

Raising Spirits (and assigning them case)

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1 Introduction

Haider (1990b) pointed out that under certain conditions it is possible to realize a subject¹ as part of a fronted non-finite verbal constituent, i.e., in the notation of Bech (1955), that it is possible to front the constituent [N'(= N'') V'']. While this option is generally available for ergative subjects (1), the occurrence of unergative subjects is significantly more restricted, but nonetheless possible as shown by Haider's example (2).

- (1) Ein Fehler unterlaufen ist ihr noch nie.
an error crept.in is her still never.
 'So far she has never made a mistake.'
- (2) Ein Außenseiter gewonnen hat hier noch nie.
An outsider won has here still never
 'An outsider has never won here yet.'

There are at least two questions arising from this observation. First, what are the restrictions on the occurrence of subjects in that position? And second, how does the subject included in the fronted non-finite verbal constituent receive nominative case? The first question has played a significant role in the Germanic syntax literature since the restrictions on such occurrences of subjects are an important empirical criterion for the base position of the subject in German, i.e., whether the subject is VP internal or external. In this paper, we focus on the second, more neglected question. On the one hand, the question how a subject fronted as part of a non-finite construction can receive nominative case is an interesting test case for the locality of grammatical relations like case assignment. On the other hand, clarifying when nominative case can be assigned also explains which constructions are ungrammatical because nominative case assignment was not possible. By answering the second question we thus also contribute to an answer of the more complex first question on the different conditions restricting the occurrence of subjects as part of non-finite fronted projections.

2 The theoretical starting point

The issue of nominative case assignment to subjects as part of non-finite constituents has not received much attention in the literature. In his investigation of ergative verbs, however, Grewendorf (1989, pp. 134ff) discusses a related problem: Nominative case assignment in the principles and parameters architecture traditionally assigns case to

¹Reis (1982) showed that establishing a well-defined notion of subject in German is problematic. Here and in the following we essentially use subject in the sense of nominative case marked NP. In German, only such nominative NPs can be eliminated (i.e., turn into PRO) when the sentence is converted to an infinitival complement in an equi construction.

an NP co-indexed with and governed by INFL. But since INFL is generally not taken to govern into the VP, it is unclear how an ergative subject, which is taken to be located within the VP, can be assigned nominative case. Note that this problem is different from the one we are concerned with in this paper in that it does not involve non-locality of case assignment arising from having to assign case to a subject embedded within a non-finite verbal complement within the VP. But it is similar enough to take it as a starting point in exploring possible analyses.

Grewendorf (1989) distinguishes two classes of approaches which have been pursued in the literature. On the one hand, theories of *direct* nominative case assignment (Fanselow, 1985; den Besten, 1985; Reuland, 1985) keep the idea that INFL assigns nominative case to the NP at the cost of relaxing the conditions under which such case assignment is possible. Fanselow (1985, sec. 4.2), for example, proposes to abandon the restriction that INFL must govern the NP to assign nominative case. Theories of *indirect* nominative case assignment, on the other hand, chose to abandon the idea that INFL assigns case to the NP directly (Hoekstra, 1984; Safir, 1985). Instead, case is assigned to some element co-indexed with and governed by INFL in the traditional way and this element then inherits the case down to the nominative bearing NP.

Returning to the apparently non-local case assignment issue we are concerned with, even though to our knowledge no theory has actually been worked out, one can find examples for the ideas of direct and indirect case assignment in the literature. Haider (1990b), for example, does not address the issue of case assignment to subjects fronted as part of a non-finite verbal constituent directly. But in a different context (p. 96) he contemplates whether a trace of the finite verb could be part of the topicalized constituent. Such a finite verbal trace supposedly could then assign nominative case, e.g., in a construction like (3).

- (3) [Ein Außenseiter gewonnen e_i] hat_i hier noch nie.
an outsider won has here still never

However, Haider points out that the existence of such structures would predict that verbal particles could occur in fronted position. As illustrated by example (4), this is clearly not the case.

- (4) * [Ein Buch auf e_i] schlug_i Hans.
a book PART open Hans
 'He opened a book.'

Kratzer (1984, p. 46), on the other hand, follows the indirect case assignment idea in suggesting that nominative case "can be inherited from some other NP by means of co-indexation" for which she assumes "some empty NP outside of their VP". This idea, however, is not worked out any further.

Picking up at this point, we need to clarify the notions mentioned and explain how they fit into the general grammatical architecture. As a first step, we thus need to answer the following three questions:

1. What is the nature of the "empty NP" and how can it be assigned case locally?
2. What kind of relationship is the "co-indexation" which has to hold between the empty NP and the overt embedded NP?
3. In what way is the "inheritance" of case from the empty NP to the overt embedded NP realized?

3 The data

3.1 Nominative case assignment

A relevant property of the construction which points the way to an answer of the questions we raised above seems to have gone unnoticed: the topicalization of [N' V"] is restricted to sentences in which V' is a raising verb.² So while a *zu*-infinitive can be fronted with the subject when embedded under the raising predicate *scheinen* (5), the same construction with an equi predicate like *versuchen* is ungrammatical (6).³

- (5) [Ein Außenseiter zu gewinnen] scheint hier eigentlich nie.
an outsider to win seems here actually never
 'An outsider never actually seems to win here.'

- (6) * [Ein Außenseiter zu gewinnen] versuchte hier noch nie.
an outsider to win tried here actually never
 'An outsider never actually tried to win here.'

Supporting this claim, verbs which are ambiguous between a equi and a raising alternative like *versprechen*, *drohen*, or *können* only have the raising reading when occurring in such a construction:

- (7) [Ein Außenseiter zu gewinnen] versprach hier noch nie.
an outsider to win promised here still never
 a. * 'An outsider never promised to win here.'
 b. 'It was never probable that an outsider wins here.'

²As so often, this turns out to be a rediscovery: Netter (1991, p. 28) mentions this restriction in passing.

³Note that we analyze tense and passive auxiliaries as ordinary raising verbs. See Höhle (1978, pp. 88ff) for an argumentation that the notion of auxiliary in German plays no theoretical role.

- (8) [Ein Außenseiter zu gewinnen] drohte hier noch nie.
an outsider to win threatened here still never
- a. * 'An outsider never threatened to win here.'
 b. 'There was never the danger of an outsider winning here.'
- (9) [Ein Kollege aus Köln teilnehmen] kann diesmal leider nicht.⁴
a colleague from Cologne participate be.able this.time unfortun. not
- a. * 'Unfortunately, a colleague from Cologne is unable to participate this time.'
 b. 'Unfortunately, it is not possible that a colleague from Cologne participates this time.'

So the subject can be realized with the embedded verb V" only in structures in which it would ordinarily be raised to become the subject of the governing verb V' (whereas co-indexing as in the equi case is not enough). The conclusion we draw from this is that even though the subject is realized as an argument of the embedded verb, raising of a 'spirit' of the subject still takes place as far as case assignment is concerned.⁵

This conclusion is confirmed by the fact that subject-to-subject raising verbs which allow extraposition of their verbal complement also allow a nominative NP to be part of the extraposed verbal projection, as illustrated by example (10).

- (10) Obwohl damals anfang, der / *den Mond zu scheinen
even-though back-then begun the-N / the-A moon to shine
 'Even though the moon had begun to shine back then'

With respect to the discussion of direct and indirect case assignment we started with, our conclusion provides natural answers to the three questions a theory of indirect case assignment has to answer. First, the nature of the "empty NP" which can locally be assigned case in the ordinary way is unveiled to be whatever representation is taken to undergo raising. In the HPSG paradigm, for example, where raising is formally captured as identification of subcategorization requirements, the "empty NP" is not actually an empty constituent but an element on the list of subcategorization requirements – and it is those subcategorization requirements which (different from HPSG

⁴Example due to Tilman Höhle (p.c.).

⁵As Gisbert Fanselow and Gereon Müller pointed out to me, the notion of a spirit we introduce here bears a certain similarity to the idea of abstract feature movement in the minimalist program (Chomsky, 1995). Note, however, that in our proposal the occurrence of spirits is triggered lexically and is of an entirely different nature than ordinary unbounded dependencies like topicalization. Spirits can only arise in the context of a raising verb since they represent (at least the case and agreement information of) an NP that could be but has not been raised in a particular case. As our data discussion shows, there is significant evidence for linking spirits to the lexical occurrence of raising verbs. Without further assumptions this also makes the right locality predictions in that non-locality can only arise through a hypotactic chain of raising predicates, which is discussed in section 3.4. It remains to be shown how the data could instead be explained on the basis of abstract feature movement and the locality restrictions assumed for such movement.

tradition) represent already realized elements that we want to refer to as 'spirits' in a narrower sense.⁶

Second, the kind of "co-indexation" relationship holding between the "empty NP" (= spirit) and the overt embedded NP is empirically established to be identical to the independently motivated raising relation introduced by verbs of a certain class.

Finally, the "inheritance" of properties like case from the "empty NP" to which it is assigned to the overt NP exhibiting these properties is the immediate effect of the raising relation. In the HPSG paradigm, it is the already mentioned identification of subcategorization requirements which requires part of the realized NP to be identical to the raised spirit.

In sum, the idea to let representations of already realized subjects take part in raising without further stipulations introduces the additional representation required to 'indirectly' assign case without having to relax the conditions under which case assignment takes place.⁷

3.1.1 Subject-verb agreement

Additional evidence for such raising of the spirit of the subject comes from subject-verb agreement. Example (11) indicates that the subject realized as complement of the fronted non-finite verb establishes the usual agreement relationship with the embedding finite verb.

- (11) [Ein Außenseiter gewonnen] hat / *hast / *haben hier noch nie.
an outsider won has / have-2.SG / have-PL here still never
 'An outsider has never won here yet.'

One might claim that this example does not show agreement but the third person singular marking which surfaces whenever a finite verb has no overt subject:

- (12) Hier wurde / *wurden getanzt.
here was / were-PL danced
 'Here people danced.'

⁶The use of the term subcategorization requirement is slightly misleading in the context of the HPSG paradigm since the subcategorization 'requirement' of a sign in HPSG is actually identified with (a subpart of) the sign realizing this requirement. With respect to a simple finite sentence, for example, the subject requirement of the finite verb is identical to the (*synsem* part of) the actual subject. When we, for lack of a better term, speak of the subcategorization requirement of a sign, one should thus always keep this identity in mind.

⁷As will be shown in section 4.1.3, raising in the HPSG paradigm establishes an identity between the raised spirit and (a part of) the overt NP. The formalizations of the raising spirits idea we present in section 4 can thus also be understood as encoding the idea of 'direct' case assignment. But note that the identification of the raised spirit with (a part of) the overt NP eliminates the need typical of direct case assignment proposals to relax the conditions under which case assignment takes place.

But the example (13) from Höhle (1997, p. 114) shows that proper number agreement has to be accounted for.

- (13) [Die Hände gezittert] haben / *hat ihm diesmal nicht
the hands-PL tremble have-PL / has him this.time not
 'This time his hands didn't tremble.'

And as far as a first person subject can be topicalized as an argument of a non-finite verb at all, the example with agreement appears to be better than the case with a non-agreeing third person singular verb (14).

- (14) [Ich Trottel gewonnen] ?habe / *hat hier noch nie.
I fool won have-1.SG / has here still never
 'I fool have never won here yet.'

In addition to the nominative case assignment data, the subject-verb agreement facts thus show that the subject fronted as part of a non-finite verbal projection selected by a finite subject-to-subject verb behaves just like it does when it constructs as the ordinary subject of the finite verb.

We conclude that in a subject-to-subject raising construction raising of the (spirit of the) subject always takes place as far as grammatical relations like case assignment and subject-verb agreement are concerned – and that this even is the case if the subject is realized as a dependent of the embedded verb. In other words, the raising relation identifying the subject of V' with that required by V'' seems to be independent of where the subject is realized. If this *raising spirits hypothesis* is on the right track, one expects to observe the same kind of effect with other kind of raising phenomena. To test this prediction, in the following sections we take a closer look at case assignment in various constructions which have been analyzed as involving raising.

3.2 Accusative case assignment in AcI constructions

One relevant raising phenomenon is the AcI construction under an analysis which raises the subject of the embedded verb to become the object of the AcI verb. Grewendorf (1994, p. 32), St. Müller (1997) and others observed that in examples like those shown in (15)–(17), where an AcI verb selects a fronted verbal complement including the subject, the subject has to bear accusative case.

- (15) [*Der / Den Kanzler tanzen] sah der Oskar.
the-N / the-A chancellor dance saw the Oskar
 'Oskar saw the chancellor dance.'

- (16) [Den Sänger jodeln] läßt der König.⁸
the singer jodel lets the King
 'The King allows/forces the singer to jodel.'

- (17) [Den Mechaniker das Auto reparieren] ließ der Lehrer schon oft.⁹
the mechanic the car repair let the teacher already often
 'The teacher already often asked the mechanic to repair the car.'

As in the nominative case discussed above, the subject of the embedded verb realized in the fronted verbal projection thus receives case as if it were realized directly in the projection of the AcI verb as in (18).

- (18) Der Oskar sah den Kanzler tanzen.
The Oskar saw the chancellor dance
 'Oskar saw the chancellor dance.'

To round off the picture, a direct comparison of the subject-to-subject raising case (19) with the subject-to-object raising AcI case (20) illustrates that the fronted verbal constituent itself is not responsible for the case assignment.

- (19) [Ein Außenseiter gewinnen] wird hier nie.
an-N outsider win will here never
 'An outsider will never win here'
- (20) [Einen Außenseiter gewinnen] läßt Gott hier nie.
an-A outsider win lets god here never
 'God never lets an outsider win here.'

The only obvious exception to this is when the fronted predicate assigns *lexical* case as in (21).

- (21) [Ihm schlecht werden] sah ich noch nie.
him-D sick become saw I still never
 'So far I never saw him become sick.'

The raising spirits hypothesis claiming that raising establishes the local case assignment and agreement relations even if the raised element is realized as part of an embedded projection thus correctly predicts the accusative case assignment observed with AcI constructions. The spirits of the subjects of non-finite projections can be raised by a subject-to-subject raising verb to receive nominative case and establish subject-verb agreement, or it can be raised by a subject-to-object raising (= AcI) verb to receive accusative case.

⁸Example due to Oppenrieder (1991, p. 57, judged ?, cited after St. Müller 1997, p. 23).

⁹Example due to Grewendorf (1994, p. 32).

3.3 Case assignment in passive constructions

An interesting test case for the raising spirits hypothesis are passives. With respect to subjects fronted as part of a verbal projection there are two cases to be considered: the subject 'after' passivization surfacing as nominative NP and the subject 'before' passivization which surfaces as *von*-PP.

3.3.1 Fronted nominative NP + past participle

The examples in (22)–(23) illustrate that the nominative NP in a passive construction can be fronted as an argument of the embedded verb.

