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Perfect and periphrastic passive constructions in Danish

Anne Bjerre & Tavs Bjerre

This paper gives an account of the event and argument structure of past participles, and the linking between argument structure and valence structure. It further accounts for how participles form perfect and passive constructions with auxiliaries. We assume that the same participle form is used in both types of construction. Our claim is that the valence structure of a past participle is predictable from its semantic type, and that the valence structure predicts which auxiliary a past participle combines with in perfect constructions and whether the past participle may occur in passive constructions. Our approach sets itself apart from similar approaches, cf. e.g. Heinz & Matiasek (1994), Kathol (1994), Pollard (1994) and Müller (2003), with its strong emphasis on semantics.

Keywords argument structure, auxiliary selection, Danish, event structure, HPSG, participles

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1. INTRODUCTION

In Danish, verbs divide into two groups based on whether they form perfect constructions with *have* 'have' or *være* 'be'. Similarly, verbs divide into two groups based on whether or not they occur in passive constructions. The purpose of this paper is to provide an analysis which explains these observations in terms of semantic properties. The analysis is formalised within the framework of Head-Driven Phrase Structure Grammar, cf. Pollard & Sag (1994).

Other authors have discussed passive and perfect constructions in Danish. Heltoft & Jakobsen (1996) and Engdahl (2001) focus on the difference between the synthetic and periphrastic passive constructions. Jensen & Skadhauge (2001) have discussed passive and perfect constructions, focusing on topological aspects of the constructions. They are not concerned with auxiliary selection. Finally, Ørsnes & Wedekind (2003) give an account of verbal complexes including perfect and passive constructions focusing on tense and aspect properties.

An account of passive constructions and auxiliary selection in perfect constructions invariably involves the notion of unaccusativity and the division of

intransitive verbs into unaccusatives (or ergatives) and unergatives. This is because the impersonal passives, cf. e.g. Perlmutter (1978), and perfect constructions, cf. e.g. Perlmutter (1989), have been used as tests for unaccusativity, unaccusatives resisting passive constructions and selecting the *be* auxiliary in perfect constructions. We will use this verb classification as descriptive terms in the remaining part of this article.

According to the Unaccusative Hypothesis (Perlmutter 1978), intransitive verbs split into two classes, unaccusative verbs and unergative verbs, based on their different underlying structures. In Perlmutter's terminology, unaccusatives have 'an initial 2 but no initial 1' (Perlmutter 1978:160). This means that unaccusatives have an underlying object but no subject. Unergatives, on the other hand, have an underlying subject. Although the classification is based on syntactic characteristics, Perlmutter nevertheless points out that semantic factors determine the syntactic classes, e.g. unaccusatives take a patient argument whereas unergatives typically describe an activity, cf. Perlmutter (1978:162f.). Burzio (1986) adopted the Hypothesis into the Govenment-Binding framework.

Various authors have tried to determine the syntactic class semantically. Zaenen (1993), based on Dowty (1991), proposes that the argument of unaccussatives has more patient properties than agent properties, and the argument of unergatives has more agent properties than patient properties. Levin & Rappaport Hovav (1995) argue that the syntactic classification of verbs into unaccusatives and unergatives corresponds to a distinction between verbs which are externally caused and internally caused (Levin & Rappaport Hovav 1995:98). Sorace (2004) posits a hierarchy of auxiliary selection based on a hierarchy of semantic verb classes, and argues that languages may differ in where their cut-off point is in the hierarchy, resulting in variance in auxiliary selection in different languages. There may even be variance within a language for verbs around the cut off point. Sorace (2004) suggests that the same hierarchy may be a hierarchy of unaccusativity, thereby suggesting that unaccusativity is based on semantic verb classes.

In this article, we determine auxiliary selection and resistance to passive constructions semantically. However, it should be emphasised that we do not claim that the semantic classes we establish in section 4 determine the unaccussative split. The semantic classes we introduce will be seen to cut across the classes of transitive and intransitive verbs. Their purpose is to predict resistance to passivisation and auxiliary selection specifically. However, it may be that the same semantic characteristics that we focus on also have a bearing on the unaccusativity split.

Section 2 goes through a set of Danish data which shows what perfect and passive constructions are possible in Danish and consequently have to be accounted for. Section 3 reviews some previous HPSG analyses of perfect and passive constructions which all take the same point of departure in assuming that only one past participle form is used in both construction types. Section 4 presents our analysis. First, we

show the event and argument structure of different types of verb. Next, we show an analysis of co-predicates which we employ in the following sections. We then show how the argument structure links to valence structure. Then the various auxiliaries are presented and it is shown how they select different types of participle to form perfect and passive constructions. We also show how the analysis extends to constructions without auxiliaries. Finally, section 5 concludes the paper.

2. DATA

Danish has three auxiliaries that combine with past participles, *have* 'have', *være* 'be', and *blive* 'be'.[1] The distribution is as follows.

Intransitive non-motion verbs denoting a process or a state are combined with *have*:

(1) a. Ole har (*er) sovet.
Ole has is slept

b. Jens har (*er) ligget på sofaen.
Jens has is lain on sofa-the

Inchoatives are combined with *være*:

(2) a. Peter (*har) er ankommet.
Peter has is arrived

b. Peter (*har) er vågnet.
Peter has is woken up

Transitive verbs are combined with *have* when the first argument is realised as subject, and with *være* when the second argument is realised as subject, the so-called periphrastic stative passive. However, the latter option is not possible with all transitive verbs.

(3) a. Peter har spist æblet.
Peter has eaten apple-the

b. Æblet er spist.
apple-the is eaten

(4) a. Pia har kysset Jørgen.
Pia has kissed Jørgen

b. *Jørgen er kysset.[2]
Jørgen is kissed

(5) a. Pia har behøvet Jørgen.
Pia has needed Jørgen

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b. *Jørgen er behøvet.
Jørgen is needed

With motion verbs in combination with directional particles and/or PPs, only *være* is possible:[3]

(6) Hunden (*har) er løbet hjem / væk / ud i haven.
dog-the has is run home away out in garden-the

Without a directional PP, verbs of motion combine with both *være* and *have*:

(7) Peter har / er løbet.
Peter has is run

Weather verbs and other subjectless verbs combine with *have*, as shown in (8).

(8) Det har (*er) regnet.
it has is rained

Blive may combine with transitive verbs realising the second argument as subject, the periphrastic agentive passive.

(9) a. Æblet bliver spist.
apple-the was eaten

b. Bordet bliver skubbet hen i hjørnet.
table-the is pushed into corner-the

c. Jørgen bliver kysset.
Jørgen is kissed

Not all transitive verbs may form a passive with *blive*.

(10) a. *Peter bliver behøvet.
Peter is needed

b. *Hatten bliver haft.
hat-the is had

Blive does not combine with intransitive verbs except for process-denoting verbs, which may combine with *blive* with an expletive subject.

(11) a. *Peter bliver forsvundet.
Peter is disappeared

b. *Peter bliver danset.
Peter is danced

c. *Peter bliver løbet.
Peter is run

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(12) a. *Der bliver forsvundet.
there is disappeared

b. *Der bliver løbet ud i haven.
there is run out into garden-the

(13) a. Der bliver danset.
there is danced

b. Der bliver løbet.
there is run

Blive does not combine with weather verbs.

(14) *Der bliver regnet.
there is rained

3. PREVIOUS HPSG ANALYSES

3.1 Introduction

In this section we discuss various accounts of perfect and passive constructions with auxiliaries and past participles. The analyses all assume one past participle form which may occur in both perfect and passive constructions. In the following discussions, the term (syntactic) argument structure is used synonymously with valence structure.

