMP} \langle \rangle \end{array} \right\rangle \\ \text{cat} \end{array} \right] \\ \wedge \boxed{2} = \boxed{4} \ominus \boxed{1}$$

This type has a subtype for the first three variants of passive where the empty tag is instantiated as the empty list and the SUBJ value is identical to the ACC value. The subtypes of this type are the types that describe the actual lexical entries for the various passive forms. These subtypes only add information about the VFORM value of the embedded verbal complex, the PFORM value of the preposition that expresses the logical subject, and information about the semantics in the case of the modal infinitive construction. In the case of the *lassen* passive, the empty tag in (38) corresponds to the ACC value. *lassen* has its own subject.

In the lexical rule-based approach, generalizations can be captured in a similar way. The generalizations are not expressed in a hierarchy for lexical entries, but in a hierarchy of lexical rules that license lexical entries. (39) shows the supertype of all lexical rules for the passive.

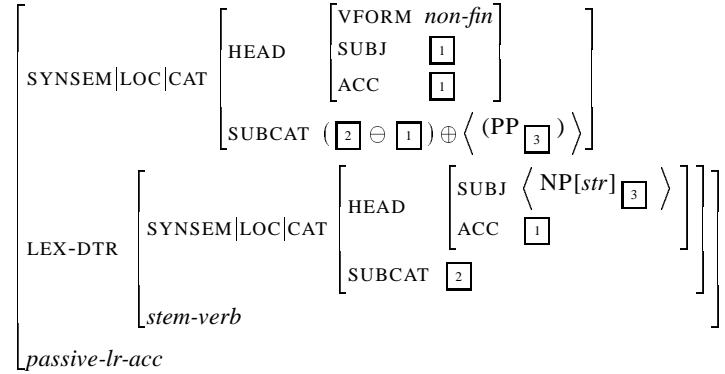
(39) Supertype of all lexical rules for the passive:

$$\left[\begin{array}{l} \text{SYNSEM|LOC|CAT|HEAD} \left[\begin{array}{l} \text{VFORM} \text{ non-fin} \\ \text{ACC} \boxed{1} \end{array} \right] \\ \text{LEX-DTR} \left[\begin{array}{l} \text{SYNSEM|LOC|CAT} \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{SUBJ} \langle \text{NP}[\text{str}]_{\text{ref}} \rangle \\ \text{ACC} \boxed{1} \end{array} \right] \\ \text{SUBCAT} \boxed{2} \end{array} \right] \\ \text{stem-verb} \end{array} \right] \\ \text{passive-lr} \end{array} \right] \\ \wedge \boxed{} = \boxed{2} \ominus \boxed{1}$$

This type corresponds to (36).

The supertype of all lexical rules that are needed for the *werden* passive, the stative passive formed with *sein*, the modal infinitive formed with *sein* and the *lassen* passive is shown in (40).

(40) Supertype of all lexical rules for the passive except the dative passive:



Note that the lexical rule for the *lassen* passive differs from the rules for the other sorts of passive only in its *VFORM* value. In the auxiliary based approach an additional type was needed since the valence properties of the passive *lassen* differ from those of the passive auxiliaries.

If one wants to capture the generalization about passive in a uniform way, one has to treat morphological processes that yield lexical entries with a passive-like valence in a way that corresponds to the treatment in syntax. So, if one assumes an auxiliary based approach to passive, one has to assume that *-bar* in (41b) is an affix that fulfills the function of the passive auxiliaries. The description of the affix is a subtype of the type (37), which is a generalization of all heads that do a object-to-subject-raising with the arguments of the verb that is embedded under the head.

If one assumes that passive is analyzed with lexical rules, one also has to assume a lexical rule-based approach for derivational morphology. The lexical rule that licenses *lesbar* on the basis of *les-* is a subtype of (40).

- (41) a. Er liest den Aufsatz.
he reads the essay
b. Der Aufsatz ist lesbar.
the essay is readable

A lexical rule-based approach to morphology was suggested by Orgun (1996), Riehemann (1998), Ackerman and Webelhuth (1998), and Koenig (1999). See (Müller, Submitted, Chapter 7.2.5) for some discussion.

7 Summary

In this paper a lexical rule-based analysis for the passive in German was developed which also covers the complicated remote passive cases. The analysis uses a feature to designate the accusative element that is equivalent to the one that was introduced by Kathol (1991) and Pollard (1994) who suggested an object-to-subject-raising analyses.

Binding data that has been used for arguing against lexical rule-based analyses of passive has been discussed and it has been shown that the premises for the argumentation do not hold.