- (22) [Zwei Männer erschossen] wurden während des Wochenendes.¹⁰
two men shot were during the weekend
 'Two men were shot during the weekend.'

- (23) [Der Führerschein abgenommen] wurde einem Autofahrer am Samstag abend bei Friedrichsdorf.
Friedrichsdorf
 'On Saturday evening, the driving-license of a driver was taken away near F.'

Generally speaking, two analyses of such passive constructions are possible. Either the passive auxiliary *werden* is an *object-to-subject* raising verb selecting a *past participle*. Or, the auxiliary is analyzed as a *subject-to-subject* raising verb selecting a *passive participle*. In the former analysis, the generalization over the active–passive relation is encoded in the auxiliary.¹¹ In the latter it can be expressed in a lexical rule deriving the passive participle¹² or as an effect of the passive morpheme¹³.

Independent of which passive analysis one chooses, the subject of the auxiliary in a passive sentence stands in a raising relationship with an argument of the selected participle. In case the passive auxiliary is finite, it assigns nominative case to its subject. The raising spirits hypothesis thus correctly predicts the grammaticality of examples like (22) and (23). The argument which is fronted as part of the non-finite complement is raised as spirit to become the subject of the finite auxiliary and is thus assigned nominative case.

¹⁰Example due to Webelhuth (1985, p. 210, cited after St. Müller 1997, p. 23).

¹¹Bech (1955, § 28), for example, states: "Das verbum *werden* hat den koeffizienten N':A", wenn es den 3. status regiert. [The verb *werden* has the coefficient N':A' when it governs a participle.]", which suggests an object-to-subject raising analysis of *werden*. This point of view is worked out in some of the HPSG proposals, like Kathol (1994, pp. 245ff) or Pollard (1994, p. 291).

¹²See, for example, Bresnan (1982b), Nerbonne (1982), or Pollard and Sag (1987).

¹³See, for example, the discussion in Abraham (1995, pp. 103ff), who also points out that since German passive and perfect participles cannot be morphologically distinguished, the passivizing effect of the morpheme has to be reversed when the participle combines with the perfect auxiliary *haben*.

An important difference between the two passive analyses combined with the raising spirits idea is, however, that under the subject-to-subject analysis of passive one only has to assume that the information on *subjects* of non-finite constituents is available even if the subject is already realized. Or expressed under the raising spirits view, one only has to assume raising of subject spirits – which is all that was needed in the ordinary subject-to-subject raising and the AcI subject-to-object raising cases our discussion started with.¹⁴ Under the object-to-subject raising analysis of passive, on the other hand, one has to provide a link to the *object* realized as part of the non-finite constituent to permit nominative case assignment. Under the raising spirits view of establishing local grammatical relations, this is the only case we are aware of that would require raising of object spirits.

3.3.2 Fronted *von*-PP + past participle

Turning to the other relevant argument of the embedded verb, the ex-subject which is realized as a *von*-PP, the example (24) observed by St. Müller (1999, p. 376) illustrates that it is possible to front the *von*-PP together with the past participle.

- (24) [Von Grammatikern angeführt] werden auch Fälle mit dem Partizip intransitiver
of grammarians mentioned are also cases with the participle intransitive
 Verben.¹⁵
verbs
 'Grammarians also mention cases with the participle of intransitive verbs'

Under an analysis of the passive auxiliary as an object-to-subject raising verb selecting a past participle, it is totally unexpected that the subject of the past participle can surface as a *von*-PP when forming a constituent with the past participle. A look into a Donaukurier corpus¹⁶ confirms, however, that the construction exemplified in (24) actually occurs on a regular basis and with different kinds of passives. Some examples for *agentive passive* (*Vorgangspassiv*) are shown in (25)–(26), for *stative passive* (*Zustandspassiv*) in (27)–(28), and a further kind of passive with *fühlen* in (29).

- (25) [Von ihrer 21 Monate alten Enkelin ausgesperrt] wurde Montag mittag eine
by her 21 months old granddaughter lock.out was Monday noon a
 58jährige Hausfrau aus der Mercystraße.
58-year-old housewife from the Mercystreet
 'On Monday at noon, a 58 year old house wife living on Mercystreet was locked out by her 21 month old granddaughter.'

¹⁴Independent evidence for the accessibility of the properties of a subject contained in a verbal projection is provided by Höhle (1997).

¹⁵Example due to Askedal (1984, p. 28, as part of text, not example).

¹⁶The text of this corpus (8.469.700 words/523.353 sentences) is taken from the ECI/DCI Multilingual Corpus I CD-ROM, directory data/eci2/ger04.

- (26) [Von den Bürgern angeregt] wurde, an der Straße in Richtung Friedhof eine weitere
by the townsmen suggested was at the road in direction cemetery a further
 Straßenlampe anzubringen.
street-lamp attach.
 'It was suggested by the townsfolk to add another street lamp at the road towards the cemetery.'
- (27) [Von Baggern umklammert] ist derzeit Riedenburg.
by excavators embraced is currently Riedenburg
 'Riedenburg is currently embraced by excavators.'
- (28) [Von den Entwicklungen auf dem Arbeitsmarkt besonders betroffen] sind laut
by the developments at the job-market particularly affected are according-to
 Arbeitsamt Ingolstadt Männer und ausländische Arbeitnehmer.
labor-exchange Ingolstadt men and foreign employees
 'Labor exchange at Ingolstadt reports that the current development of the work market particularly
 affected men and foreign workers.'
- (29) [Von einem Unbekannten verfolgt] fühlt sich ein Imker aus Bad Abbach.
by a person.unknown followed feels himself a bee-keeper from Bad Abbach
 'A bee-keeper from Bad Abbach feels followed by a person unknown.'

A passive analysis based on a subject-to-subject raising auxiliary selecting a passive participle easily lends itself to an analysis of such data. In the derivation of the passive participle, for example by a passivization lexical rule, the subject of the active form is demoted to become an optional *von*-PP argument of the passive participle. To license a fronted constituent consisting of the *von*-PP and the passive participle, the head thus only needs to combine with its PP-argument.

Under an object-to-subject raising analysis of passive, on the other hand, the participle is the ordinary past participle. Such a passive analysis is prima facia not compatible with the data presented above. The past participles of our examples are verbs subcategorizing for an NP subject, but they instead combine with a *von*-PP. The only way out of this conflict appears to be an analysis that sees the preposition *von* as a special kind of case marking of an NP, i.e., the agentive phrase is analyzed as a *von*-marked NP and not as a PP.¹⁷ Under such an analysis, the passive auxiliaries would assign "von-case" to the raised ex-subject. In line with the raising spirits hypothesis, raising of the ex-subject spirit would then ensure "von-case" assignment to ex-subjects fronted as part of the non-finite complement.

¹⁷We are not aware of a proposal for German which analyses *von*-PPs in passives as NPs marked by a preposition in this way. But see Heinz and Matiasek (1994, sec. 6.4.5) for a suggestion to analyze other prepositions without semantic contribution as markers instead of as heads.

3.4 Interaction of multiple raising constructions

In the last sections, we investigated different kinds of raising constructions and showed that each of these constructions behaves as expected under the raising spirits hypothesis. Since multiple raising constructions can be combined in a single sentence, we now turn to an investigation of the interaction between different kinds of raising constructions to clarify whether the possibility to consecutively raise an element also applies to spirits.

3.4.1 Extending the raising relation

Nominative case assignment Examples in which the construction we are interested in is embedded under a further raising verb are already mentioned by Haider (1990b). He lists the sentences in (30), which extend the example (2) presented in the introduction with the subject-to-subject raising verb *scheinen*.

- (30) a. [Ein Außenseiter gewonnen] scheint hier noch nie zu haben.
an outsider won seems here still never to have
 'An outsider seems never to have won here yet.'
- b. [Ein Außenseiter gewonnen zu haben] scheint hier noch nie.
an outsider won to have seems here still never

Examples with an ergative verb, like the sentence (1) mentioned in the introduction, also permit such embedding under a raising predicate, as shown in (31).

- (31) a. [Ein Fehler unterlaufen] scheint ihr dabei aber noch nie zu sein.
an error crept.in seems her there but still never to be
 'So far she never seems to have made a mistake there.'
- b. [Ein Fehler unterlaufen zu sein] scheint ihr dabei aber noch nie.
an error crept.in to be seems her there but still never

Adding a subject-to-subject raising verb in the way exemplified in the above examples adds one additional level of embedding in between the subject fronted as part of the non-finite constituent and the finite verb assigning nominative case. By adding further raising predicates, further levels of embedding are possible – even though the increasing complexity makes such examples hard to process. In (32) the nominative case of the subject of *scheint* is assigned through three levels of embedding raising predicates to the NP argument of *unterzeichnet*.

- (32) ? Der endgültige Vertrag unterzeichnet worden zu sein scheint aber erst nach langen
the-N final contract signed be to be seems but only after long
 Verhandlungen.
negotiations
 'The final contract was only signed after long negotiations.'

In light of the fact that the apparently non-local case assignment relationship can be reduced to ordinary local case assignment to the spirit of the subject which was raised by a sequence of raising predicates, under the raising-spirits hypothesis such case assignment is correctly predicted to be possible.

Accusative case assignment In section 3.2 we showed that AcI verbs can assign accusative case to NPs embedded in the verbal complement of the AcI verb. To support that raising is the relation establishing the link for case assignment, in (33) we have inserted a subject-to-subject raising verb *aufhören* in between the AcI verb and its verbal complement containing the accusative NP.

(33) ? [Den Herbert freiwillig zu streiten aufhören] sah ich wohl noch nie.
the-A Herbert voluntarily to fight stop saw I probably still never
 'I probably never saw Herbert voluntarily stop fighting.'

(34) ? Ich sah wohl noch nie den Herbert freiwillig zu streiten aufhören.
I saw probably still never the-A Herbert voluntarily to fight stop

While such sentences do not appear to be fully grammatical, for our purpose it is relevant that the grammaticality of the example (33), in which the fronted constituent includes an embedded subject receiving accusative case from the AcI verb in verb-second position, appears to be comparable to the grammaticality of the same sentences without such a special fronted constituent (34).

We conclude that grammatical relations with an NP embedded in the verbal complement of a raising predicate can be extended by inserting a further raising verb between the case assigner and the NP. This is in line with our raising-spirits analysis which relies on the raising relation for case assignment even in cases when no overt raising has taken place.

3.4.2 Multiple case assignment possibilities

In the cases discussed above, subject-to-subject raising verbs were used to extend the raising relation since they do not alter the function and thereby the case of the raised element. While these cases confirm the basic raising spirits hypothesis, the other possibility of extending a sentence with a raising predicate that changes the function of the raised element can disclose further properties. In the following, we discuss two instances of passivization for this purpose.

Passivization of AcI constructions Höhle (1978, pp. 169–172) points out that a small subset of AcI constructions in German can be passivized. This is illustrated by example (35).

- (35) *als das Werkzeug fallen gelassen wurde*
when the tool drop let was
 'when the tool was dropped'

Due to the presence of two cases which can potentially be assigned to the NP *das Werkzeug*, accusative by the AcI verb and nominative by the finite passive auxiliary, this construction is an interesting test case for determining the exact circumstances under which structural case assignment is possible. Example (36) shows that if a case-disambiguated NP is fronted by itself, it has to occur in nominative case.

- (36) [Ein / *Einen Hammer] *wird hier nie fallen gelassen.*
a-N / a-A hammer is here never fallen let
 'No one ever drops a hammer here.'

In (36) it thus is the finite verb which assigns case to the NP realized as its subject.

Under our raising spirits perspective, the interesting question is what happens when the subject is realized as part of the verbal complement, i.e., in those circumstances under which in the previously discussed constructions case was assigned to a raised spirit. Example (37) shows that the finite verb can assign nominative case to the embedded NP just like it did to the locally realized NP in the ordinary passivization of an AcI construction in (36).

- (37) [Ein / ?*Einen Hammer fallen gelassen] *wird hier eigentlich nie.*
a-N / a-A hammer fall let is here usually never
 'Usually, no one ever drops a hammer here.'

From this we conclude that an NP which is not assigned lexical case always shows the structural case assigned by the highest case assigner to which it could be raised.

Note, however, that at least some speakers hesitate to totally rule out the accusative NP for example (37). For these speakers our conclusion that only the highest case assignment is possible would predict that accusative case is only possible if there was no raising link established by the passive auxiliary. This seems plausible since *werden* can construct to form subjectless, impersonal passives, as exemplified in (38).

- (38) *Hier wurde früher viel getanzt.*
here was back.then a.lot danced
 'Here people danced a lot back then.'

While such subjectless passives are usually taken to arise only when no direct object with structural case of the lower verb exists, the examples in (39)–(41) show that there appear to exist certain exceptions to this regularity.

- (39) a. *Damals wurde den Talmud gelesen bis zum Umfallen.*
back-then was the Talmud read until to fall-over
 'Back then the Talmud was read for a very long time.'
- b. *Hier wurde den Tango getanzt bis spät in die Nacht.*
here was the tango danced until late in the night
 'Here people danced tango until late at night.'
- (40) a. *Im Urlaub wird immer Muscheln gegessen.*
during vacation is-SG always mussels-PL eaten
 'During vacation one usually eats mussels.'
- b. *Montags wird Hemden gebügelt. Dienstags wird Socken gestopft.*
on-Mondays is-SG shirts-PL ironed on-Tuesdays is-SG socks-PL mended.
 'Monday is the day for ironing shirts. Tuesdays the socks are mended.'
- (41) a. *Jetzt wird nicht gemotzt sondern den Tag genossen!*
Now is not complained but the-A day enjoyed
 'Now isn't the time to complain but to enjoy the day!'
- b. *Jetzt wird aber endlich die Zähne geputzt!*¹⁸
Now is-SG but finally the teeth-PL brushed
 'It's high time to brush your teeth!'

In (39) the accusative NPs *den Talmud* and *den Tango* seem to have escaped promotion to the subject. In (40), the plural NPs *Muscheln*, *Hemden*, and *Socken* are case ambiguous in form. But since they fail to show number agreement with the finite verb they too must have remained accusative object NPs. Finally, the imperative sentences in (41) also exhibit such accusative case marking or number mismatch.

We take one of the characteristics of all of these examples to be that the accusative case NP can only receive a 'generic' reading. There is a clear contrast between (42a), where a 'non-referential' reading is possible, and the ungrammatical (42b), where a 'referential' reading is forced.¹⁹

- (42) a. ?*Hier wird den Hintern versohlt.*
here is the-A bottom hit
 'Here someone's bottom is hit.'

¹⁸Example due to Christian Fortmann (p.c.).

¹⁹The ditransitive use of *versohlen* has the same effect of fixing the reading of (i), even though here it becomes clear that 'referential' is not quite the right term for the relevant NP interpretation.