3.2 Heinz & Matiasek (1994)

Heinz & Matiasek (1994) provide an account of the valence structure of participles and auxiliary selection in connection with perfect constructions, and agentive and stative passive constructions. They use the term (syntactic) argument structure to refer to valence structure.

Their account of argument structure is based on Haider's (1986) notion of a designated argument. They introduce the feature DA, designated argument, which takes a list of *synsem* objects as its value. The feature picks out the argument on the SUBCAT list with 'subject properties' and not 'object properties'. In entries for transitive and unergative verbs, the first element on the SUBCAT list also appears on the DA. In entries for ergative verbs, the DA list is empty.

A designated argument reduction rule is applied to base verb forms and results in past participle forms with a different argument structure. The designated argument is blocked, which means that the designated argument is removed from the SUBCAT list. The Past Participle Rule is given in (15) (Heinz & Matiasek 1994:219).

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(15) $$\left[\begin{array}{ll}\text{HEAD} & verb\left[\text{VFORM}\ bse\right] \\ \text{DA} & \boxed{1} \\ \text{SUBCAT} & \boxed{1} \oplus \boxed{2}\end{array}\right] \longmapsto \left[\begin{array}{ll}\text{HEAD} & verb\left[\text{VFORM}\ ppp\right] \\ \text{DA} & \boxed{1} \\ \text{SUBCAT} & \boxed{2}\end{array}\right]^{4}$$

The Past Participle Rule gives rise to the forms in (16)–(18) (Heinz & Matiasek 1994:220).

(16) *geschlagen* 'beaten'

$$\left[\begin{array}{ll}\text{HEAD} & verb\left[\text{VFORM}\ ppp\right] \\ \text{DA} & \left\langle \text{NP}[str] \right\rangle \\ \text{SUBCAT} & \left\langle \text{NP}[str] \right\rangle\end{array}\right]$$

(17) *geschlafen* 'slept'

$$\left[\begin{array}{ll}\text{HEAD} & verb\left[\text{VFORM}\ ppp\right] \\ \text{DA} & \left\langle \text{NP}[str] \right\rangle \\ \text{SUBCAT} & \langle\rangle\end{array}\right]$$

(18) *aufgewacht* 'woken'

$$\left[\begin{array}{ll}\text{HEAD} & verb\left[\text{VFORM}\ ppp\right] \\ \text{DA} & \langle\rangle \\ \text{SUBCAT} & \left\langle \text{NP}[str] \right\rangle\end{array}\right]$$

NP[*str*] means an NP with structural case, an NP which is assigned case according to which structure it ends up in. This is in contrast to case being lexically specified. In (16) the NP[*str*] on the SUBCAT list is the 'object' NP, and the NP[*str*] on the DA list the 'subject' NP of the active form. See Meurers (1999) for a description of case assignment in German.

These participle forms are selected by auxiliaries to form perfect and passive constructions, and their different valence structures determine whether the participle forms can occur in passive constructions of which Heinz & Matiasek assume two types, the agentive passive and the stative passive. They also discuss dative passives, which we will not be concerned with here.

The perfect auxiliaries select a past participle. The entry for the perfect auxiliaries *haben* and *sein* is shown in (19) (Heinz & Matiasek 1994:221).

(19) $$\left[\begin{array}{ll}\text{DA} & \boxed{1} \\ \text{SUBCAT} & \boxed{1} \oplus \boxed{2} \oplus \left\langle \left[\text{LOC} \mid \text{CAT} \left[\begin{array}{ll}\text{HEAD} & verb\left[\text{VFORM}\ ppp\right] \\ \text{LEX} & + \\ \text{DA} & \boxed{1} \\ \text{SUBCAT} & \boxed{2}\end{array}\right]\right] \right\rangle\end{array}\right]$$

In effect, the auxiliary reinserts the designated argument on its SUBCAT list together with the SUBCAT list of the participle complement. The subject of the participle

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becomes the subject of the auxiliary either via the participle's SUBCAT list (ergatives) or via the DA list. Heinz & Matiasek do not distinguish between the two auxiliaries, but they nevertheless anticipate that a distinction can be encoded in the lexical entries of the auxiliaries *sein* and *haben*, so that *sein* selects participles with an empty DA list, and *haben* selects all other participles. They further assume that it is lexically specified whether participles follow this default selection or are selected by a non-default auxiliary, encoded with an AUXFORM feature. See Bouma (1992) for a description of a default mechanism in typed feature structures.

The default rules account for the perfect auxiliary selection in (20).

(20) a. Peter hat Paul geschlagen.
Peter has beaten Paul

b. Peter hat geschlafen.
Peter has slept

c. Peter ist aufgewacht.
Peter has woken

Heinz & Matiasek claim that auxiliary selection in perfect constructions follows these rules and cannot be given a semantic explanation. They give the semantically equivalent examples in (21) to show that the selection cannot be asscociated with semantic properties (Heinz & Matiasek 1994:222).

(21) a. Hans hat Maria geholfen.
Hans$_{NOM}$ has Maria$_{DAT}$ helped
'Hans helped Maria.'

b. Hans ist Maria zu Hilfe gekommen.
Hans$_{NOM}$ ist Maria$_{DAT}$ to aid come
'Hans came to Maria's aid.'

However, as we show in section 4, these two verbs differ in which verb class they belong to even though they are semantically related, and this explains the difference in auxiliary selection. *Helfen* is an activity verb whereas (*zu Hilfe*) *kommen* is a metaphorical directional motion verb.

Turning now to Heinz & Matiasek's treatment of passives, they propose that the same participle forms can be used to form passive constructions. They distinguish between an agentive and a stative passive. The agentive passive is formed by a past participle preceded by the auxiliary *werden*. Agentive passives can be formed with participles which have a designated argument, i.e. a non-empty DA list,[5] as shown in the lexical entry for *werden* in (22) (Heinz & Matiasek 1994:224).

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(22)
$$\left[\begin{array}{ll} \text{HEAD} & \left[\text{AUXFORM } \textit{sein}\right] \\ \text{DA} & \langle\rangle \\ \text{SUBCAT} & \boxed{1} \oplus \left\langle \left[\text{LOC} \mid \text{CAT} \left[\begin{array}{ll} \text{HEAD} & \textit{verb}\left[\text{VFORM } \textit{ppp}\right] \\ \text{LEX} & + \\ \text{DA} & \langle \textit{synsem} \rangle \\ \text{SUBCAT} & \boxed{1} \end{array}\right]\right] \right\rangle \end{array}\right]$$

This correctly predicts that ergative participles do not occur in agentive passives, as they have an empty DA list. It further specifies that it is the 'object' of the transitive participle that appears as subject of the auxiliary as it is raised to the auxiliary's SUBCAT list. The unergative participles have an empty SUBCAT list and an impersonal passive results.

Another entry for *sein* is assumed to form stative passive constructions. This entry is shown in (23) (Heinz & Matiasek 1994:227).

(23)
$$\left[\begin{array}{ll} \text{DA} & \langle\rangle \\ \text{SUBCAT} & \boxed{1} \oplus \left\langle \left[\text{LOC} \mid \text{CAT} \left[\begin{array}{ll} \text{HEAD} & \textit{verb}\left[\text{VFORM } \textit{ppp}\right] \\ \text{LEX} & + \\ \text{SUBCAT} & \boxed{1} \end{array}\right]\right] \right\rangle \end{array}\right]$$

This entry predicts that stative passives can be formed with all three types of participle, as no specific constraints are expressed on neither the DA or SUBCAT list. For transitive participles, the object appears as subject of the auxiliary. For ergatives, the subject of the participles appears as subject of the auxiliary. It also predicts that, for unergatives, an impersonal stative passive results, as the SUBCAT list is empty and no subject is available.