It was shown that the decision to use lexical rules in syntax makes the use of lexical rules in morphology necessary since otherwise generalizations could not be captured.

Bibliography

- Ackerman, Farrell and Webelhuth, Gert. 1998. *A Theory of Predicates*. CSLI Lecture Notes, No. 76, Stanford, California: CSLI Publications.
- Askedal, John Ole. 1988. Über den Infinitiv als Subjekt im Deutschen. *Zeitschrift für Germanistische Linguistik* 16, 1–25.
- Bech, Gunnar. 1955. *Studien über das deutsche Verbum infinitum*. Linguistische Arbeiten, No. 139, Tübingen: Max Niemeyer Verlag, 2nd unchanged edition 1983.
- Bierwisch, Manfred. 1963. *Grammatik des deutschen Verbs*. studia grammatica II, Berlin: Akademie Verlag.
- Bresnan, Joan. 1982. The Passive in Lexical Theory. In Joan Bresnan (ed.), *The Mental Representation of Grammatical Relations*, MIT Press Series on Cognitive Theory and Mental Representation, pages 3–86, Cambridge: Massachusetts, London: England: The MIT Press.
- Chung, Chan. 1993. Korean Auxiliary Verb Constructions Without VP Nodes. In Susumo Kuno, Ik-Hwan Lee, John Whitman, Joan Maling, Young-Se Kang and Young joo Kim (eds.), *Proceedings of the 1993 Workshop on Korean Linguistics*, Harvard Studies in Korean Linguistics, No. 5, pages 274–286, Cambridge: Massachusetts: Harvard University, Department of Linguistics.
- Copestake, Ann and Briscoe, Ted. 1992. Lexical Rules in a Unification Based Framework. In James Pustejovsky and Sabine Bergler (eds.), *Lexical Semantics and Knowledge Representation*, Lecture Notes in Artificial Intelligence, No. 627, pages 101–119, Berlin: Springer-Verlag, <http://www.cl.cam.ac.uk/Research/NL/acquilex/papers.html>.
- Gunkel, Lutz. 1999. Causatives in German. *Theoretical Linguistics* 25(2/3), 133–159.
- Haider, Hubert. 1986a. Fehlende Argumente: vom Passiv zu kohärenten Infinitiven. *Linguistische Berichte* 101, 3–33.
- Haider, Hubert. 1986b. Nicht-sententiale Infinitive. *Groninger Arbeiten zur Germanistischen Linguistik* 28, 73–114.
- Heinz, Wolfgang and Matiassek, Johannes. 1994. Argument Structure and Case Assignment in German. In Nerbonne et. al. (1994), pages 199–236.

- Hinrichs, Erhard W., Kathol, Andreas and Nakazawa, Tsuneko (eds.). 1998. *Complex Predicates in Nonderivational Syntax*, volume 30 of *Syntax and Semantics*. San Diego: Academic Press.
- Hinrichs, Erhard W. and Nakazawa, Tsuneko. 1998. Third Construction and VP Extrapolation in German: An HPSG Analysis. In Hinrichs et. al. (1998), pages 115–157.
- Höhle, Tilman N. 1978. *Lexikalische Syntax: Die Aktiv-Passiv-Relation und andere Infinitkonstruktionen im Deutschen*. Linguistische Arbeiten, No. 67, Tübingen: Max Niemeyer Verlag.
- Kathol, Andreas. 1991. Verbal and Adjectival Passives in German. In Jonathan David Bobaljik and Tony Bures (eds.), *Papers from the Third Student Conference in Linguistics*, volume 14 of *MIT Working Papers in Linguistics*, pages 115–130, Cambridge, Massachusetts: MIT.
- Kathol, Andreas. 1994. Passives without Lexical Rules. In Nerbonne et. al. (1994), pages 237–272.
- Kathol, Andreas. 1998. Constituency and Linearization of Verbal Complexes. In Hinrichs et. al. (1998), pages 221–270.
- Kiss, Tibor. 1992. Variable Subkategorisierung. Eine Theorie unpersönlicher Einbettungen im Deutschen. *Linguistische Berichte* 140, 256–293.
- Koenig, Jean-Pierre. 1999. *Lexical Relations*. Stanford Monographs in Linguistics, CSLI Publications.
- Krieger, Hans-Ulrich and Nerbonne, John. 1993. Feature-Based Inheritance Networks for Computational Lexicons. In Ted Briscoe, Ann Copestake and Valeria de Paiva (eds.), *Inheritance, Defaults, and the Lexicon*, pages 90–136, Cambridge: Cambridge University Press, a version of this paper is available as DFKI Research Report RR-91-31 <ftp://lt-ftp.dfki.de/pub/papers/local/RR-91-31.ps.Z>. 03.23.2000. Also published in: Proceedings of the ACQUILEX Workshop on Default Inheritance in the Lexicon, Technical Report No. 238, University of Cambridge, Computer Laboratory, October 1991.
- Lebeth, Kai. 1994. Morphosyntaktischer Strukturaufbau – Die Generierung komplexer Verben im HPSG-Lexikon eines Sprachproduktionssystems. Hamburger Arbeitspapiere zur Sprachproduktion – IV Arbeitspapier No. 16, Universität Hamburg, Fachbereich Informatik.
- Meurers, Walt Detmar. 1995. Towards a Semantics for Lexical Rules as used in HPSG. In Glyn V. Morrill and Richard T. Oehrle (eds.), *Proceedings of the Formal Grammar Conference*, Barcelona, Spain, <http://www.sfs.nphil.uni-tuebingen.de/~dm/LR/sem.ps.gz>. 11.23.99.
- Meurers, Walt Detmar. 1999. Raising Spirits (and Assigning Them Case). *Groninger Arbeiten zur Germanistischen Linguistik (GAGL)* 43, 173–226, <http://www.sfs.nphil.uni-tuebingen.de/~dm/papers/gagl99.html>. 04.18.2000.