(i) *Hier wird niemandem der / *den Hintern versohlt*
here is nobody the N / the A bottom hit
 Here nobody is hit on the bottom.

- b. *Hier wird den Hintern von Karl versohlt.
here is the-A bottom of Karl hit
 'Here Karl's bottom is hit.'

While it is beyond the scope of this paper to further investigate the properties of this construction,²⁰ the data discussion above should be sufficient to motivate that the (marginal) acceptability of the accusative case marked NP in example (37) can be explained as involving a subjectless passive along the lines of the examples discussed above. Such passivizations do not involve a raising link for a subject. We can thus maintain our conclusion that an NP which is not assigned lexical case always shows the structural case assigned by the highest case assigner to which it could be raised.

Remote passive Turning to another instance of passivization, it was discovered by Höhle (1978, pp. 175ff) that it is possible to passivize sentences headed by the subject-oriented equi verb *versuchen* so that the accusative object of the verbal complement in an active sentence (43a) becomes the subject in the passive counterpart (43b).

- (43) a. wenn Karl den Wagen zu reparieren versucht
when Karl the-A car to repair tries
 'when Karl tries to repair the car'
- b. wenn der Wagen zu reparieren versucht wird
when the-N car to repair tried is
 'when it is attempted to repair the car'

The construction is usually referred to as distant, long or *remote passive* (*Fernpassiv*) in the literature.²¹ While such passivization is not generally possible with subject-oriented equi verbs, at least with *versuchen* (*try*) the construction appears to be widely accepted. Interestingly, the construction is not limited to subject-oriented verbs as can be seen from the example (44a) attributed to Tilman Höhle in Haider (1990a, pp. 128f), in which the dative object-oriented equi verb *erlauben* (*permit*) is passivized. Askedal (1988, p. 13) pointed out the parallel example (44b) from Stefan Zweig as presented by Bech (1955, §350).

- (44) a. Der Erfolg wurde uns nicht auszukosten erlaubt.
the success was us not enjoy allowed
 'We were not allowed to enjoy our success.'

²⁰We are not aware of an investigation of the range of data which allow accusative objects with structural case to escape passivization. Certain examples are discussed as (*object*) *incorporation* by Kroch and Santorini (1991, p. 295) and Abraham (1995, pp. 110ff). The latter also mentions that other examples resist such an analysis.

²¹See, for example, Kiss (1995, sec. 3.3.1.4), Pollard (1994, pp. 276 and 288ff), Kathol (1995, sec. 4.4.2 and p. 280), and St. Müller (1999, sec. 15.3.6) for a discussion of remote passive in an HPSG context. Thanks to Adam Przepiórkowski for pointing out the relevance of this construction for our discussion.

- b. Keine Zeitung wird ihr zu lesen erlaubt.
no newspaper is her to read permitted
 'She was not permitted to read the newspaper.'

The subject-oriented equi verb *versuchen* and the object-oriented equi verb *erlauben* have in common that they optionally construct coherently.²² In a sentence like (45), where coherence is enforced by fronting a verbal cluster, the object of the verbal complement has to receive nominative case.

- (45) [Zu reparieren versucht] wurde der / *den Wagen.
to repair try was the-N / the-A car
 'Someone tried to repair the car.'

The fact that only the nominative case assignment is allowed suggests that passivizing a verb coherently selecting a verbal complement forces a structural case NP argument (if one exists) of the verbal complement to become the subject.

In an obligatorily incoherent construction like sentence (46), where the verbal complement is extraposed, the structural case NP argument of the verbal complement cannot receive nominative case.

- (46) Obwohl versucht wurde, *der / den Wagen zu reparieren
even though tried was the-N / the-A car to repair
 'Even though it was tried to repair the car'

In other words, we conclude with Kiss (1995, p. 136) that passivization of an equi verb can only affect the object of a verbal complement if the equi verb and its complement combine coherently.

The conclusions drawn above predict that constructions which have two analyses, one coherent and one incoherent, allow for both case assignments. The examples in (47) show that this prediction is correct.

- (47) a. wenn der / den Wagen zu reparieren versucht wird
when the-N / the-A car to repair tried is
 'when it is attempted to repair the car'
- b. [Der / Den Wagen] wird zu reparieren versucht.
the-N / the-A car is to repair tried
 'It is attempted to repair the car.'

²² Readers not familiar with the notion of coherence introduced by Bech (1955) are referred to Meurers (1999) for an empirical introduction, to Stechow (1984), Evers (1975, p. 49–52) and Grewendorf (1991, p. 263–274) for a discussion based on a principles and parameters setup, or to Kiss (1994) and Kiss (1995) for a discussion assuming an HPSG background.

That this is on the right track can nicely be illustrated by inserting material which disambiguates the coherence/incoherence of example (47a). In (48a) we enforce an incoherent construction by inserting the adverbial expression *noch einmal* in between the two verbal heads. In (48b), on the other hand, the adverb *verzweifelt* modifying *versucht* is inserted in between *zu reparieren* and its complement *den Wagen*, enforcing a coherent construction. In both cases, only one kind of case assignment is possible.

- (48) a. wenn *der / den Wagen zu reparieren noch einmal versucht wird
 when the-N / the-A car to repair still once tried is
 'when it is attempted to repair the car one more time'
- b. wenn der / *den Wagen verzweifelt zu reparieren versucht wird
 when the-N / the-A car desperately to repair tried is
 'when it is desperately attempted to repair the car'

In anticipation of a discussion in section 4.2 addressing the question which theoretical interpretation of the raising spirits hypothesis is most promising, let us point out here that the revised raising spirits hypothesis of the form 'a spirit receives case when it cannot be raised further', which resulted from the discussion of the passivized Acl construction above, puts a restriction on the analysis of coherence. In the standard analysis of coherent constructions in HPSG, following Hinrichs and Nakazawa (1989) the arguments of the verbal complement are raised to become arguments of the verbal head. Thereby an NP of the lower verb can be raised to become an argument of the higher verb – which is parallel to the idea in the principles and parameters paradigm of Haider (1993, sec. 9.3) who speaks of 'Vereinigung der Argumentstrukturen [Unioning of the argument structures]'.²³ Based on this analysis of coherence in HPSG, Kiss (1995) and Pollard (1994, pp. 288ff) propose that the remote passive construction be analyzed by allowing passivization to turn an NP which has been raised to the higher verb as a result of cluster formation into the subject. The danger of incompatibility with our revised raising spirits hypothesis lies in the details of the argument raising relationship encoding coherence, as one could propose to analyze optionally coherent verbs like *versuchen* as always establishing a link to raise the arguments of their verbal complement, independent of whether complements are actually raised (in a coherent construction) or not (in an incoherent construction). Under such an analysis one would then incorrectly predict the example with an optionally coherent verb constructing incoherently shown in (49a) (repeating (46)) to be parallel to a sentence where a

²³All of these proposals can be understood as incorporating the idea of functional composition from categorial grammar (Geach, 1970). As far as we know, it was first applied to German by Johnson (1986). The HPSG formulation of argument attraction as a lexical specification differs from the original functional composition rule of categorial grammar on which it was modeled in that it is the head of the construction which inherits the subcategorization requirements of its complement. In functional composition and apparently also in the approach of Haider (1993), the subcategorization requirements of the complement are transferred to the mother of the construction.

subject-to-subject raising verb introduces a raising link without overtly making use of it like (49b) (repeating (10)).

- (49) a. Obwohl versucht wurde, *der / den Wagen zu reparieren
even.though tried was the-N / the-A car to repair
 b. Obwohl damals anfang, der / *den Mond zu scheinen
even.though back.then begun the-N / the-A moon to shine

To be compatible with the raising spirits idea of assigning case only to those elements which cannot be raised further, an incoherent construction must therefore be analyzed as absence of a raising relation, independent of whether the same verb could also construct coherently in a different sentence.

An even stronger conclusion can be derived from the observation illustrated by (50) that a remote passive is not possible when a full VP constituent is fronted.

- (50) [*Der / Den Wagen zu reparieren] wurde lange Zeit versucht.
the-N / the-A car to repair was long time tried

The fact that only the accusative case is possible is parallel to the incoherent VP extraposition case we saw in (49a). The striking difference, however, is that whereas VP extraposition is an indicator for incoherence (51a), VP topicalization is also possible for obligatorily coherent verbs (51b).

- (51) a. *weil er lieber nicht will [einen Frosch küssen]
because he rather not wants a frog kiss
 b. [Einen Frosch küssen] will er lieber nicht.
a frog kiss wants he rather not
 'He prefers not to kiss a frog.'

It thus would be incorrect to interpret (50) as showing that optionally coherent verbs have to construct incoherently when their full VP complement is fronted.

The puzzle can be resolved by assuming that, different from the regular raising verbs, which always establish the raising relation independent of whether an element is actually raised, a coherently constructing verb only establishes an argument raising relation in case an argument of the lower verb is actually raised to form a verbal cluster. Or in terms of the metaphor of this paper, coherence never introduces spirits. This difference could also be used to explain why in contrast to passivization of NPs raised by ordinary subject-to-subject raising verbs, remote passivization of an NP attracted by a coherently constructing equi verb is only a marked, not generally accepted option.

The generalization reached in the last paragraph predicts that nominative case assignment should be possible when we change sentence (50) so that the coherently selecting verb *versucht* is part of the fronted constituent as shown in (52).

- (52) [Der / Den Wagen zu reparieren versucht] wurde lange Zeit.
the-N / the-A car to repair tried was long time

This is so since in this construction *versucht* can form a coherent verbal cluster with *zu reparieren* and attract the NP so that it can undergo passivization as argument of the higher verb. The prediction appears to be correct as the occurrence of a nominative case marked NP in (52) is at least much better than the nominative case option in (50).

Coherently constructing ergative verbs Haider (1993, sec. 9.3) relates the remote passive to an interesting case conversion occurring in coherent constructions, namely with ergative predicates embedding an infinitival complement. His examples with *gelingen* in (53) illustrate this phenomenon.²⁴

- (53) a. daß ihm auf Anhieb gelang, *der / den Brief zu entziffern
that him at first.try succeeded the-N / the-A letter to decipher
 'that he managed to decipher the letter at first try'
- b. [Zu entziffern gelungen] ist mir der / *den Brief auf Anhieb.
to decipher succeeded is me the-N / the-A letter at first.try

In the incoherent construction in (53a), the complete non-finite complement of *gelang* is extraposed. The object included in this non-finite complement has to occur in accusative case, as expected. In the coherent construction in (53b), the head of the non-finite complement as part of a verbal cluster is topicalized without its object, which is realized in the Mittelfeld bearing nominative case.

We can make sure that coherence is the decisive factor behind the case alternation using a minimal pair which only differs with respect to the order of elements in the Mittelfeld as illustrated in (54).

- (54) a. obwohl er / *ihn mir nicht zu entziffern gelungen ist
even.though he / him me not to decipher succeeded is
- b. obwohl mir *er / ihn zu entziffern nicht gelungen ist
even.though me he / him to decipher not succeed is

The example (54a) is a coherent construction as can be seen from the wide scope of the negation and the interleaved order of *mir* as object of *gelungen* and *er* as that of *zu entziffern*. Changing these two factors by untangling the objects and placing the negation in-between the two verbs as in (54b) results in an incoherent construction in which the object of *zu entziffern* has to bear accusative case.

²⁴Parallel examples with *gelingen* are discussed on the handout of a talk held by Tilman Höhle in Trondheim and Konstanz, October 1985. Askedal (1983, pp. 185ff) mentions the construction with *freistehen* (*be allowed to do something*). Other verbs mentioned by Haider (1993, sec. 9.3) are *schwerfallen* (*find something difficult*) and *glücken* (*manage to do something*).

Regarding the topicalization of the complete verbal complement, which in example (51b) on page 191 was illustrated as option for both incoherent and coherent constructions, only the accusative case can show up (Haider, 1993, p. 269), which is parallel to the remote passive example (50) repeated here as (55b).

- (55) a. [*Er / Ihn zu entziffern] ist mir nicht gelungen.
 he / him to decipher is me not succeeded
 b. [*Der / Den Wagen zu reparieren] wurde lange Zeit versucht.
 the-N / the-A car to repair was long time tried

This is expected based on the conclusion we drew in the remote passive discussion, namely that the option of a coherent construction – such as the one between *gelingen* and *zu entziffern* in (55a) – does not establish a raising relation which could mediate grammatical relations such as case. Argument raising as encoding of coherence thus differs from the raising relations of traditional raising predicates, which we showed to be established independent of whether an argument is actually raised or not.

A closer look at the comparison between remote passive and the ergative verbs shows, however, that the two phenomena are not entirely parallel. As illustrated in (56a), nominative case assignment to the embedded NP does not occur even if the ergative verb is included in the fronted constituent, which contrasts with the remote passive case we saw in (52) repeated here as (56b).

- (56) a. [*Er / Ihn zu entziffern gelungen] ist mir nicht.
 he / him to decipher succeeded is me not
 b. [Der / Den Wagen zu reparieren versucht] wurde lange Zeit.
 the-N / the-A car to repair tried was long time

With respect to the most deeply embedded verb, both NPs are ordinary objects. The subjects of the controlled infinitival verbs are not overtly expressed (= PRO). Both topicalized constituents are headed by verbs (*versuchen*, *gelingen*) which can construct coherently or incoherently. In the incoherent case, the two examples are parallel and only the accusative case is possible for the NP as object of the embedded infinitive.

The difference arises in the coherent case, where the NP in the remote passive example (56b) bears nominative case, whereas the NP in the ergative verb case example (56a) shows up in accusative case. As a result of argument raising as encoding of coherence, the NP in both examples is represented as an argument of the higher verb (*gelingen*, *versucht*). Focusing on the remote passive example first, there are two analyses to consider, depending on the analysis of passive one favors (cf., sec. 3.3). Either the NP is the subject of the passive participle *versucht* and *wurde* is analyzed as a subject-to-subject raising predicate establishing a raising relation for that subject. Or the NP is the object of the past participle *versucht* and *wurde* is an object-to-subject raising predicate establishing a raising relation with the NP in that way. Under the raising spirits hypothesis both analyses thus correctly entail the nominative case assignment.

Turning to the coherent analysis of the ergative verb example (56a), argument attraction as encoding of coherence turns the object NP of *zu entziffern* into an argument of *gelungen*, but not into the subject of that verb. The subject-to-subject raising verb *ist* therefore does not establish a raising relation with this NP, so that the NP has to bear accusative case.

3.5 The case of unexpressed subjects

To determine the application domain of the theory of structural case we propose in section 4, in this last empirical section we need to take a look at the case of unexpressed subjects. St. Müller (1998) reminds us of the test of Höhle (1983, sec. 6) who shows with the help of the floating quantifier *einer nach dem anderen* that the unrealized (or not overtly realized) subject of an infinitival complement of an equi verb, i.e., PRO in the principles and parameters terminology, bears nominative case. In (57), the accusative NP *den Burschen* is the logical subject of the extraposed non-finite verbal complement. The floating quantifier *einer nach dem anderen* contained in the verbal complement obligatorily bears nominative case, which suggests that whatever represents the logical subject in the extraposed infinitive clause bears nominative case too.