Heinz & Matiasek's analysis makes a number of wrong predictions. Not all transitive participles occur in passive constructions, and an example such as (24) is questionable, cf. note 1.

(24) ?Sie ist geküsst.
she is kissed

The analysis also does not explain why unergative motion verbs may form perfect constructions with both *haben* and *sein*, as in (25).

(25) a. Er hat getanzt.
he has danced

b. Er ist durch den Wald getanzt.
he is through the woods danced
'He has danced through the woods.'

Getanzt is unergative and perfect *sein* does not select unergative participles to form perfect constructions.

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Finally, the syntactic analysis without augmentation of semantic theory allows all transitive verbs to form agentive passive construction.

3.3 Müller (2003)

Müller (2003)[6] modifies and extends Heinz & Matiasek (1994) to give an account of passive and perfect constructions, including modal infinitive constructions based on one lexical entry for the participle and *zu* infinitive form respectively.[7] Here we will not be concerned with modal infinitive constructions.

Müller further modifies Heinz & Matiasek's analysis by regarding the DA feature to be a head feature and further introducing the SUBJ list (as a head feature) containing the subject of non-finite verb forms following Borsley (1989) and Pollard (1996).

Müller's lexical rule for past participles is given in (26) (Müller 2003:288).

(26)
$$\left[\text{SYNSEM} \mid \text{LOC} \mid \text{CAT}\left[\begin{array}{ll}\text{HEAD} & \left[\begin{array}{ll}\text{DA} & \boxed{1}\\ \textit{verb} & \end{array}\right]\\ \text{SUBCAT} & \boxed{1} \oplus \boxed{2}\end{array}\right]\right] \longmapsto$$

$$\left[\text{SYNSEM} \mid \text{LOC} \mid \text{CAT}\left[\begin{array}{ll}\text{HEAD} & \left[\begin{array}{ll}\text{VFORM} & \textit{ppp}\\ \text{SUBJ} & \boxed{1}\\ \textit{verb} & \end{array}\right]\\ \text{SUBCAT} & \boxed{2}\end{array}\right]\right]$$

The designated argument of the input base form verb becomes the subject of the non-finite form. It is blocked and therefore removed from the SUBCAT list. The SUBCAT list is also represented on the output participles. The rule results in the participle forms in (27)[8] (Müller 2003:288).

(27)

	SUBJ	SUBCAT
a. angekommen (unacc) (*arrived*):	⟨⟩	⟨NP[*str*]⟩
b. getanzt (unerg) (*danced*):	⟨NP[*str*]⟩	⟨⟩
c. aufgefallen (unacc) (*noticed*):	⟨⟩	⟨NP[*str*], NP[*ldat*]⟩
d. geliebt (unerg) (*loved*):	⟨NP[*str*]⟩	⟨NP[*str*]⟩
e. geschenkt (unerg) (*given*):	⟨NP[*str*]⟩	⟨NP[*str*], NP[*ldat*]⟩
f. geholfen (unerg) (*helped*):	⟨NP[*str*]⟩	⟨NP[*ldat*]⟩

The passive auxiliary *werden* selects participles with a designated argument, as in Heinz & Matiasek's analysis. The entry for *werden* is shown in (28) (Müller 2003:289).

(28) *werd-* (Passive Auxiliary)

$$\left[\begin{array}{ll}\text{HEAD} \mid \text{DA} & \langle\rangle\\ \text{SUBCAT} & \boxed{1} \oplus \left\langle \text{V}\left[\textit{ppp}, \text{DA}\left\langle \text{NP}[\textit{str}]_{\textit{ref}} \right\rangle, \text{SUBCAT } \boxed{1}\right]\right\rangle\end{array}\right]$$

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The entry prevents unaccusatives from appearing in passive constructions as they have empty DA lists.

The entry for the auxiliary *haben* is shown in (29) (Müller 2003:290).

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

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

The perfect auxiliary de-blocks the designated argument of the participle which is encoded by the SUBJ feature.

The entry for the auxiliary *sein* is shown in (29) (Müller 2003:290).

(30) *sein* (Perfect Auxiliary and Auxiliary for Modal Infinitive Constructions)

$$\left[\begin{array}{l}\text{HEAD} \mid \text{DA} \ \langle\rangle \\ \text{SUBCAT} \quad \boxed{1} \oplus \left\langle \text{V}\left[\textit{ppp}, \text{SUBCAT}\ \boxed{1}\right]\right\rangle\end{array}\right]$$

The auxiliary *sein* does not de-block the designated argument, only the SUBCAT list is raised to the auxiliary. This entry is for the selection of unaccusative participles like *ankommen* and *auffallen*, which do not have blocked arguments, cf. Müller (2003:290).

Müller's analysis, without semantics, has the same problem in accounting for the fact that not all transitive verbs have a parallel construction with the object appearing as subject of the 'be' perfect auxiliary, cf. (24). Also, Müller does not provide an explanation of alternations like those in (25). However, the main problem, from our perspective, is that the entries for the perfect auxiliaries *haben* and *sein* do not seem to ensure that unaccusative and unergative participles are selected by the correct auxiliary, as both entries may select both types of participle. However, see Müller (2002), who argues that auxiliaries are not relevant for the unaccusative/unergative distinction.

3.4 Kathol (1994)

Kathol (1994:7.3.3) proposes an analysis of perfect constructions and the agentive passive construction. The basic idea is to let participles have a passive argument structure, and then have the perfect auxiliary recover the active argument structure. A feature EXT encodes the argument which is the subject in the corresponding active form. He proposes the entries in (31)–(33) for the three types of participle.[9,10]

(31) *geliebt* 'loved'

$$\left[\begin{array}{ll}\text{SUBJ} & \left\langle \text{NP[ACC]} \right\rangle \\ \text{COMPS} & \langle\rangle \\ \text{EXT} & \left\langle \text{NP[NOM]} \right\rangle\end{array}\right]$$

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(32) *geschlafen* 'slept'

$$\begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \langle\rangle \\ \text{EXT} & \langle \text{NP[NOM]} \rangle \end{bmatrix}$$

(33) *angekommen* 'arrived'

$$\begin{bmatrix} \text{SUBJ} & \boxed{1}\langle \text{NP[NOM]} \rangle \\ \text{COMPS} & \langle\rangle \\ \text{EXT} & \boxed{1} \end{bmatrix}$$

Participles which have SUBJ and EXT features with different values form perfect constructions with *haben*, as the valence specification for *haben* 'have' in (34) shows.[11]

(34) *haben*

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

constraint: $\boxed{2} \neq \boxed{3}$

The argument on the EXT list appears as the subject of the auxiliary and the argument on the SUBJ list appears as the complement of the auxiliary, and an active argument structure results. The ergative participle cannot form perfect with *haben* as its SUBJ and EXT value is structure-shared. Instead, it forms a perfect construction with *sein*, in which it is specified that the participle complement must have identical SUBJ and EXT value. The entry for *sein* 'be' is shown in (35).

(35) *sein*

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

The participles which can form passive constructions with *werden* 'be' are those which have an accusative argument on the SUBJ list, i.e. the transitive participles. The entry for *werden* is given in (36).

(36) *werden*

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

The NP on the SUBJ list of the participle becomes the subject of the auxiliary, i.e. the passive argument structure is maintained. It should be noted that only the index of

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the two NPs is structure-shared, which makes it possible to change the case value of the raised NP to nominative.

Kathol does not cover impersonal passives or stative passives in this analysis.

Just as Heinz & Matiasek's analysis, Kathol's analysis does not account for unergative motion verbs which may form perfect constructions with both *haben* and *sein*, repeated here as (37).

(37) a. Er hat getanzt.
he has danced

b. Er ist durch den Wald getanzt.
he is through the woods danced
'He has danced through the woods.'