- Meurers, Walt Detmar. 2000. Lexical Generalizations in the Syntax of German Non-Finite Constructions. Arbeitspapiere des SFB 340 145, Eberhard-Karls-Universität, Tübingen.
- Müller, Stefan. 1997. Yet another Paper about Partial Verb Phrase Fronting in German. Research Report RR-97-07, Deutsches Forschungszentrum für Künstliche Intelligenz, Saarbrücken, a shorter version appeared in *Proceedings of COLING 96*, pages 800–805. http://www.dfki.de/~stefan/Pub/e_pvp.html. 11.20.2000.
- Müller, Stefan. 1999. *Deutsche Syntax deklarativ. Head-Driven Phrase Structure Grammar für das Deutsche*. Linguistische Arbeiten, No. 394, Tübingen: Max Niemeyer Verlag, http://www.dfki.de/~stefan/Pub/e_hpsg.html. 11.20.2000.
- Müller, Stefan. Submitted. *Complex Predicates: Verbal Complexes, Resultative Constructions, and Particle Verbs in German*. Habilitationsschrift, Universität des Saarlandes, Saarbrücken, http://www.dfki.de/~stefan/Pub/e_complex.html. 11.20.2000.
- Müller, Stefan. To Appear. Case in German – Towards an HPSG Analysis. In Tibor Kiss and Detmar Meurers (eds.), *Constraint-Based Approaches to Germanic Syntax*, Studies in Constraint-Based Lexicalism, Stanford: Center for the Study of Language and Information, http://www.dfki.de/~stefan/Pub/e_case.html. 11.20.2000.
- Nerbonne, John, Netter, Klaus and Pollard, Carl J. (eds.). 1994. *German in Head-Driven Phrase Structure Grammar*. CSLI Lecture Notes, No. 46, Stanford: Center for the Study of Language and Information.
- Orgun, Cemil Orhan. 1996. *Sign-Based Morphology and Phonology*. Ph. D. thesis, University of California, Berkeley.
- Pollard, Carl J. 1994. Toward a Unified Account of Passive in German. In Nerbonne et. al. (1994), pages 273–296.
- Pollard, Carl J. and Sag, Ivan A. 1987. *Information-Based Syntax and Semantics Volume 1 Fundamentals*. CSLI Lecture Notes, No. 13, Stanford: Center for the Study of Language and Information.
- Pollard, Carl J. and Sag, Ivan A. 1994. *Head-Driven Phrase Structure Grammar*. Studies in Contemporary Linguistics, Chicago, London: University of Chicago Press.
- Rentier, Gerrit. 1994. Dutch Cross Serial Dependencies in HPSG. In *Proceedings of COLING 94*, pages 818–822, Kyoto, Japan, <http://xxx.lanl.gov/abs/cmp-lg/9410016>. 04.07.99.
- Riehemann, Susanne Z. 1998. Type-Based Derivational Morphology. *Journal of Comparative Germanic Linguistics* 2, 49–77, <http://doors.stanford.edu/~sr/morphology.ps>. 11.29.99.