- (57) Ich habe den Burschen geraten, im Abstand von wenigen Tagen einer / *einen nach
I have the-A boys advised in distance of few days one-N / one-A after
 dem anderen zu kündigen.
the other to quit
 'I advised the boys to quit their job, one after the other within a few days time.'

As should be expected, the nominative case surfaces only in infinitival complements of equi predicates. In raising constructions like the AcI shown in (58), no floating quantifier in nominative case is possible as the unrealized subject of the infinitival complement is raised to become the object of the AcI verb so that no unrealized subject in nominative case is present.

- (58) Der Dirigent läßt den Tenor, den Alt und den Sopran *einer / einen nach dem anderen
the conductor lets the tenor the alto and the soprano one-N / one-A after the other
 vorsingen.
sing
 'The conductor asks the tenor, the alto, and the soprano to sing one after the other.'

A related observation is made by Bech (1955, §190), who remarks that in (what we would call) dative-object oriented equi constructions, predicative complements and elements which are related to the understood subject of the infinitive with *als* (*as*) or *wie* (*as*) never show case agreement with the controlling dative NP, but have to occur in nominative case. A parallel argument is made by Gert Webelhuth (HPSG list, 18.

July 1995) for *als*-phrases functioning as appositions to NPs. As shown in (59), the apposition agrees in case with the NP.²⁵

- (59) a. Als Vorsitzender / *Vorsitzenden darf er das Komitee ernennen.
as chair-N / chair-A can he the committee nominate
 'As chair he can nominate the committee.'
- b. Ich habe ihm als Vorsitzendem / *Vorsitzender im Namen aller Anwesenden zu seiner Wiederwahl gratuliert.
I have him as chair-D / chair-N in name.of all people.present to his re-election congratulated
 'I congratulated him, who is the chair, on his re-election in the name of everyone present.'

Just like with the floating quantifier *einer nach dem anderen* discussed above, the *als*-phrase in an infinitival complement of an equi verb has to appear in nominative if it is interpreted as apposition to the logical subject (60), whereas in an AcI construction as far as we can tell only the accusative case is possible (61).

- (60) a. Er hatte geplant, als Vorsitzender / *Vorsitzenden das Komitee zu ernennen.
he had planned as chair-N / chair-A the committee to nominate
 'He, who is the chair, had planned to nominate the committee.'
- b. Ich habe ihn gebeten, als Vorsitzender / *Vorsitzenden die Sitzung zu eröffnen.
I have him asked as chair-N / chair-A the meeting to open
 'I asked him, who is the chair, to open the meeting.'
- (61) Sie lassen ihn als *Vorsitzender / Vorsitzenden immer so lange reden wie er will.
they let him as chair-N / chair-A always so long talk as he likes
 'They always let him, who is the chair, talk as long as he likes.'

We thus conclude that there is significant evidence for assuming that the unrealized subject of the infinitival complement of an equi verb (= PRO) bears nominative case.

3.5.1 A brief excursion into default case

A possible alternative to assuming that nominative case is assigned to the unexpressed subject of incoherently selected infinitives would be to follow the tradition of Jakobson (1936, sec. III), who views the nominative case not as a representation of a particular marking like the accusative case, but rather as a representation of the unmarked. One could interpret this to mean that examples like the ones shown in (57) and (60) do not require nominative case assignment to the unrealized subject of the infinitive. Instead,

²⁵There are some exceptions to this case agreement requirement for appositions. According to Grebe (1959, §991) they, however, all involve genitive or very rarely dative NPs, an apposition to which can surface in nominative case.

either the unrealized subject could be understood as bearing nominative as a kind of "default case" when no case is assigned and the floating quantifier would show agreement with this case. Or one could claim more directly that in the absence of an overt subject NP, the floating quantifier *einer nach dem anderen* bears nominative case, a situation similar to third person singular morphology surfacing on the finite verb when no subject is present (cf., example (12) on page 178).

As Adam Przepiórkowski pointed out to me, in Polish and other Slavic languages there is one class of case agreeing elements which always show instrumental case when they are realized in the absence of a subject they could agree with, whereas another class of case agreeing elements apparently shows up in dative in such cases (Franks, 1995). If both classes of elements are indeed to be analyzed as exhibiting case agreement, the existence of two distinct cases showing up on case agreeing elements when no overt subject is present is problematic both for a theory assigning case to representations of the not-overtly-realized subjects as well as for the idea of a default case surfacing on elements which are not assigned case. The situation thus seems to support the idea that at least for one of the classes of normally case agreeing elements, a member of this class exhibits a specific case whenever no element to agree with is present. Different from German the case exhibited by an element in those environments could then plausibly depend on the lexical class of the element.

An aspect which appears to be problematic for any proposal not analyzing the case of case agreeing elements like the ones we discussed above as ordinary case agreement with an NP even in case no NP is overtly present is that person and number agreement between the upstairs controlling NP and the agreeing element in the non-finite clause has to be accounted for. For example, the floating quantifier *einer nach dem anderen* always requires a plural referent and the *als*-appositions show number and person agreement. If representations of empty subjects are used to mediate person and number agreement from the controlling NP to the agreeing element in the embedded clause, it seems highly plausible that case agreement with these empty subjects also takes place as with overtly realized subjects.

A conclusive discussion of the Jakobsonian view of nominative as absence of case marking and the ideas mentioned above is beyond the scope of this paper as it would involve a detailed investigation of the motivation and consequences of a default case with respect to general case assignment and agreement phenomena in German and cross-linguistically. Beside the Slavic facts, the multiple case possibilities for subjects and case agreeing elements in Icelandic (Andrews, 1982; Sag et al., 1992) would appear to constitute a further interesting test case for the adequacy of a default case analysis. In addition to these open empirical issues causing us not to pursue this alternative further at this point, the choice also relates to the grammar architecture we want to formalize our proposal in. Trying to incorporate the idea of a default case which surfaces when no case is assigned would be an obstacle for working out an HPSG proposal in section 4, as the HPSG architecture proposed by Pollard and Sag (1994)

and formalized in King (1989, 1994) for well-motivated reasons does not include non-monotonic devices such as defaults. Note, however, that often the formalization of situations intuitively involving default behavior does not require defaults in the formal sense.²⁶

4 Theoretical consequences

In sections 3.1 through 3.3 we argued that the case assignment and subject-verb agreement data makes it plausible to assume that raising establishes local grammatical relations regardless of where the NP to be raised is realized. On the basis of interactions in complex constructions discussed in section 3.4, this was made more precise by determining that independent of where the NP is realized, the local case assignment relations are only established at the highest place to which the NP or its spirit can be raised.

In the remaining part of the paper, we want to develop these ideas into a theoretical proposal which we will couch in the framework of HPSG (Pollard and Sag, 1994). We show that the raising spirits idea can be integrated into HPSG in a straightforward and general way and that it interacts properly with a theory of case assignment.

4.1 A basic theory

4.1.1 Subcategorization in HPSG

In traditional HPSG (Pollard and Sag, 1994, ch. 1–8), the subcategorization information of a word is represented in the sign itself, as shown in the partial lexical entry for the ditransitive verb *gibt* (*gives*) in figure 1.

$$\left[\begin{array}{l} \text{PHON } \langle \textit{gibt} \rangle \\ \text{SYNSEM|LOC|CAT|SUBCAT } \langle \text{NP, NP, NP} \rangle \end{array} \right]$$

Figure 1: Subcategorization information in the lexical entry of *gibt*

The Subcategorization Principle of Pollard and Sag (1994, p. 399) shown in figure 2 on the next page ensures that when a word which is licensed by such an entry combines

²⁶Non-monotonic devices would, for example, not be needed to formalize the idea that a normally case agreeing element bears a specific 'default case' when no element it could agree with is present. Since the formal setup for HPSG of King (1989, 1994) provides full (classical) negation, all that is needed to formalize this is a statement ensuring case agreement if a case bearing element is available within a certain domain and the 'default case' when this is not the case.

$$\left[\begin{array}{l} \textit{phrase} \\ \text{DTRS } \textit{head-struct} \end{array} \right] \rightarrow \left[\begin{array}{l} \text{SYNSEM|LOC|CAT|SUBCAT } \langle \mathbb{1} \rangle \\ \text{DTRS } \left[\begin{array}{l} \text{HEAD-DTR|SYNSEM|LOC|CAT|SUBCAT } \langle \mathbb{1} \oplus \mathbb{2} \rangle \\ \text{COMP-DTRS } \textit{synsems2signs}(\mathbb{2}) \end{array} \right] \end{array} \right]$$

Figure 2: The Subcategorization Principle of Pollard and Sag (1994)²⁷

with one or several of its arguments, (the SYNSEM value of) each argument has to be identical to one of the subcategorization requirements of that word. The constituent resulting from this combination then bears only the subcategorization requirements of the head daughter which were not already realized. This cancellation mechanism, reminiscent of categorial grammar, is illustrated by the sketch of an analysis of a simple German verb-last sentence in figure 3.²⁸

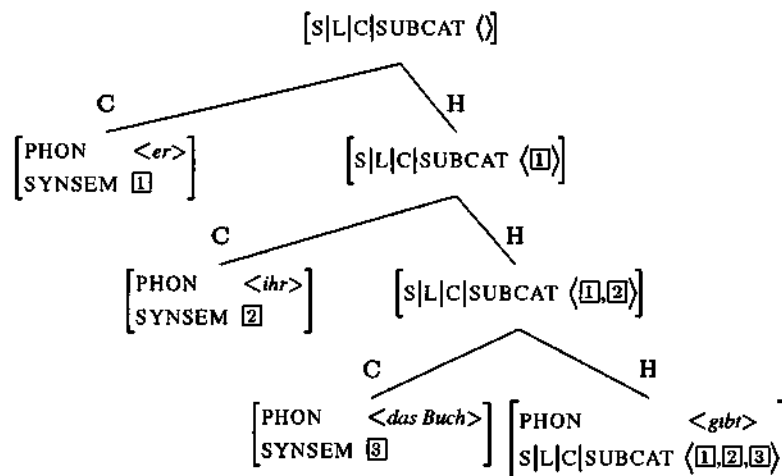


Figure 3: SUBCAT percolation in an analysis of a simple verb-last sentence:
 “(daß) er ihr das Buch gibt [(that) he her the book gives]”

4.1.2 The spirits appear on the scene

To formalize the idea of spirits as representations of already realized constituents, we need to change the Subcategorization Principle so that instead of removing all informa-

²⁷The principle is shown in an AVM notation instead of the text of the original. As usual, \oplus stands for the append relation concatenating two lists. The relation *synsems2signs* takes a list of synsems and returns a list of signs as its result argument. It is straightforwardly defined as:

$$\begin{aligned} \textit{synsems2signs}(\langle \rangle) &= \langle \rangle \\ \textit{synsems2signs}(\langle \langle \mathbb{1} \rangle \mid \langle \mathbb{2} \rangle \rangle) &= \langle \langle \text{SYNSEM } \mathbb{1} \rangle \mid \textit{synsems2signs}(\langle \mathbb{2} \rangle) \rangle \end{aligned}$$

²⁸For space reasons we here and in the following sometimes abbreviate attribute names by their first letters and SUBCAT by SUBC.

tion about an argument that has been realized, we only check off the subcategorization requirement but keep (at least some of) the subcategorization information on that argument around. A metaphorical way of thinking about this is that there are two ways of going through a store with a shopping list: The traditional Subcategorization Principle corresponds to tearing off a piece of the shopping list every time one has put that item into the shopping cart. The alternative we propose now is to check off an item on the list once we have picked it up – which has the advantage of still being able to check something about an item on the list later, for example what kind of chocolate bar we wanted to buy, without going through the whole shopping cart to look for it. For our case, this advantage corresponds to being able to check local grammatical relations like case with the checked-off element on the local SUBCAT list instead of having to look through the tree for the realized argument.

Technically, we realize the idea of marking elements as realized instead of removing them from the SUBCAT list by introducing two subtypes of *local*, namely *realized* and *unrealized*.²⁹ The idea is that all subcategorization requirements start out in the lexicon as *unrealized* and are turned to *realized* by the modified Subcategorization Principle in figure 4 once they are realized syntactically.³⁰

$$\left[\begin{array}{l} \textit{phrase} \\ \text{DTRS } \textit{head-struct} \end{array} \right] \rightarrow \left[\begin{array}{l} \text{SYNSEM|LOC|CAT|SUBCAT } \boxed{1} \oplus \textit{mark-realized}(\boxed{2}) \oplus \boxed{3} \\ \text{DTRS } \left[\begin{array}{l} \text{HEAD-DTR|SYNSEM|LOC|CAT|SUBCAT } \boxed{1} \oplus \boxed{2} \oplus \boxed{3} \textit{list}([\text{LOC } \textit{realized}]) \\ \text{COMP-DTRS } \textit{synsems2signs}(\boxed{2}) \end{array} \right] \end{array} \right]$$

Figure 4: Modified Subcategorization Principle³¹

Comparing the original Subcategorization Principle in figure 2 on the preceding page with the version modified so as to introduce spirits in figure 4, the important change is that the tag $\boxed{2}$ representing the list of arguments which are realized, in the modified principle also occurs in the specification of the SUBCAT list of the mother instead of simply being left off from this list as in the original principle. To keep track of which elements have been realized, the relation *mark-realized* changes the local subtype of the *synsem* objects on the list $\boxed{2}$ from *unrealized* to *realized*. In light of the fact that

²⁹We introduce the distinction at the level of local objects since we are not aware of examples showing that the realization status of an element is not mediated by non-local dependencies (which only identify local values).

³⁰I would like to thank Adam Przepiórkowski for pointing out several bugs in an earlier formulation of this principle and suggesting how to fix them. Note that what is encoded in this principle differs from the encoding of realizedness in Przepiórkowski (1999), where an attribute REALIZED is used to record in each argument whether it has been *locally* realized, whereas here the new subtypes we introduce record whether the argument is realized anywhere.

spirits of already realized elements stay on the SUBCAT list, an additional tag ③ is needed to carry over those spirits to the SUBCAT list of the mother which are already realized as part of the head daughter.