According to the analysis, the unergative may not form perfect with *sein*, as *sein* requires the SUBJ list and the EXT list of the participle to be identical.

Finally, without a semantic theory, the analysis predicts that all transitive verbs may form the agentive passive construction.

3.5 Pollard (1994)

Pollard (1994) aims to give a unified account of passive in German. His account is based on Borsley's valence feature analysis (Borsley 1989, 1990) and Kathol's ERGATIVE feature (Kathol 1991). The ERG feature encodes the subject of ergative verbs and the accusative object of transitive verbs. Unlike the other analyses, Pollard retains an active argument structure for participles with the subject of the active sentence appearing on the SUBJ list. He proposes the hypothesis that 'passivization in German is disallowed in case the SUBJ and ERG values of the participle are one and the same structural NP' (Pollard 1994:282).

The syntactic argument structures for the three basic types of participle are shown in (38)–(40) (Pollard 1994:280).[12]

(38) *geschlagen* 'beaten'

$$\begin{bmatrix} \text{COMPS} & \langle \boxed{1} \rangle \\ \text{SUBJ} & \langle \text{NP}[str] \rangle \\ \text{ERG} & \langle \boxed{1}\,\text{NP}[str] \rangle \end{bmatrix}$$

(39) *geschlafen* 'slept'

$$\begin{bmatrix} \text{COMPS} & \langle\rangle \\ \text{SUBJ} & \langle \text{NP}[str] \rangle \\ \text{ERG} & \langle\rangle \end{bmatrix}$$

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(40) *angekommen* 'arrived'

$$\begin{bmatrix} \text{COMPS} & \langle\rangle \\ \text{SUBJ} & \langle \boxed{1} \rangle \\ \text{ERG} & \langle \boxed{1}\,\text{NP}[str] \rangle \end{bmatrix}$$

Transitive and ergative participles group together in having a non-empty ERG list. Unergatives have an empty ERG list.

German passive is formed by the auxiliary *werden* followed by a past participle. The entry for *werden* is given in (41) (Pollard 1994:291).

(41) *werden*

$$\begin{bmatrix} \text{HEAD VERB}[bse] & \\ \text{SUBJ} & \boxed{2} \\ \text{ERG} & \boxed{2} \\ \text{COMPS} & \boxed{3} \oplus \left\langle \begin{bmatrix} \text{HEAD} & verb\left[pastpart\right] \\ \text{SUBJ} & \langle \text{NP}[str]_{ref} \rangle \\ \text{ERG} & \boxed{2} \\ \text{COMPS} & \boxed{2} \oplus \boxed{3} \end{bmatrix} \right\rangle \end{bmatrix}$$

The selection specified for *werden* gives rise to a personal passive if the participle is transitive. The argument which is on the ERG list and the COMPS list is the object and it appears as the subject of the auxiliary. It gives rise to an impersonal passive if the participle is unergative. The ERG and COMPS lists are empty, and no subject is available for the auxiliary, resulting in an impersonal passive. Ergative participles do not satisfy the constraint that the element on the ERG list and the first element on the COMPS list are the same, and they cannot form passives. Participles which have SUBJ and ERG values which are the same structural NP will not have the element on the ERG list as the first element on the COMPS list.

Pollard's analysis does not include an account of stative passives or perfect constructions.[13] The analysis also predicts that all transitive verbs may form agentive passive construction.

A problem with Pollard's analysis is that it does not account for constructions in which the past participle occurs without an auxiliary. This is because the participles have an active argument structure with the argument surfacing as subject of an active sentence on the SUBJ list, whereas the object is on the COMPS list. Müller (2000:250) notes this and refers to the examples in (42) as problematic for the analysis.

(42) a. weil er die Äpfel gewaschen ißt
because he the apples washed eats
'because he eats the apples washed'

b. So lange gilt die 39-Jährige als nicht suspendiert.
so long counts the 39 year old as not suspended
'The 39-year-old woman is regarded as suspended for this period.'

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In these examples the 'object' appears as subject of the participle, but there is no auxiliary to change the argument structure. The previous analyses do not have this problem as they posit a passive argument structure for the participles.

3.6 Ruy (2002)

Ryu (2002) argues against the traditional dichotomous classification of intransitive verbs into unaccusatives and unergatives. He bases his argumentation on four unaccusative diagnostics frequently discussed in the literature which give rise to the distinction between unaccusatives and unergatives. The diagnostics and their results are shown in (43) (Ryu 2002:520).

(43)

Unaccusative phenomena	Unergative verbs e.g. *arbeiten* 'to work'	Unaccusative verbs e.g. *ankommen* 'to arrive'
auxiliary selection	*haben* 'to have'	*sein* 'to be'
impersonal passive	yes	no
prenominal attribute	no	yes
agent nominalisation	yes (*-er*/*-or* in German)	no (*-ling* in German)

Ryu (2002) points out that this two-way classification does not hold for German and gives examples of a number of unaccusative mismatches found in German. Examples of such mismatches are given in (44) and (45) (Ryu 2002:521).

(44) a. Es hat gestern geregnet / geblüht / geblutet.
there has yesterday rained bloomed bled

b. Es wurde gestern *geregnet / *geblüht / *geblutet.
there was yesterday rained bloomed bled

(45) a. Der Junge ist im Wald / durch den Wald gelaufen.
the boy is in-the forest through the forest run
'The boy has run in the forest/through the forest.'

b. Es wird im Wald / durch den Wald gelaufen.
it is in-the forest through the forest run

As *regnen*, *blühen*, and *bluten* select *haben*, they should also occur in impersonal passive constructions, but they do not. Likewise, as *laufen* selects the auxiliary *sein*, it should not occur in an impersonal passive construction, but it does.

To account for the German unaccusative mismatches, Ryu proposes a four-way rather than a two-way classification of intransitive verbs (Ryu 2002:521).[14]

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(46)

Split-Intransitivity phenomena	*arbeiten*/*tanzen* 'to work/dance'	*ankommen* 'to arrive'	*laufen*/*tanzen*+PP 'to run/dance to'	*regnen* 'to rain'
auxiliary selection	*haben*	*sein*	*sein*	*haben*
impersonal passive	yes	no	yes	no
prenominal attribute	no	yes	yes	no
agent nominalisation	yes	no	yes	no

The four types of verb are formally distinguished by their different argument structure. Ryu (2002) introduces 'The Structured Argument Structure' to enable the classification. The structured argument structure differs from traditional HPSG argument structure in singling out an external and an internal argument on two additional lists.

The four different argument structures result from the thematic structure of a verb and a set of pre-linking constraints (Ryu 2002:524f.). The four types are shown in (47) (Ryu 2002:525).

(47) a. Verbs of type 1

$$\begin{bmatrix} \text{ARG-ST} & \begin{bmatrix} \text{E-ARG} & \langle \boxed{1} \rangle \\ \text{I-ARG} & \langle\rangle \\ \text{ARG-L} & \langle \boxed{1}, \ldots \rangle \end{bmatrix} \end{bmatrix}$$

b. Verbs of type 2

$$\begin{bmatrix} \text{ARG-ST} & \begin{bmatrix} \text{E-ARG} & \langle\rangle \\ \text{I-ARG} & \langle \boxed{1} \rangle \\ \text{ARG-L} & \langle \boxed{1}, \ldots \rangle \end{bmatrix} \end{bmatrix}$$

c. Verbs of type 3

$$\begin{bmatrix} \text{ARG-ST} & \begin{bmatrix} \text{E-ARG} & \langle \boxed{1} \rangle \\ \text{I-ARG} & \langle \boxed{1} \rangle \\ \text{ARG-L} & \langle \boxed{1}, \ldots \rangle \end{bmatrix} \end{bmatrix}$$

d. Verbs of type 4

$$\begin{bmatrix} \text{ARG-ST} & \begin{bmatrix} \text{E-ARG} & \langle\rangle \\ \text{I-ARG} & \langle\rangle \\ \text{ARG-L} & \langle \boxed{1}, \ldots \rangle \end{bmatrix} \end{bmatrix}$$

Arbeiten 'to work' is a type 1 verb. *Ankommen* 'to arrive' is a type 2 verb. *Tanzen*+PP 'to dance to' is a type 3 verb. *Regnen* 'to rain' is a type 4 verb.