Under the modified percolation of subcategorization requirements, the analysis of the example we sketched in figure 3 on page 198 now looks as shown in figure 5. As a

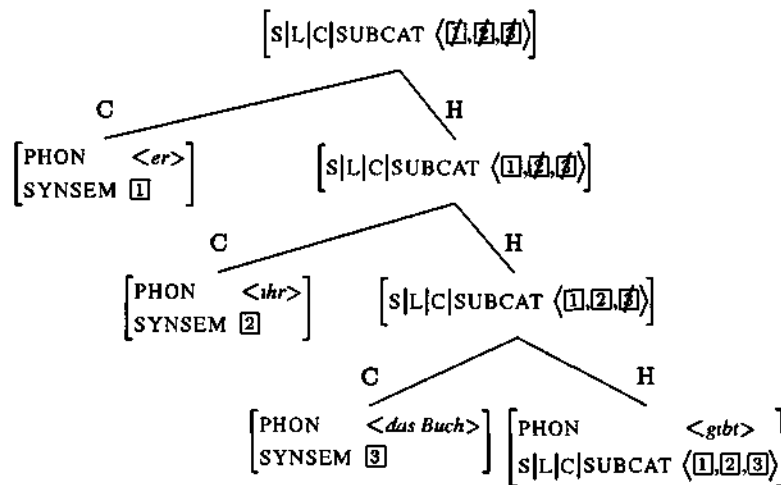


Figure 5: Modified SUBCAT percolation introducing spirits in the analysis of: “(daß) er ihr das Buch gibt [(that) he her the book gives]”

convenient notation we have represent all *synsem* objects with a LOCAL value of type *realized* as boxes which have been crossed out. Note that different from the traditional picture, the mother of the entire construction in the tree in figure 5 locally represents the *synsem* information of all realized arguments on its SUBCAT list.

4.1.3 Raising spirits

Having formalized the representation of spirits and how they percolate in the domain of their head, we only need to remind ourselves of the HPSG treatment of raising and equi to see that nothing else is needed in order for the spirits to penetrate the local head domain whenever the head is selected by a raising verb.

Pollard and Sag (1994, pp. 132ff) propose to analyze the regularities involving raising and equi predicates as a result of their lexical properties. Pollard (1996, pp. 299f), Kiss

³¹ The relation *mark-realized* is defined as follows:

$$\text{mark-realized}(\langle \rangle) = \langle \rangle \\
 \text{mark-realized} \left(\left\langle \left\langle \left[\begin{array}{l} \text{LOCAL} \\ \text{CAT} \quad \text{①} \\ \text{CONT} \quad \text{②} \end{array} \right] \right\rangle \right\rangle \right) = \left\langle \left[\begin{array}{l} \text{LOCAL} \\ \text{CAT} \quad \text{①} \\ \text{CONT} \quad \text{②} \end{array} \right] \mid \text{mark-realized}(\text{④}) \right\rangle$$

(1995), Heinz and Matiasek (1994, p. 229), Hinrichs and Nakazawa (1994) and others adopted this lexical analysis of control constructions for German. While the analyses differ in various respects, the central idea can be illustrated by the following lexical entries.³² The lexical entry of an equi verb like *versuchen* (*try*) in figure 6 identifies the semantic index (□) of the subject requirement of its verbal complement with that of its own subject requirement and assigns a semantic role to this index.

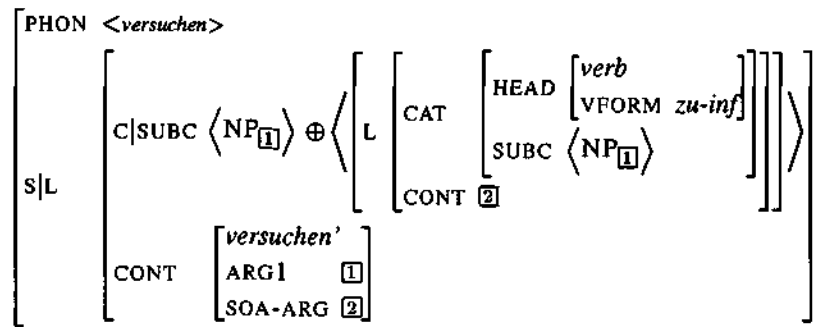


Figure 6: Lexical entry of a subject-oriented equi verb in HPSG

The lexical entry of a raising verb like *anfangen* (*start*) shown in figure 7, on the other hand, identifies the entire subject requirement list of the non-finite complement with its own subject requirement list. Furthermore, it assigns no semantic role to its subject.

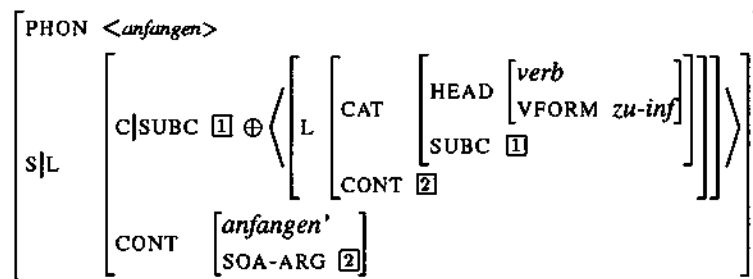


Figure 7: Lexical entry of a subject-to-subject raising verb in HPSG

Combining this traditional HPSG analysis of raising and equi verbs with our modified subcategorization principle is sufficient to permit spirits to percolate from one head domain to another whenever they are embedded by a raising verb. Figure 8 on the next page illustrates this with an analysis of the example (10) we discussed on page 177. The central aspect is that even though the verbal complement selected by the raising

³²The issue of argument raising as encoding of coherence is ignored here. We will come back to this point in section 4.2.

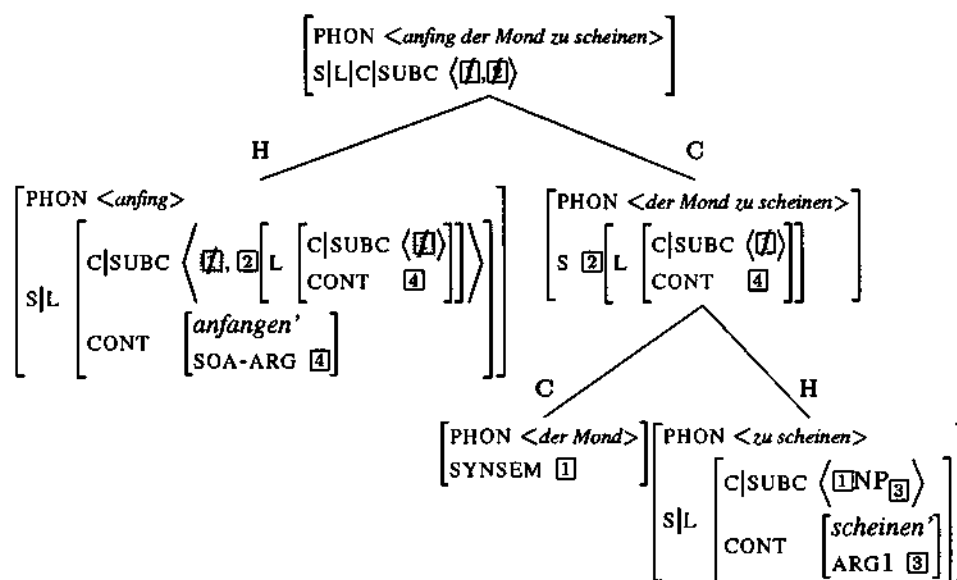


Figure 8: A simple example for raising of spirits:
 “(obwohl damals) anfang, der Mond zu scheinen”

verb *anfang* is already realized as part of the extraposed³³ verbal complement, the sub-categorization requirement for the subject is still raised by *anfang* and identified with its own subject requirement as shown by the specification highlighted in grey. Note that the spirit [1] of the subject of the embedded verb has thus left its local head domain solely by virtue of being selected by a raising verb. In particular, no non-local mechanism like the SLASH percolation employed in HPSG for non-local extraction phenomena is involved.

4.1.4 Case assignment

Having clarified the introduction and percolation of spirits as marked elements on the SUBCAT list of signs, we are ready to show that the existence of such spirits permits a straightforward formulation of case assignment.

Taking up the principles and parameters tradition of structural case assignment, Heinz and Matiasek (1994) and other HPSG proposals argue that a case theory for languages like German needs to make use of information on where an argument is syntactically realized. While certain arguments of a head always surface with a specific case, which can therefore be assigned in the lexical entry of the head (*lexical case*), the case of other arguments depends on the syntactic configuration in which they are realized and

³³We here ignore the question how to generally capture extraposition phenomena, an issue which is largely orthogonal to the point discussed here.

thus has to remain underspecified in the head's lexical entry (*structural case*).³⁴

In addition to the aspect that certain arguments *have to* be assigned case based on where the argument is realized, a different aspect of structural case assignment is that other arguments *can* be assigned case in this way, i.e., without requiring lexical specification. The interest in this aspect is based on an understanding of the lexicon as the locus of idiosyncratic stipulations which should be avoided whenever possible. This perspective is also reflected in the terminology *predictable vs. unpredictable case*, where the former corresponds to all cases which can be resolved based on structural regularities and the latter refers to the cases which cannot be assigned based on syntactic information alone but require knowledge of lexical specification. As we saw in part two of this thesis, though, the grammar architecture of HPSG includes rich data structures for words and supports the formulation of lexical generalizations over these structures by implicational principles. In an HPSG setup it thus seems unmotivated to emphasize which cases can be predicted on syntax information alone.

Returning to the HPSG proposals for resolving structural case, it is clear that assigning the correct case to arguments which do not receive lexical case requires some syntactic information. The HPSG proposals differ with respect to exactly what information is needed and how it becomes available to the case principle resolving syntactic case. Heinz and Matiasek (1994) propose a case principle resolving the case of a sign in the syntactic structure in which that sign is realized. This follows from the fact that the case principle of Heinz and Matiasek (1994, pp. 209f) assigns case to an element on the head daughter's SUBCAT list which is required to be missing from the SUBCAT list of the mother. Przepiórkowski (1999), on the other hand, presents a case principle which assigns case on the argument structure of a sign in a way that is only indirectly informed about whether the sign is syntactically realized. For this Przepiórkowski introduces an attribute REALIZED which records in the elements on the argument structure whether an element has been realized locally. The proposal by St. Müller (1996) in essence can be viewed as a hybrid between these two kinds of approaches. On the one hand, Müller's case assignment principle is similar to that of Heinz and Matiasek (1994) in that it refers directly to (the ARG-ST value as *cat* attribute of) the daughters structure, i.e., the syntactic realization. On the other, it shares with the approach of Przepiórkowski (1999) the fact that case is assigned to elements on the ARG-ST, which for St. Müller (1996) includes representations of those elements which have been extracted by a lexical rule as part of a traceless theory of unbounded dependencies.

We believe that the data we presented in section 3 provide important evidence for the assumption that case assignment should not directly be linked to the syntactic realization of a sign as, e.g., in the theory of Heinz and Matiasek (1994). While we propose to keep a representation of already realized subcategorization requirements, nothing short

³⁴We here restrict ourselves to two structural cases arising in verbal environments, nominative and accusative. We are agnostic as to whether a complete structural case theory should also include the dative.

of syntactically realizing such spirits as some kind of phonologically empty elements would make it possible to stick with a case principle running on syntactic realization – and we are not aware of any motivation for the syntactic realization of such empty elements. Essentially following the view of Przepiórkowski (1999), we thus reject the idea that it is the syntactic realization which causes structural case to be resolved. We instead propose to assign case to all subcategorization requirements which are not selected by a raising predicate. For the verbal heads we are concerned with in this paper, the two statements in figure 9 are sufficient to assign case.

Nominative case assignment

In an utterance, the least oblique subcategorization requirement with structural case of each verb which is not raised from that verb receives nominative case.

Accusative case assignment

In an utterance, each non-least oblique subcategorization requirement with structural case of each verb which is not raised from that verb receives accusative case.

Figure 9: A Case Principle for verbal environments

Let us explain these two statements in detail. First, we follow standard HPSG in assuming that the subcategorization requirements of a head are ordered according to a hierarchy of obliqueness. While the motivation for this hierarchy is discussed in Pollard and Sag (1994), here it is sufficient to note that this obliqueness ordering on the subcategorization requirements allows us to identify the subject as the least oblique argument.³⁵ Second, we follow Heinz and Matiasek (1994) and others in assuming that the lexical entry of each verb specifies which of its arguments bears a lexical case and which a structural case, where structural case is an underspecified marking which in verbal environments can resolve to nominative or accusative.

Having clarified what we in figure 9 meant by 'the (non-)least oblique subcategorization requirement with structural case', we are left to explain the restriction that we only assign case to a verb's argument 'which is not raised from that verb'. We showed in section 3.4 that we only want to assign case to a subcategorization requirement on the highest subcategorization frame it can be raised to. Given a particular verb the subcategorization requirements of which we want to assign case to, we thus only assign case to those required arguments which are not raised by a predicate selecting that verb. In other words, given a particular verb, we only assign case to those of its subcatego-

³⁵Note that this does not yet differentiate between the subjects of ordinary and those of ergative verbs. To make this additional distinction, one can follow Heinz and Matiasek (1994) in introducing the notion of *designated argument* (Haider, 1985, 1986) into HPSG.

rization requirements which are realized as part of that verb's head projection or not realized at all.

Finally, let us point out that the two parts of the case principle are exactly parallel, in particular the nominative case assignment does not make reference to finiteness. In accordance with the conclusion of section 3.5 we thus also assign nominative case to the unrealized subject of the non-finite complement of equi verbs. They thus differ from the subjects of the non-finite complements of raising verbs which due to the restriction discussed in the last paragraph are not assigned case with respect to the verb from which they are raised.

There are a variety of options for formalizing the case principle of figure 9 on the preceding page in HPSG, in particular with respect to the check whether an argument is raised higher or not. If one wants to be able to check in the lexical specification of each verb whether an argument is raised from it or not, one has to record this syntactic information within the subcategorization requirement. This can be done parallel to the idea of the *REALIZED* attribute proposed by Przepiórkowski (1999) which records as part of each subcategorization requirement of a lexical head whether it is realized as part of this head's head domain. While this is an attractive option, which as far as we see is compatible with the raising spirits idea, we want to explore a different possibility which allows us to provide a formalization directly corresponding to the case principle we expressed as prose above. The proposed formalization does not introduce additional attributes for recording syntactic properties lexically, at the cost of having to refer to these syntactic properties by consulting the syntactic structure – a tradeoff which we believe to be without empirical consequences. As formal language we make use of RSRL (Richter et al., 1999; Richter, in preparation), an extension of the SRL language for HPSG defined by King (1989, 1994).

In figure 10 on the next page, we show that each of the passages in the nominative case assignment rule corresponds directly to a subterm of the implicational statement.

To formalize the concept of an 'utterance', we make use of the sub-classification of *sign* into *unembedded-sign* and *embedded-sign* as introduced and motivated by Richter (1997). In RSRL, quantification is restricted to substructures of the particular linguistic object described. The first conjunct of the principle in figure 10 thus fixes that the principle talks about case assignment relative to an unembedded sign, or more properly speaking, it does so with respect to each unembedded sign.

The second conjunct of the principle then refers to each verbal word (I) which occurs in this unembedded sign that has a least oblique³⁶ argument (II) marked as structural case³⁷ receiving.

³⁶As mentioned above, we follow Pollard and Sag (1994) in assuming that the *SUBCAT* list which encodes the subcategorization requirements is ordered by increasing obliqueness. The *FIRST* element under *SUBCAT* thus is the least oblique argument.

³⁷The type *struc* in figure 10 on the following page is an abbreviation for the type *structural-case* of which *nominative* and *accusative* are defined to be subtypes.

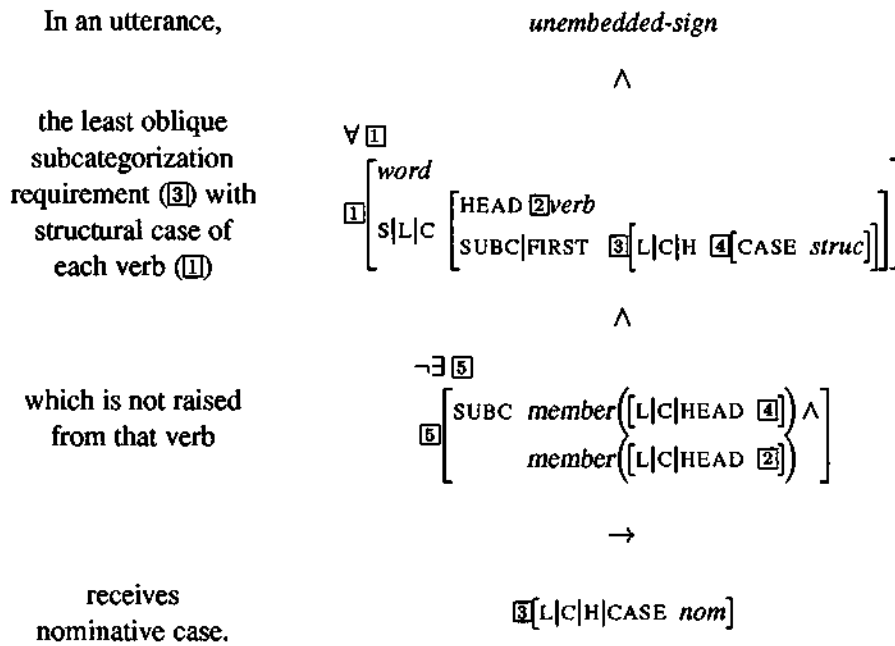


Figure 10: Formalizing nominative case assignment

The third conjunct serves to exclude such elements 3 which are raised from the SUBCAT list of a verb 1. This is expressed by checking whether there is an element 5 in the unembedded sign which has a subcategorization frame on which both the verb 1 and its argument 3 are present. In that case, the element 5 would be the subcategorization frame of a head which has raised the argument 3 from the verb 1, in which case we do not want to assign case to 3 with respect to the verb 1. Since this check also needs to catch *projections* of the verb 1 and since the *local* subtype of the argument 3 changes to record that it has been realized (cf., sec. 4.1.2), the actual condition in the third conjunct of figure 10 is not formulated in terms of 1 and 3 being members of the same SUBCAT list, but by referring to the HEAD values of 1 and 3, namely 2 and 4.³⁸

Once the antecedent of the nominative case assignment principle in figure 10 is satisfied, i.e., once it has identified the least oblique structural case marked arguments 3 of verbal words 1 such that 3 is not raised from the verb 1, then the consequent of the principle assigns nominative case to each such element.

The principle assigning accusative case shown in figure 11 on the next page is exactly parallel to the one for nominative case assignment just discussed. The only difference is that instead of the least oblique argument which we picked out as the FIRST

³⁸The necessity to refer to the HEAD values instead of the *synsem* objects directly is illustrated in the discussion of figure 12 on page 208. Note that this use of the HEAD values assumes that the HEAD values of different head projections are never (accidentally) token identical, which could be explicitly enforced by a constraint on unembedded signs.

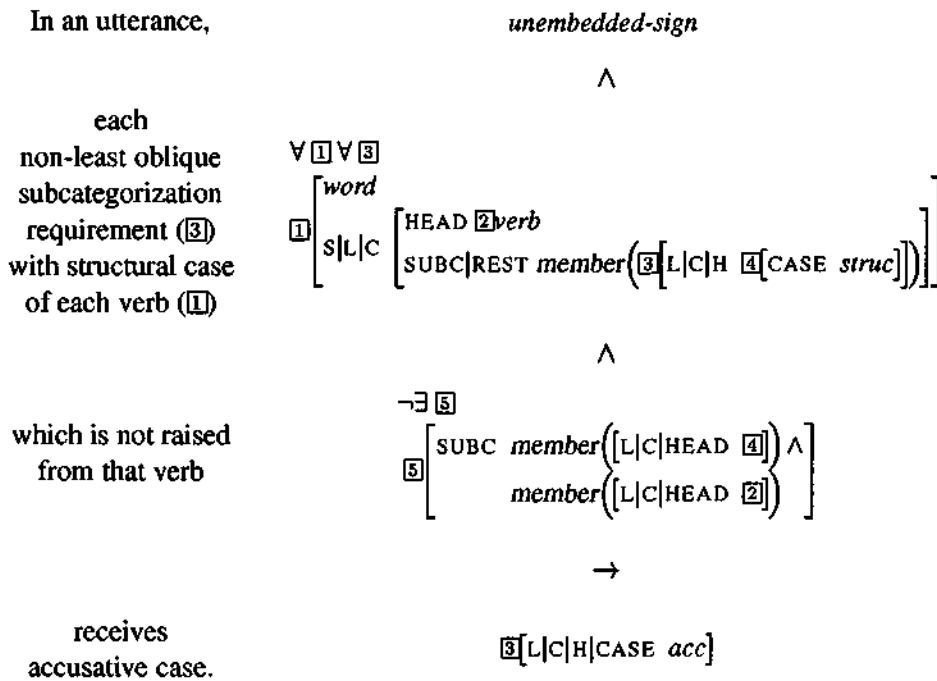


Figure 11: Formalizing accusative case assignment

element on SUBCAT for the nominative case assignment, this time the element 3 we want to assign case to can be any of the members of the REST of the SUBCAT list. Compared to the nominative case principle in figure 10 on the preceding page, the principle assigning accusative case in figure 11 thus makes use of an additional universal quantifier to pick out all non-first elements on SUBCAT with structural case. Note that both principles make use of the negated existential condition which excludes elements from receiving case that are raised from the verb under discussion to a higher subcategorization frame.

4.1.5 Two examples

Let us illustrate these two parts of our case principle and its interaction with the subcategorization principle modified so as to introduce spirits with two example analyses. In figure 12 on the following page we see the analysis assigned to the example (2) from the very beginning of the paper.³⁹ In this example nominative case is assigned to a subject embedded in a fronted non-finite constituent. The fronted constituent 2 consisting of the non-finite verb *gewonnen* which has realized its subject *ein Außenseiter* (1) is related by the standard non-local feature mechanism of HPSG to a trace at the

³⁹To abstract over the nature of verb-second and the structure of the Mittelfeld we follow Pollard (1996) in assuming a flat Mittelfeld and obtain verb-second by simple linearization in this local tree.

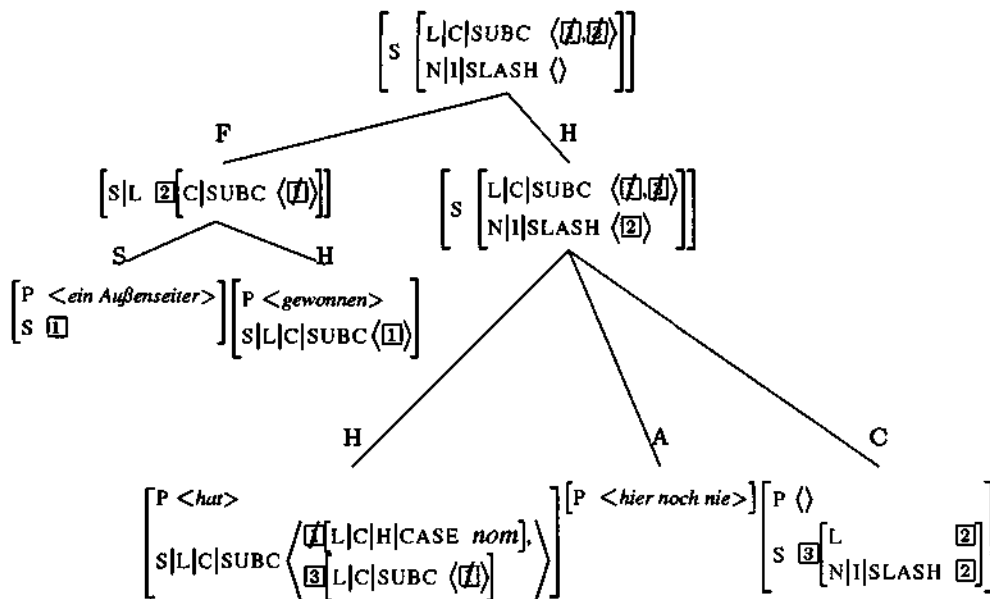


Figure 12: An example for nominative case assignment to a spirit

extraction site ([3]).⁴⁰ The finite verb *hat* selects the trace as its verbal complement, and since *hat* is a subject-to-subject raising verb, it identifies the spirit of the subject ([I] of (the trace of) the verbal complement with its own subject requirement.

So how does the case theory we just formulated assign nominative case to the subject fronted as part of the non-finite constituent? The case principle does not apply to [I] on the SUBCAT list of the verb *gewonnen*. This is so since *gewonnen* is the head of a constituent that (via its trace) is selected by the raising verb *hat* which identifies [I] as an argument to be raised further.⁴¹ Zooming in on the other occurrence of a verb, we see that the spirit [I] of the subject occurs as first element on the SUBCAT list of *hat*. Since *hat* is not selected by another raising predicate identifying [I] as an argument to be raised further, the case principle of figure 10 on page 206 assigns nominative case to [I] as the first element on the SUBCAT list.

To showcase the accusative case assignment, let us return to example (15) on page 179 which is an instance of a sentence in which an AcI verb assigns accusative case to an argument fronted as part of a non-finite complement. Figure 13 on the following page shows how this sentence is analyzed under our theory. Parallel to the previous

⁴⁰For reasons of presentation, we here use a trace based version of an unbounded dependency theory. Our theory could equally well be combined with a traceless account of extraction; but see De Kuthy and Meurers (1999a) for some discussion of the choice between unbounded dependency approaches in the context of argument raising.

⁴¹Note that [I] and [I] differ with respect to their local subtypes. This is the motivation for only requiring identity of HEAD values in the negated existential conjuncts of our case principle in the figures 10 on page 206 and 11 on the preceding page.

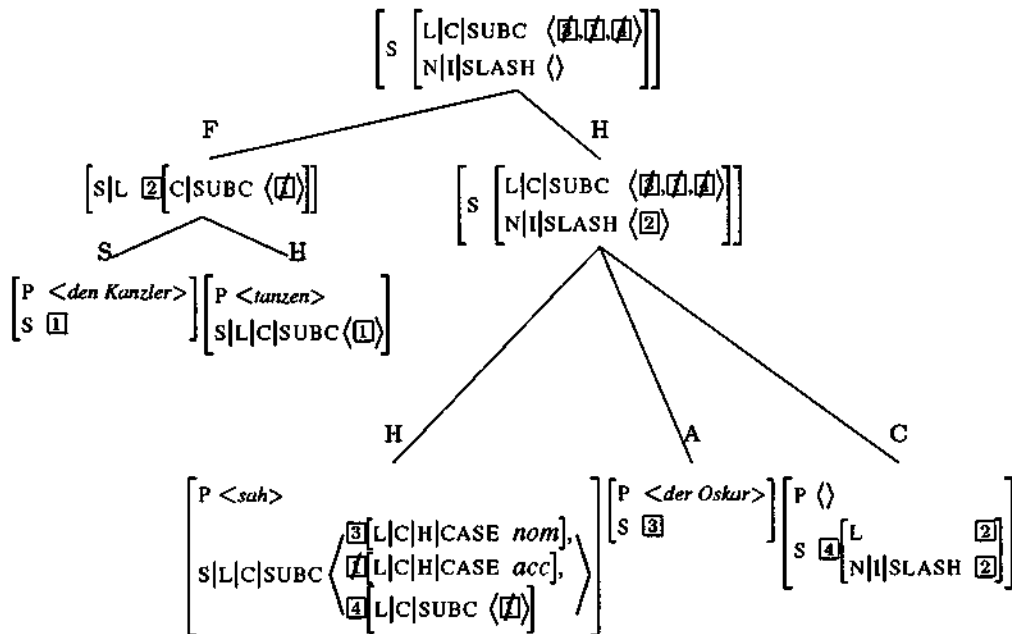


Figure 13: An example for accusative case assignment to a spirit

case, the subject requirement [1] on the SUBCAT list of the fronted verb *tanzen* is not assigned nominative case, since the fronted constituent is selected by the subject-to-object raising verb *sah* which raises [1] to become its object. Since *sah* is not selected by a raising predicate, our case principle assigns nominative case to its subject and accusative case to the second element on the SUBCAT list.

4.2 Towards a more restrictive theory of spirits

The theory formalized in the last section captures the raising spirits hypothesis we argued for on the basis of the data presented in section 3: local relations are established with elements on the highest subcategorization frame to which an element could be raised. To capture this idea, it was sufficient to modify the HPSG architecture of Pollard and Sag (1994) essentially in only one place, the percolation of subcategorization information. While this results in a very general and straightforward theoretical rendition of the intuitions behind spirits, the general nature of the modified subcategorization principle treating all arguments on a par has the disadvantage of, in principle, allowing every head to refer to any property of any argument realized as part of its complement. Going over the empirical motivation for spirits again, a more restrictive option for introducing spirits seems to be available. If one adopts a subject-to-subject raising analysis of passives instead of an object-to-subject raising one, it appears to be sufficient to introduce only spirits of subjects. For non-subject arguments one could

therefore return to the more constrained traditional setup, in which the properties of an argument cannot be accessed as part of the local properties of the verbal constituent in which the arguments are realized.

While this motivation for considering an alternative proposal capturing the raising spirits idea could be considered a theoretical issue without (immediate) empirical consequences, there also is an empirical issue which forces us to consider an alternative to the basic formalization proposed in the previous section. In section 3.4.2 we established that an argument is assigned case only by the highest case assigner to which it could be raised. In the discussion of remote passivization as part of the same section, we then showed that argument raising as encoding of coherence has to be distinguished from the raising relation established by the traditional raising predicates. While the traditional raising relation is always established, independent of whether the argument is actually raised or not (which gave rise to the notion of 'spirit'), argument raising as encoding of the merging of subcategorization requirements in a coherent construction does not raise arguments onto the head's requirements if they are already realized as part of the verbal complement, i.e., coherence never introduces 'spirits'.