Verbs of type 1 are subtypes of the relation *act* or *cause*, and the value of the external argument and the first element of the ARG-L list are structure-shared. Verbs of type 2 are subtypes of the relation *affected*, and the value of the internal argument and the first element of the ARG-L list are structure-shared. Verbs of type 3 are subtypes of both *act* and *affected*, and the value of both the external, the internal argument and the first element of the ARG-L list are structure-shared. Finally, verbs of type 4 are not subsumed by any of the relation types mentioned in the constraints, and their external and internal argument lists are empty.[15] According to Ryu (2002), verbs of types 2 and 3 are unaccusatives, and their occurrence with the auxiliary *sein* is explained by the fact that their internal argument and the first element of their ARG-L lists are structure-shared.

Ryu (2002) does not include an account of transitive verbs and (agentive) passive constructions.

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There is a problem with the four-way classification. According to Ryu (2002), there is a mismatch between auxiliary selection and the ability to occur as a prenominal attribute in (48) (Ryu 2002:521).

(48) a. Der Junge **ist** im Wald gelaufen.
the boy is in-the forest run

b. *Der im Wald gelaufene Junge.
the in-the forest run boy

However, Ryu's four-way classification does not account for verbs which select *sein* but do not occur as prenominal attribute. *Laufen* 'run' does not seem to fit into any of the groups. It selects *sein*, but does not occur as prenominal attribute.

Also, according to the analysis only verbs which denote acts or causes are accounted for as verbs selecting *haben* in perfect constructions. The examples in (49), denoting states, are not accounted for.

(49) a. Peter hat hier gewohnt.
Peter has lived here

b. Peter hat existiert.
Peter has existed

3.7 Concluding remarks

In this section we have outlined various accounts of valence and argument structure in connection with the past participle form and its occurrence in perfect and passive constructions.

Heinz & Matiasek (1994) and Kathol (1994) provide no account of unergative motion verbs which may occur with a different perfect auxiliary in directional and non-directional contexts, respectively. Ryu (2002) does account for this, but the verb *laufen* 'run', which selects *sein* 'be' in both contexts, is not accounted for.

The analysis which Heinz & Matiasek (1994) propose does not differentiate between types of transitive verb and allows all transitive participles to occur in stative passive constructions.

Heinz & Matiasek (1994), Müller (2003), Kathol (1994) and Pollard (1994) allow transitive verbs to occur in agentive passive constructions, and do not rule out stative verbs in this construction type.

The two latter problems may be solved by augmenting the accounts with semantics.

As no distinction is made between the participle in perfect and passive constructions in these accounts, it is a problem for Pollard (1994), who assumes that the past participle has an active valence structure, to explain the auxiliary-free constructions in which the participle typically has a passive valence structure.

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In spite of these problems with the uniform perfect/passive account, we think it is worthwhile pursuing the idea behind these approaches.

The analyses presented here show that the broader the empirical scope is, the less uniform the analyses are. In the remaining part of this article we want to put forward an analysis which solves at least some of the problems that the analyses in this section have been shown to pose.

Ryu (2002) sets itself apart from the other analyses discussed in this section by motivating his syntactic verb classification semantically. We believe that semantics is central to an analysis of auxiliary selection, and we will now show our analysis, which is based on a semantic classification of verbs. Our analysis has greater empirical coverage and, based on event decomposition, it provides a natural explanation of the ideas expressed in Ryu's structured argument structure.

4. PROPOSAL

The central claim in our proposal below is that verbs split into a number of semantic classes reflected in their event and argument structure, and that the auxiliaries *have* 'have', *være* 'be', and *blive* 'be' select co-predicates based on these classes.[16]

4.1 Situations and argument structure

Predicates denote situations. Situations split into simple situations, a process or a state, and complex situations, where a process results in (the coming about of) another situation, a state in most cases. The sentences in (50) denote simple situations, a process, and a state, respectively.

(50) a. Ole løb.
Ole ran

b. Ole hadede sin lærer.
Ole hated his teacher

The sentences in (51)–(53) denote complex situations.

(51) a. Bogen forsvandt.
book-the disappeared

b. Tigeren døde.
tiger-the died

c. Peter kom ud i haven.
Peter came out in garden-the

(52) a. Peter fjernede bogen.
Peter removed book-the

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b. Peter dræbte tigeren.
Peter killed tiger-the

c. Peter fik bordet ud i haven.
Peter got table-the out i garden-the

(53) a. Peter spiste æblet.
Peter ate apple-the

b. Peter løb tigeren til døde.
Peter ran tiger-the to death

c. Peter skubbede bordet ud i haven.
Peter pushed table-the out in garden-the

The structures in (51) are inchoatives denoting situations in which an unspecified process causes the coming about of a result state. The structures in (52) are causatives. Also in this case the process is unspecified, but here we have an actor of the unspecified process; for instance, (52c) says that Peter did something causing the table to be in the garden. This description is satisfied by a situation in which he carries or pushes it out, a situation in which someone else does it on his order, a situation in which he by the power of his thinking can get it out there, etc. The structures in (53) also have a result state. What sets them apart from the structures in (52) is that in this case the causing process is specified.

The idea of decomposing event structure goes back at least to Lakoff (1965) and McCawley (1968), and is employed in combination with the Vendlerian classification (Vendler 1957) in Dowty (1979) and Levin & Rappaport Hovav (1995) among many others.

Part of the lexical entry for *løb-* 'run' is shown in (54).[17]

(54) *løb-* 'run'

$$\begin{bmatrix} \text{CAT} \begin{bmatrix} \text{HEAD} & \textit{verb} \\ \text{CO-PRED} & \langle\rangle \end{bmatrix} \\ \text{CONT} \begin{bmatrix} \textit{simple-situation} \\ \text{SIT1} \quad \textit{run-rel} \end{bmatrix} \end{bmatrix}$$

This representation says that *løb-* is a verb denoting a simple run situation, a process. The empty CO-PRED list means that this verb cannot combine with a co-predicate. The variant *løbe* that combines with a PP co-predicate is licensed by a lexical rule, cf. (75) below.

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Part of the lexical entry for *forsvind-* 'disappear' is shown in (55).

(55) *forsvind-* 'disappear'

$$\begin{bmatrix} \text{CAT} \begin{bmatrix} \text{HEAD} & \textit{verb} \\ \text{CO-PRED} & \langle\rangle \end{bmatrix} \\ \text{CONT} \begin{bmatrix} \textit{complex-situation} \\ \text{SIT1} \ \textit{fully-unspec-rel} \\ \text{SIT2} \ \textit{disappeared-rel} \end{bmatrix} \end{bmatrix}$$

Some unspecified process (*fully-unspec*(*ified*)-*rel*(*ation*)) results in the state of something being disappeared.

Part of the lexical entry for *dræb-* 'kill' is shown in (56).

(56) *dræb-* 'kill'

$$\begin{bmatrix} \text{CAT} \begin{bmatrix} \text{HEAD} & \textit{verb} \\ \text{CO-PRED} & \langle\rangle \end{bmatrix} \\ \text{CONT} \begin{bmatrix} \textit{complex-situation} \\ \text{SIT1} \ \textit{unspec-act-rel} \\ \text{SIT2} \ \textit{dead-rel} \end{bmatrix} \end{bmatrix}$$

Some unspecified process with an actor argument results in the state of something being dead.

(57) shows part of the lexical entry for *spis-* 'eat'.

(57) *spis-* 'eat'

$$\begin{bmatrix} \text{CAT} \begin{bmatrix} \text{HEAD} & \textit{verb} \\ \text{CO-PRED} & \langle\rangle \end{bmatrix} \\ \text{CONT} \begin{bmatrix} \textit{complex-situation} \\ \text{SIT1} \ \textit{eat-rel} \\ \text{SIT2} \ \textit{consumed-rel} \end{bmatrix} \end{bmatrix}$$

In this case, the process of eating results in the state of something being eaten.

We assume that semantic relations come with a fixed number of arguments no matter in which context they turn up. An eating situation, for instance, always has two arguments, an entity eating and an entity being consumed, an actor and an undergoer. We are inspired by Davis (2001), though many details differ (cf. Bjerre 2003b). Semantic arguments are not specified in the individual lexical entries, but licensed by constraints on relations, cf. (60) below.

Semantic roles are introduced as features on relations, as shown in the hierarchy in (58). This hierarchy is further expanded in (61) and (62).

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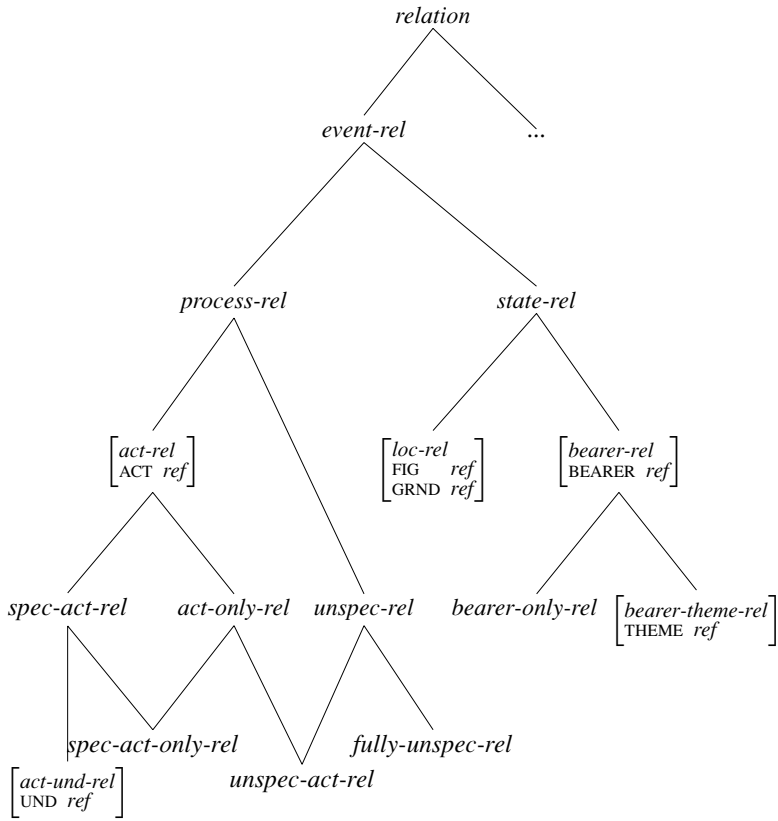
(58)



The type *relation* splits into *event-rel*(*ation*) and other relations not treated here. *Event-rel* splits into *process-rel* and *state-rel*. *Process-rel* splits into *act-rel* and *unspec-rel*. *Act-rel* has an ACTOR feature. The value of type *ref* indicates a referential index, i.e. an index referring to a semantically contentful argument. This is opposed to indices for expletives. *Act-rel* splits into an *act-only-rel*, which has only an actor, and *act-und-rel*, which has the additional feature UND(ERGOER). *Unspec-rel* has two subtypes *unspec-act-rel* which is also a subtype of *act-only-rel* and *fully-unspec-rel*. *State-rel* splits into *loc*(*ation*)*-rel* with the features FIGURE and GROUND, and *bearer-rel* with a BEARER feature splitting into *bearer-only-rel* and *bearer-theme-rel* with an additional THEME feature.

We further introduce a feature SEM(ANTIC)-ARG(UMENTS) for the type *psoa*, the supertype of both *situation* and *relation*, taking a list of synsem-objects as value.[18]

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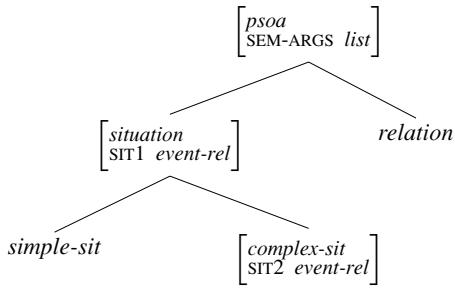
(59)



Each type of *relation* is subject to a constraint that specifies how many (semantic) arguments the *relation* in question has, and which semantic roles these arguments fulfill. This is shown in (60).

(60) *fully-unspec-rel* ⟶ [SEM-ARGS ⟨⟩]

act-rel ⟶ [SEM-ARGS ⟨[LOC | CONT | INDEX 1] | *list*⟩, ACT 1]

act-only-rel ⟶ [SEM-ARGS ⟨[ ]⟩]

act-und-rel ⟶ [SEM-ARGS ⟨[ ], [LOC | CONT | INDEX 1]⟩, UND 1]

loc-rel ⟶ [SEM-ARGS ⟨[LOC | CONT | INDEX 1], [LOC | CONT | INDEX 2]⟩, FIG 1, GRND 2]

bearer-rel ⟶ [SEM-ARGS ⟨[LOC | CONT | INDEX 1] | *list*⟩, BEARER 1]

bearer-only-rel ⟶ [SEM-ARGS ⟨[ ]⟩]

bearer-theme-rel ⟶ [SEM-ARGS ⟨[ ], [LOC | CONT | INDEX 1]⟩, THEME 1]

(60) says that a *fully-unspec-rel* has no semantic arguments, an *act-rel* has as its first semantic argument an ACT(OR), which is the first element on the SEM-ARGS list. An *act-only-rel* has only this element on its SEM-ARGS list, while an *act-und-rel* has an additional element co-indexed with the UNDERGOER-feature. A *loc-rel* has two arguments, a FIGURE and a GROUND, in that order. A *bearer-rel* has either only a BEARER argument, *bearer-only-rel*, or a BEARER and a THEME argument, *bearer-theme-rel*.

All event relations are subtypes of one of these linking-types and inherit the constraints. (61) is a further specification of the *process-rel* part of (58) combining information on linking with information on whether the relations express motion or

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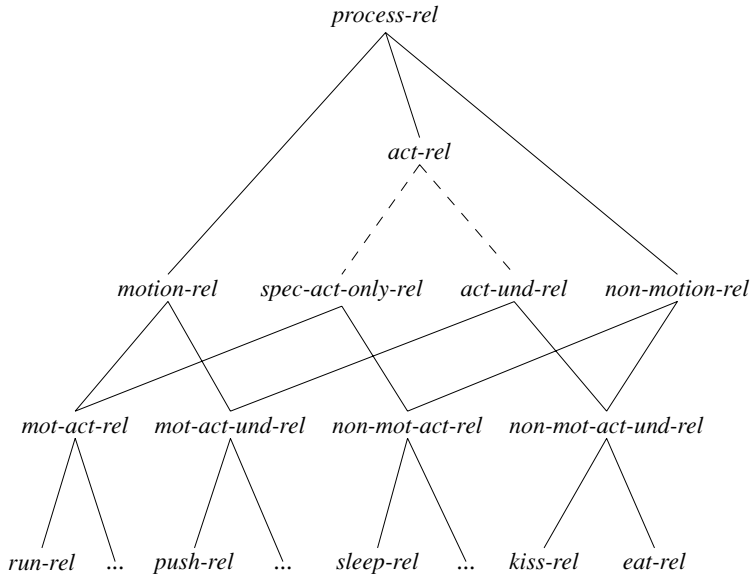
not. This latter information will be relevant in connection with resultatives treated in the following section.