This explains, for example, that the nominative case is unavailable in (62a) whereas it is available in 62b.⁴²

- (62) a. [*Der / Den Wagen zu reparieren] wurde lange Zeit versucht.
 the-N / the-A car to repair was long time tried
 b. [Der / Den Wagen zu reparieren versucht] wurde lange Zeit.
 the-N / the-A car to repair tried was long time

In (62a), the fronted verbal complement of the optionally coherent verb *versuchen* contains the argument *den Wagen*. We saw in the discussion of the example (51b) on page 191 that topicalization of the complete VP complement is an option which is also available to verbs which can only construct coherently. The sentence in (62a) thus has an analysis in which *versucht* coherently selects the topicalized constituent. The unavailability of the nominative can therefore be taken to show that the coherence of a combination alone is not sufficient for establishing a raising relation transferring the case assignment.

In (62b), the fronted constituent is ambiguous between two structures. Either *versucht* combines incoherently with the full VP *den Wagen zu reparieren*, or *versucht* raises the argument *der Wagen* of *zu reparieren* and both verbs combine in a verbal cluster which then realizes *der Wagen*. Once argument raising as encoding of coherence has raised the NP onto the valence representation of *versucht*, the lexical raising relation established by the passive auxiliary thus is sufficient to assign nominative case.

Having refreshed our memory on what we intend the theory to achieve, we only need to introduce argument raising as encoding of coherence into the basic raising spirits

⁴²These examples repeat the ones we mentioned as (50) on page 191 and (52) on page 192. Further related examples are discussed as (49a) and (49b) on page 191.

theory we defined in the previous section to see that it falls short of the desideratum. Extending the lexical entry of the optionally coherent equi verb *versuchen* we had defined in figure 6 on page 201 with an argument raising specification in the tradition of Hinrichs and Nakazawa (1989), we obtain the revised entry for *versuchen* in figure 14.

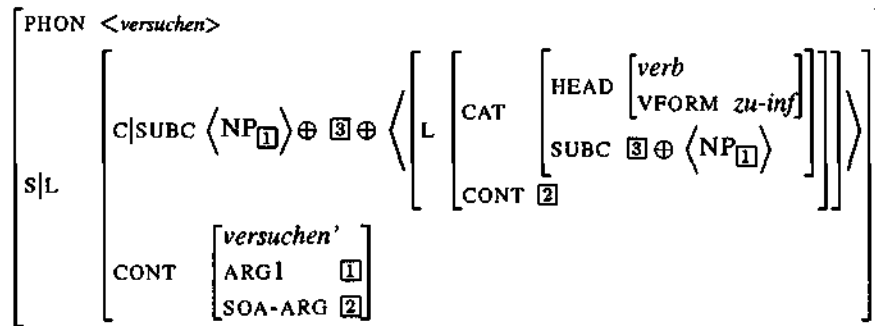


Figure 14: Lexical entry of an optionally coherent equi verb

In a traditional HPSG setup, i.e., without spirits, the tag $\boxed{3}$ represents those argument requirements of the verbal complement, which were not already realized as part of the verbal complement. These argument requirements are then added to the argument requirements of *versuchen*.⁴³

In the basic raising spirits setup we defined in the previous section, we modified the subcategorization principle so that it keeps a representation of the already realized arguments around (sec. 4.1.2). This has the effect that a verb such as *versuchen* always selects a verbal complement which still has all its arguments on its SUBCAT list, the ones that are already realized are only marked as spirits. With respect to the ordinary argument raising specification as part of the lexical entry of *versuchen* we saw in figure 14, the effect is that in a coherent construction, all arguments of the verbal complement are raised, some of them as ordinary arguments, some of them as spirits. This, however, is exactly the situation we set out to avoid: argument raising in this setup establishes a raising relation for all arguments of a coherently selected verb, independent of whether the argument is realized as part of the verbal complement or not.

There are two ways to overcome this situation in order to obtain a theory which captures our original intentions. Either we change the argument raising specification so that it no longer raises spirits.⁴⁴ Or we return to the original subcategorization principle so that subcategorization requirements are discharged in the traditional way. Spirits as

⁴³The operator \oplus stands for the append relation, i.e., list concatenation.

⁴⁴This option, which we do not explore here, has an ad-hoc technical and a more interesting general aspect. Technically it is straightforward to stipulate that spirits never undergo argument raising. One simply changes the lexical argument raising specification to only raise non-spirits, which can be identified by their *local* subtype. The more interesting general aspect would involve exploring alternatives to the lexical argument raising specification as encoding of coherence.

representations of those elements which could be raised by a traditional raising predicate then have to be introduced in a different, more restricted way. Introducing spirits only for subject requirements is such a more restricted option, and as we saw at the beginning of this section, this option would also be preferable on theoretical grounds. In the remaining part of this paper we therefore explore this possibility.

4.2.1 Splitting SUBCAT and the realizability of subjects

As a first step, we need to adopt a more elaborate representation of valence requirements. For ease of exposition, we so far based our discussion on a basic setup with a single representation for all subcategorized for elements, the SUBCAT list as used in Pollard and Sag (1994, ch. 1–8). The uniform representation of all arguments also allowed us to remain silent about when a non-finite verb can form a constituent with its subject. To provide a more complete theory, in particular one that only introduces subject spirits as suggested above, firstly we should replace this setup with a representation distinguishing subject requirements from other valence requirements in a straightforward way. And secondly, we need to introduce a mechanism which can be used to determine when a subject can be realized as part of a non-finite projection.

For both of these tasks we can build on previous HPSG proposals. Pollard and Sag (1994, ch. 9) follow Borsley in proposing distinct valence attributes for subjects and complements. For German, Pollard (1996) and Kiss (1995) suggest to encode the subject requirement of non-finite verbs separate from the other requirements. Both argue that the subject of a non-finite verb is never realized and thus their theory does not permit realization of the separately encoded subject requirement of non-finite verbs. Kiss (1995) actually goes as far as making SUBJ a *head* feature so that the Head-Feature Principle percolates the subject requirement along the entire non-finite head projection. A lexical rule deriving finite verbs from non-finite ones then ensures that the subject requirement is added to the other, realizable subcategorization requirements of finite verbs.

In light of the fact that most of the data we discussed in this paper contradict the assumption that subjects of non-finite verbs can never be realized, we cannot carry over the proposals of Pollard (1996) and Kiss (1995) as they stand. On the other hand, the idea of Kiss (1995) to introduce SUBJ as a *head* feature nicely captures the insight that subjects (but not objects) are visible from outside a verbal projection. In addition to our raising spirits data this is independently argued for by Höhle (1997).

The idea to use a lexical rule as the means for integrating the subject into the list of realizable arguments is equally attractive. Rather than licensing finite verbs in this way, we use it to license (the subclass of) non-finite verbs which can combine with a subject. Using a lexical rule for this purpose is attractive since it provides us with a well-defined locus for encoding the conditions under which the subject requirement can be integrated with the other valence requirements in order to be realizable. Such

a *subject integration lexical rule* thus eliminates the incorrect assumption that subjects can always be realized which was underlying the basic raising spirits theory we formulated above. At the same time it permits us to concentrate on the task we defined in the introduction, the case assignment issue in those examples in which a subject can actually be realized in a non-finite projection. Even though we thereby leave the exploration and integration of the other factors restricting the occurrence of subjects in non-finite environments to future research, we are confident that they can ultimately be integrated as restrictions on which non-finite verbal words can undergo the subject integration lexical rule.

In figure 15. we see a first version of a lexical rule integrating the subject requirements

$$\left[\begin{array}{l} \text{word} \\ \text{s|L|C} \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{verb} \\ \text{VFORM } \neg \text{fin} \\ \text{SUBJ } \boxed{1} \end{array} \right] \\ \text{SUBCAT } \boxed{2} \end{array} \right] \end{array} \right] \mapsto \left[\text{s|L|C} \left[\begin{array}{l} \text{H|SUBJ } \text{mark-realized}(\boxed{1}) \\ \text{SUBCAT } \boxed{1} \oplus \boxed{2} \end{array} \right] \right]$$

Figure 15: Subject integration lexical rule

with the complement requirements in order for the subject to be realizable. Note that while the lexical rule appends the (possibly empty) subject valence requirement to the SUBCAT list, it does not remove the subject requirement from the SUBJ value but only marks it as realized. Recursive application of this rule is ruled out since *mark-realized* requires a list of *unrealized* elements and turns it to a list of *realized* ones.

To obtain the full picture, we also provide a version of a finitivization lexical rule in figure 16. Just like in our subject integration lexical rule, the subject requirement is

$$\left[\begin{array}{l} \text{word} \\ \text{PHON } \boxed{1} \\ \text{s|L|C} \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{verb} \\ \text{VFORM } \text{bse} \\ \text{SUBJ } \boxed{2} \end{array} \right] \\ \text{SUBCAT } \boxed{3} \end{array} \right] \end{array} \right] \mapsto \left[\begin{array}{l} \text{PHON } \text{bse2fin}(\boxed{1}, \boxed{2}) \\ \text{s|L|C} \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{VFORM } \text{fin} \\ \text{SUBJ } \boxed{2} \end{array} \right] \\ \text{SUBCAT } \boxed{2} \oplus \boxed{3} \end{array} \right] \end{array} \right]$$

Figure 16: A finitivization lexical rule

added to the beginning of the SUBCAT valence. And just like in the non-finite case, we do not remove the subject from the SUBJ attribute. Since there are no raising verbs selecting finite projections with possibly unrealized subjects, this is not required for the raising spirits phenomena but for the already mentioned subject visibility data discussed in Höhle (1997).⁴⁵ Note that if there is no subject requirement, $\boxed{2}$ is the empty

⁴⁵Marking the subject requirement of finite verbs as realized in the output of the finitivization lexical rule parallel to the subject integration rule is not necessary, though.

list, and thus the SUBCAT list contains only the complements. The relation *bse2fin* transforms the base form into a finite form agreeing with the person and number of the subject, if there is one, and with the third person, singular in subjectless constructions.

4.2.2 Verbal entries in the modified setup

On the basis of this setup, raising verbs can now be defined to establish a link to the head attribute SUBJ of the verbal complement as shown in figure 17. The relevant

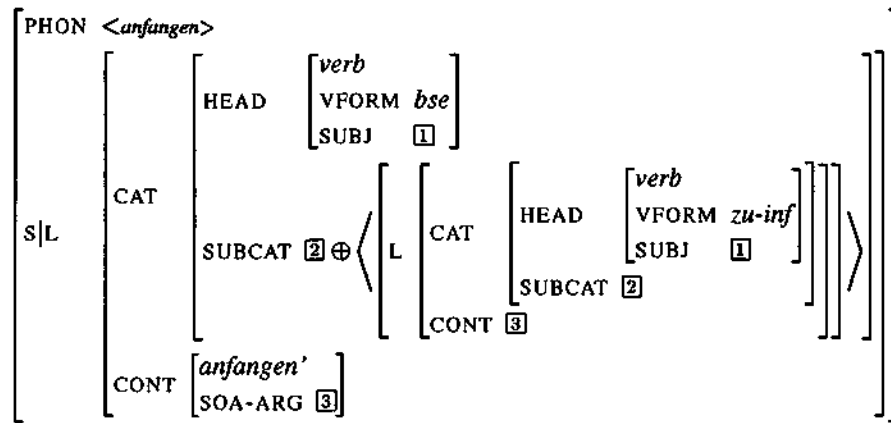


Figure 17: A subject-to-subject raising verb in the modified setup

change is that the identification of subject requirements now makes use of the new *head* feature SUBJ. Note that the tag 2 remains in order to encode that an optionally coherent verb like *anfangen* can attract the unrealized complements of its verbal complement in order to form a verbal cluster with that verbal complement.

A lexical entry for a subject-to-object raising verb like *sehen (to see)* is shown in figure 18 on the next page.⁴⁶

4.2.3 Introducing, percolating and assigning case to spirits

With an attribute percolating subject requirements along the head projection and a lexical rule integrating subjects into the list of realizable arguments for (certain) non-finite verbs in place, the question how spirits as representations of already realized subjects are introduced and percolated can be given a new, more restrictive answer: A subject requirement is percolated along the entire head projection, independent of where it is realized. Raising verbs identify this subject requirement with their own subject or

⁴⁶In the figure, NP₁ is an abbreviation for the description $\left[\text{LOC} \left[\text{CAT} \left[\begin{array}{l} \text{HEAD } \textit{noun} \\ \text{SUBCAT } \{ \} \end{array} \right] \right] \right]$.

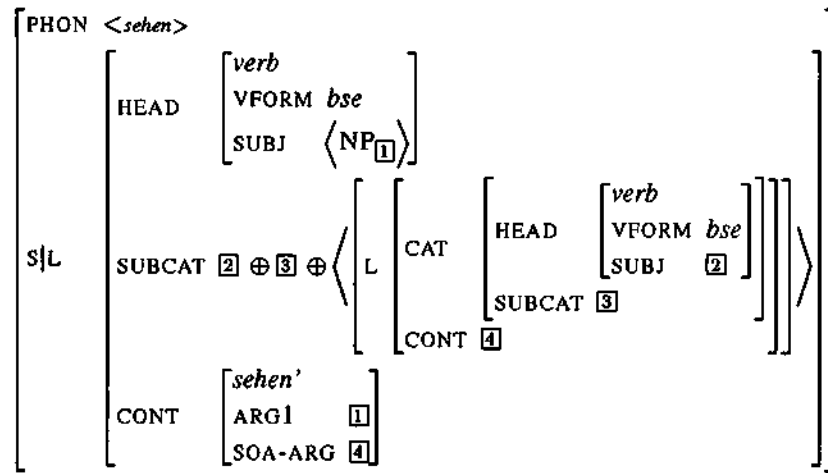


Figure 18: A subject-to-object raising (=AcI) verb in the modified setup

object (AcI) requirement, which allows subject requirements to penetrate their head domain and receive case on the subcategorization list they were raised to, independent of whether the subject was already realized as part of the non-finite projection. But different from the basic raising spirits theory defined in section 4.1, we no longer need to modify the 'traditional' Subcategorization Principle of figure 2 on page 198 to percolate spirits through the tree. Instead, we only need to ensure that elements marked as already realized which appear on SUBCAT as the result of raising are simply ignored. This is ensured by the revised version of the 'traditional' Subcategorization Principle shown in figure 19. Note that the only change is the addition of a possibly empty

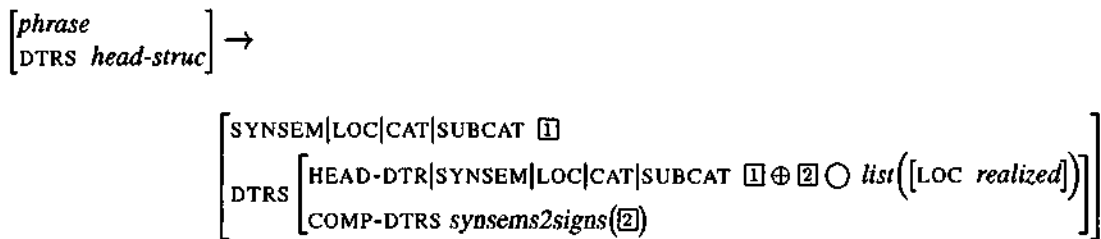


Figure 19: Revised 'traditional' Subcategorization Principle

list of realized elements occurring shuffled (○) into, i.e., interspersed with, the other elements on the SUBCAT list of the head daughter.

Summing up, the existence of subject spirits in this revised setup derives from the observation that (at least certain properties of) subjects are visible when looking at a saturated verbal projection combined with the lexical existence of raising verbs establishing links to the subjects of their verbal complements made visible in this manner.

Case assignment Finally, we need to change the formalization of the prose in the two implicational statements in figure 10 on page 206 and figure 11 on page 207 to fit the new feature geometry. Let us first focus on the negated existential conjunct occurring in both statements. This conjunct is supposed to ensure that case is only assigned if the argument is not raised further. The way we formalized this was by checking whether (the HEAD value of) an argument appears on the same subcategorization list as (a projection of) the head it is selected by. In other words, we check whether the argument and its head are 'selected as sisters' somewhere in the utterance. Having split up subcategorization into two attributes, this check is slightly more complex to express so that we factor it out in the relation *selected-as-sisters* defined in figure 20.

$$\begin{aligned} \text{selected-as-sisters}(\boxed{1}, \boxed{2}) &:= \text{on-subj-or-subcat}(\boxed{1}) \wedge \text{on-subj-or-subcat}(\boxed{2}). \\ \text{on-subj-or-subcat}(\boxed{1}) &:= \left[\text{H|SUBJ member}(\left[\text{L|C|HEAD } \boxed{1} \right]) \right] \vee \left[\text{SUBCAT member}(\left[\text{L|C|HEAD } \boxed{1} \right]) \right]. \end{aligned}$$

Figure 20: Making explicit what it means to be selected as sisters

The three-place relation *selected-as-sisters* holds if the *head* values passed as first and second argument occur on the SUBJ or SUBCAT list of the *category* that is the result argument.

The implicational statement assigning nominative case can then be reformulated as shown in figure 21. Compared to the original formalization in figure 10 on page 206

In an utterance,	<i>unembedded-sign</i>
	^
the least oblique subcategorization requirement (3) with structural case of each verb (1)	$\forall \boxed{1} \left[\begin{array}{l} \text{word} \\ \boxed{1} \left[\text{S L C} \left[\text{HEAD } \boxed{2} \left[\text{SUBJ} \left\langle \boxed{3} \left[\text{L C H} \boxed{4} \left[\text{CASE } \textit{struc} \right] \right] \right\rangle \right] \right] \right] \right] \end{array} \right]$
	^
which is not raised from that verb	$\neg \exists \boxed{5} \boxed{5} \text{selected-as-sisters}(\boxed{4}, \boxed{2})$
	→
receives nominative case.	$\boxed{3} \left[\text{L C H CASE } \textit{nom} \right]$

Figure 21: Revised nominative case assignment

there are two changes. First, the subject requirement is no longer picked out as the first

Figure 23 illustrates the analysis assigned by our revised theory to the example in which nominative case has to be assigned to a spirit.

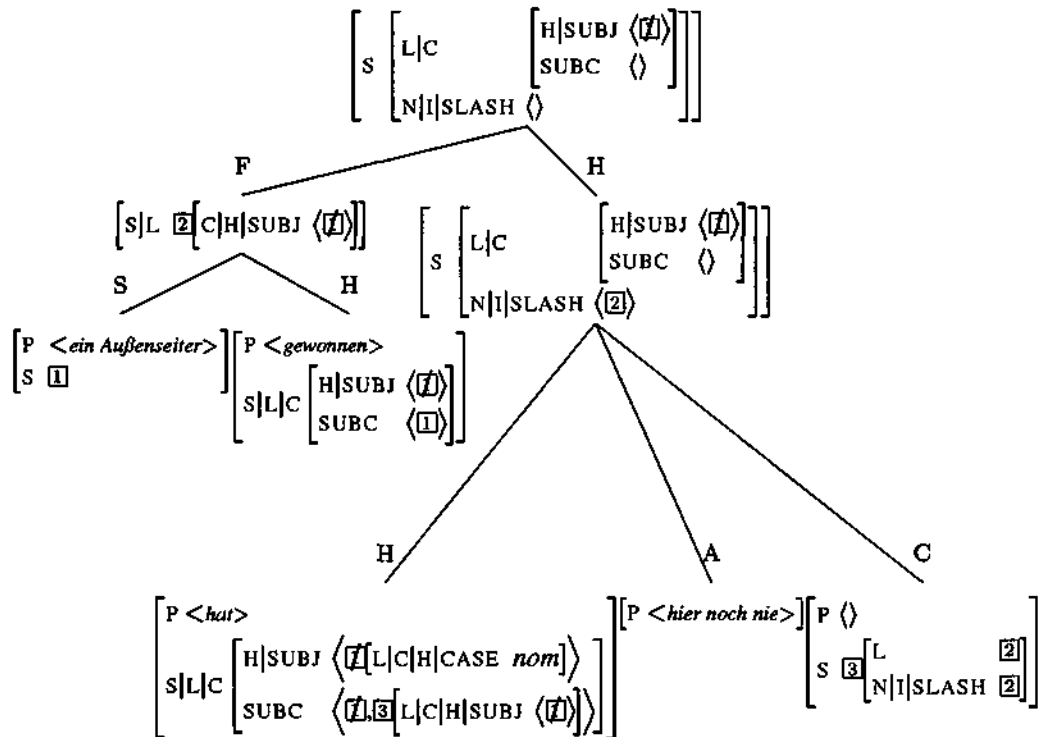


Figure 23: Revised analysis of nominative case assignment to a spirit

Starting with the fronted constituent, the fronted non-finite verb *gewonnen* is licensed by the subject integration lexical rule we defined in figure 15 on page 213. As a result, the subject requirement [I] on SUBJ, which as head value percolates along the entire fronted head projection, has a *realized* local value.

The second effect of the lexical rule is that the subject requirement [I] is also encoded as a realizable argument on the SUBCAT list. The case of the subject is not resolved with respect to the fronted verbal word since the spirit of the subject requirement [I] is raised by the subject-to-subject raising verb *hat* which thus selects both the non-finite verbal complement and the subject spirit as tested by the *selected-as-sisters* condition of the case principles. The finite verb-second element *hat* as subject-to-subject raising verb identifies the SUBJ attribute of (the trace of) its verbal complement with its own SUBJ attribute. Since the subject requirement encoded on SUBJ is not raised any further, it is assigned nominative case by our revised case principle of figure 21 on page 216.

As a finite verb, *hat* is licensed by the finitization lexical rule (figure 16 on page 213) and therefore also encodes the subject on its SUBCAT list. Since the subject requirement has a *realized* local value, though, the revised traditional subcategorization prin-

ciple (figure 19 on page 215) neither percolates this value higher, nor can it be realized. Compared to the basic raising spirits analysis of this example we discussed under figure 12 on page 208, the revised setup is more restrictive in that it does not represent the subcategorization requirement for the verbal complement (3) at the two finite phrasal mother nodes.

Turning to the accusative case example, the revised analysis is illustrated in figure 24. Just like in the nominative case example discussed above, the fronted non-finite verb

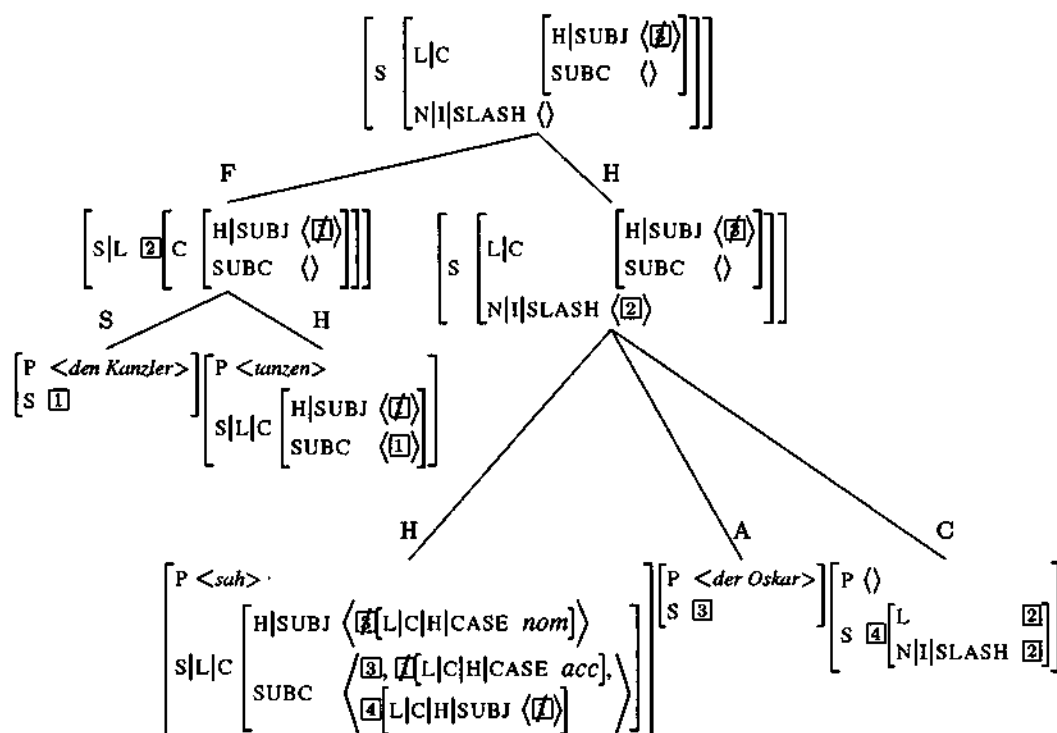


Figure 24: Revised analysis of accusative case assignment to a spirit

tanzen is licensed by the subject integration lexical rule (figure 15 on page 213), which results in the subject valence requirement being encoded both as a realizable argument on SUBCAT and as a spirit on the *head* feature SUBJ. And just as in the previous example, the subject is not assigned case with respect to the non-finite verbal word since it is selected by a raising predicate, but this time by the subject-to-object raising verb *sah*.

The finite verb-second verb *sah* is licensed by the finitivization lexical rule and thus includes its own subject as a realizable argument on SUBCAT in addition to the encoding under SUBJ to which nominative case is assigned by our case principle. The only non-subject argument with structural case on the SUBCAT list of *sah* is the raised spirit [1]. Since it is not raised further our case principle resolves its case to accusative.

4.2.4 Which properties of arguments survive as spirits?

An issue we glossed over when merging the traditional HPSG theory of control with the modified subcategorization percolation introducing spirits concerns the question which properties of an argument survive as spirit. To capture that equi verbs have to select a verbal projection with an unrealized subject, in the traditional HPSG setup the lexical entry of an equi verb selects a verbal complement having a single subcategorization requirement left. This single remaining element restriction is well-motivated since an equi verb needs to identify its subject index with that of the subject of the verbal complement – a requirement which can only be made locally if the subject requirement has not yet been realized and therefore is locally visible when the verbal complement is selected.

Under the raising spirits setup, even subjects which are realized remain visible in this way so that there is no independent motivation for having to require the first list element to bear an *unrealized* LOCAL value. Just as before, one would like this to fall out from the intuition that spirits mediate grammatical information but cannot be assigned a semantic role. This could be captured by encoding spirits as representations of selected properties only. In particular, such a selection should not include the semantic index in order to rule out the possibility of assigning a semantic role to an argument already realized as part of a complement. In the traditional HPSG setup, however, subject-verb agreement as one of the relations we showed to be mediated by spirits is expressed via the semantic index. The only way to express that the semantic index of a spirit is unavailable even though subject-verb agreement is ensured would thus be to separate the encoding of subject-verb agreement from the semantic index – an undertaking which has been argued for on independent grounds by Kathol (1999).

5 Summary

We started our investigation with the observation that for certain non-finite constructions in German it appears to be necessary to ensure non-local nominative case assignment and agreement relations. Instead of contemplating a new non-local mechanism for establishing these relations, we observed that such extended relations are only possible when mediated by a lexical element, a raising predicate. This finding was confirmed by an empirical overview of raising constructions covering subject-to-subject raising, AcI constructions analyzed as subject-to-object raising, and stative and agentive passives analyzed either as subject-to-subject or as object-to-subject raising. Taking a closer look at sentences in which several raising constructions interact, we showed that local grammatical relations like case assignment are only established on the highest subcategorization frame to which an argument could be raised. In light of the fact that these raising relations are independently motivated, the remaining question we set out to answer in the rest of this paper was how already realized subcategoriza-

tion requirements can be made visible to the traditional raising relations.

In the first of the two encodings we proposed as answers to this question, this was accomplished by modifying the traditional Subcategorization Principle of HPSG so as to mark realized complements rather than eliminating them from the list of subcategorization requirements. Since the subcategorization requirements corresponding to already realized arguments, the so-called 'spirits', are represented in the same way as ordinary subcategorization requirements (except for their local subtype), they take part in all grammatical relations without requiring further changes. They can be raised when their verbal head is selected by a raising predicate and they can be assigned case by a version of an HPSG case theory which does not make case assignment directly dependent on argument realization.

The first encoding is a general and straightforward theoretical rendition of the intuitions behind spirits. The general nature of the modified subcategorization principle treating all arguments on a par, however, has the disadvantage of eliminating the idea that selection is a local phenomenon which does not in general have access to arguments embedded inside a constituent.

As a more restrictive alternative respecting this insight, we therefore proposed a revised theory introducing only spirits of subjects. Making subjects the special case is attractive, as they have independently been argued to be visible from outside the saturated verbal projection. The existence of the linguistic representation we call subject spirits thus is the result of the interaction of two independently motivated linguistic observations. First, the observation that (at least certain properties of) subjects are visible when looking at a saturated verbal projection. And second, the existence of raising verbs as a special lexical class of verbs establishing local links to the subject requirements of their verbal complements.

While the formalization we provide of the raising spirits idea can surely be improved on, the idea of subject spirits appears to be a valuable concept in that it shows that one can reduce the apparently non-local variants of case assignment and subject-verb agreement to an interaction of the traditional local variants of these relations with the raising relations introduced by a well-established lexical class of verbs.

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