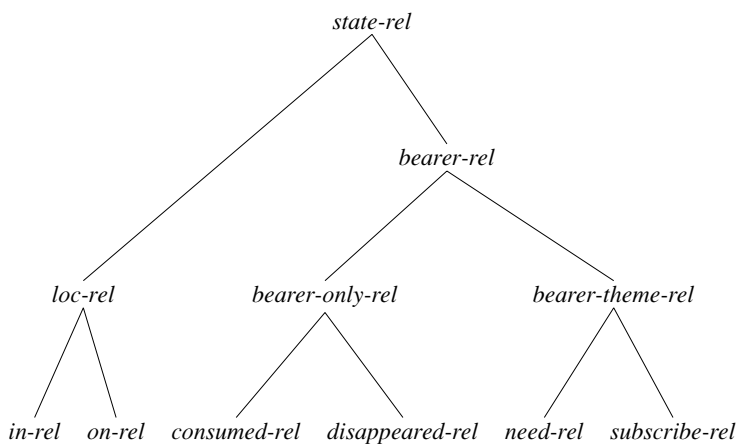
(61)



Thus, *run-rel* expresses motion and is a subtype of *spec-act-only-rel* and therefore has one element on the SEM-ARGS list co-indexed with the ACT-feature. *Push-rel* also expresses motion but is a subtype of *act-und-rel* and has two semantic arguments, an ACTOR and an UNDERGOER; *kiss-rel* does not express motion; etc. Broken lines indicate that intermediate types have been left out.

Part of the hierarchy of states is shown in (62).

(62)



In-rel is a subtype of *loc-rel* and has, according to (60), two semantic arguments, a figure and a ground; *consumed-rel* has one argument; a bearer; etc.

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As mentioned above it is not just *relation* but also *situation* that has a SEM-ARGS list. The SEM-ARGS list of a *situation* is the concatenation of the SEM-ARGS lists of the subevents in that *situation*. This is trivial for words denoting simple situations. In a sentence like *Peter walks*, the *walk-rel* has one ACTOR-argument, and so has the *simple-situation*. This is expressed in (63).

(63) $\left[\begin{array}{l} \textit{word} \\ \text{SS} \mid \text{LOC}\left[\begin{array}{l} \text{CAT} \mid \text{CO-PRED}\langle\rangle \\ \text{CONT } \textit{simple-situation} \end{array}\right] \end{array}\right] \longrightarrow$

$\left[\text{SS} \mid \text{LOC} \mid \text{CONT}\left[\begin{array}{l} \text{SEM-ARGS } \boxed{1} \\ \text{SIT1} \mid \text{SEM-ARGS } \boxed{1} \end{array}\right]\right]$

The top-level SEM-ARGS list of a word expressing a semantically complex situation is composed of the sum of the arguments from the two subsituations in accordances with (64).

(64) $\left[\begin{array}{l} \textit{word} \\ \text{SS} \mid \text{LOC}\left[\begin{array}{l} \text{CAT} \mid \text{CO-PRED}\langle\rangle \\ \text{CONT } \textit{complex-situation} \end{array}\right] \end{array}\right] \longrightarrow$

$\left[\text{SS} \mid \text{LOC} \mid \text{CONT}\left[\begin{array}{l} \text{SEM-ARGS } \boxed{1} \oplus \boxed{2} \\ \text{SIT1}\left[\begin{array}{l} \textit{fully-unspec-rel} \\ \text{SEM-ARGS } \boxed{1} \end{array}\right] \\ \text{SIT2} \mid \text{SEM-ARGS } \boxed{2} \end{array}\right]\right]$

(*forsvinde, dræbe*)

$\vee$

$\left[\text{SS} \mid \text{LOC} \mid \text{CONT}\left[\begin{array}{l} \text{SEM-ARGS } \boxed{1} \\ \text{SIT1}\left[\begin{array}{l} \textit{spec-act-rel} \\ \text{SEM-ARGS } \boxed{1}\left(\textit{list} \oplus \langle\boxed{2}\rangle\right) \end{array}\right] \\ \text{SIT2} \mid \text{SEM-ARGS}\langle\boxed{2}\rangle \end{array}\right]\right]$

(*spise*)

The first disjunct concerns *inchoatives* and *causatives*, which both have an *unspec-rel* as their SIT1 value. The constraint says that for these verbs the highest SEM-ARGS list is the concatenation of the two lower SEM-ARGS lists. *Forsvinde* 'disappear' has an empty SIT1 | SEM-ARGS list and one element on the SIT2 | SEM-ARGS list (the 'disappearer'), which will be the only element on the highest SEM-ARGS list. *Dræbte* 'kill' has one element on the SIT1 | SEM-ARGS list (the 'causer') and one element on the SIT2 | SEM-ARGS list (the 'dead'), and therefore these two elements in that order on the highest SEM-ARGS list.

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The second disjunct concerns verbs with a specified SIT1 value. It says that the higher SEM-ARGS list is identical to the SIT1 | SEM-ARGS list and that the last (whether first or second) argument on this list is identical to the argument on SIT2 | SEM-ARGS list.

For verbs that do not combine with co-predicates (technically, verbs with an empty CO-PRED list) the number and canonical order of syntactic arguments is a direct reflection of their semantics. This is expressed in the following constraint which ensures that the SYN-ARGS list is identical to the highest SEM-ARGS list:

(65) $\left[\begin{array}{l} word \\ \text{SS | LOC | CAT | CO-PRED } \langle\rangle \end{array}\right] \longrightarrow \left[\text{SS | LOC}\left[\begin{array}{l} \text{CAT | SYN-ARGS } \boxed{1} \\ \text{CONT | SEM-ARGS } \boxed{1} \end{array}\right]\right]$[19]

Applying these constraints to the lexical entries of *løb-*, *forsvind-*, *dræb-*, and *spis-*, shown in (54)–(57), yields (66)–(69).

(66) *løb-* 'run'

$$\left[\text{SS | LOC}\left[\begin{array}{l} \text{CAT}\left[\begin{array}{ll} \text{HEAD} & verb \\ \text{CO-PRED} & \langle\rangle \\ \text{SYN-ARGS} & \boxed{1} \end{array}\right] \\ \text{CONT}\left[\begin{array}{l} simple\text{-}situation \\ \text{SEM-ARGS } \boxed{1} \\ \text{SIT1}\left[\begin{array}{ll} run\text{-}rel & \\ \text{ACT} & i \\ \text{SEM-ARGS} & \boxed{1}\langle \text{NP}_i \rangle \end{array}\right] \end{array}\right] \end{array}\right]\right]$$

Run-rel is a subtype of *act-rel* and the constraint in (60) ensures that *løbe* gets one semantic arguments coindexed with the ACT feature. As *løbe* denotes a simple situation, the constraint in (63) ensures that the highest SEM-ARGS list is identical to the SIT1 | SEM-ARGS list and, as this *løbe* does not take a co-predicate, the constraint in (65) ensures that the SYN-ARGS list is identical to the highest SEM-ARGS list.

(67) *forsvind-* 'disappear'

$$\left[\text{SS | LOC}\left[\begin{array}{l} \text{CAT}\left[\begin{array}{ll} \text{HEAD} & verb \\ \text{CO-PRED} & \langle\rangle \\ \text{SYN-ARGS} & \boxed{3} \end{array}\right] \\ \text{CONT}\left[\begin{array}{l} complex\text{-}situation \\ \text{SEM-ARGS } \boxed{3}\left(\boxed{1} \oplus \boxed{2}\right) \\ \text{SIT1}\left[\begin{array}{ll} unspec\text{-}rel & \\ \text{SEM-ARGS} & \boxed{1}\langle\rangle \end{array}\right] \\ \text{SIT2}\left[\begin{array}{ll} disappeared\text{-}rel & \\ \text{BEARER} & j \\ \text{SEM-ARGS} & \boxed{2}\langle \text{NP}_j \rangle \end{array}\right] \end{array}\right] \end{array}\right]\right]$$

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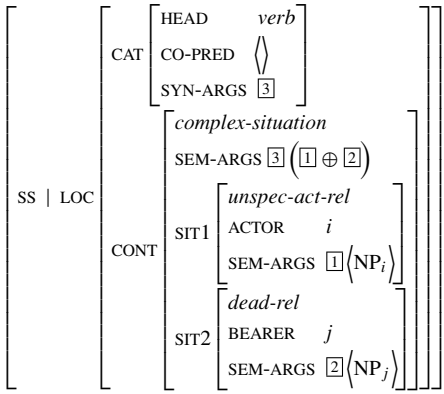
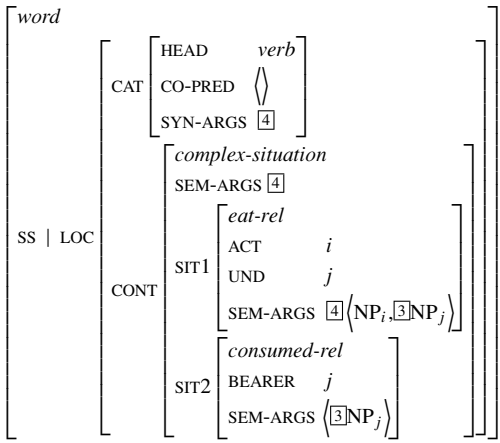
(68) *dræb-* 'kill'



(69) *spis-* 'eat'



4.2 Resultatives

While *forsvinde* 'disappear' and *spise* 'eat' are semantically complex, i.e. with a complex event structure, but syntactically simple, the predicates in (70) are syntactically complex consisting of a verb and a co-predicate. (70a) is semantically simple while (70b) is semantically complex.

(70) a. Peter har danset.
Peter has danced

b. Peter danser ud i køkkenet.
Peter dances out in kitchen-the

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Two types of syntactically complex predicate are relevant in this context: the combination of a full verb and a co-predicate in a *resultative construction*, and the combination of an auxiliary and a participle in an *auxiliary construction*. In this section we treat resultatives, past participles are treated in section 4.5, and auxiliary constructions are treated in section 4.6.

There are two subtypes of the resultative construction, as exemplified in (71) and (72).

(71) a. Ole løb ud i haven.
Ole ran out in garden-the

b. Ole bar bordet ud i haven.
Ole carried table-the out in garden-the

(72) Ole løb Peter træt.
Ole ran Peter tired

In both cases the verb denotes the causing process and the co-predicate, *ud i* (*haven*), and *træt*, the result state.

The difference between the two subtypes is that in (71) the object is either selected for by the verb if the verb is transitive or left out if the verb is intransitive. In (72) the object though not selected for by the verb, (73), is obligatory, and a so-called 'fake reflexive' (Simpson 1983:145) has to be inserted if we want to predicate over the subject, (74).

(73) *Ole løb Peter.
Ole ran Peter

(74) a. *Ole løb træt.
Ole ran tired

b. Ole løb sig træt.
Ole ran himself tired

Following Wechsler (1997) and Wechsler & Noh (2001), we assume that this difference is a question of whether the result state is the canonical outcome of the process in question. The canonical outcome of running and any other motion verb is that you end up somewhere else, while a number of other states including that of being tired are plausible outcomes.

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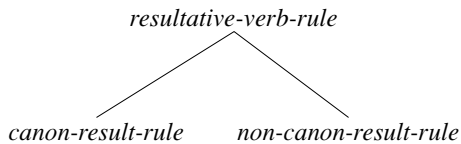
The following lexical rule (Meurers 2001) licenses resultative verbs:

(75)
$$\left[\begin{array}{l}\textit{resultative-verb-rule}\\ \text{IN}\left[\begin{array}{l}\textit{word}\\ \text{SS}\mid\text{LOC}\left[\begin{array}{ll}\text{CAT}\mid\text{CO-PRED} & \langle\rangle\\ \text{CONT}\mid\text{SIT1} & \boxed{1}\ \textit{spec-act-rel}\end{array}\right]\end{array}\right]\\ \text{OUT}\left[\begin{array}{l}\textit{word}\\ \text{SS}\mid\text{LOC}\left[\begin{array}{ll}\text{CAT}\mid\text{CO-PRED} & \left\langle\left[\text{SS}\mid\text{LOC}\mid\text{CONT}\ \boxed{2}\right]\right\rangle\\ \text{CONT} & \left[\begin{array}{l}\textit{complex-situation}\\ \text{SIT1}\ \boxed{1}\\ \text{SIT2}\ \boxed{2}\end{array}\right]\end{array}\right]\end{array}\right]\end{array}\right]$$

It says that, for each verb in the lexicon with a *spec-act-rel* as value for the SIT1 feature and an empty CO-PRED list, there is a corresponding verb with a non-empty CO-PRED list. The output verb denotes a complex situation and the SIT2 value (the result) is identical to the CONTENT value of the co-predicate. By convention, everything that is not explicitly mentioned in the rule is carried over unaltered from input to output.

Corresponding to the two types of resultative exemplified in (71) and (72), the lexical rule in (75) has two subtypes.

(76)


The lexical rule producing verbs which give rise to the canonical resultative construction is shown in (77).

(77)
$$\left[\begin{array}{l}\textit{canon-result-rule}\\ \text{IN}\left[\begin{array}{l}\textit{word}\\ \text{SS}\mid\text{LOC}\mid\text{CAT}\mid\text{SYN-ARGS}\ \boxed{1}\end{array}\right]\\ \text{OUT}\left[\begin{array}{l}\textit{word}\\ \text{SS}\mid\text{LOC}\left[\begin{array}{ll}\text{CAT} & \left[\begin{array}{ll}\text{CO-PRED} & \left\langle\left[\text{SS}\mid\text{LOC}\mid\text{CAT}\mid\text{SUBJ}\left\langle\boxed{2}\right\rangle\right]\right\rangle\\ \text{SYN-ARGS} & \boxed{1}\left(\textit{list}\oplus\left\langle\boxed{2}\right\rangle\right)\end{array}\right]\\ \text{CONT} & \left[\begin{array}{ll}\text{SIT1}\mid\text{CAN-RES} & \boxed{3}\\ \text{SIT2} & \boxed{3}\end{array}\right]\end{array}\right]\end{array}\right]\end{array}\right]$$

It says that the SYN-ARGS list of the output verb is identical to the SYN-ARGS list of the input verb and furthermore that the element on the SUBJ list of the co-predicate is the last element on this list. This means that the result state is predicated of an entity which is also an argument of the verb, and that this argument in an active sentence is realised as subject if the verb is intransitive, as in (71a) above, and object if the

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verb is transitive, as in (71b). The SIT2 value (the result state) must be identical to the canonical result state, the value for the feature CAN-RES. For *motion-rel*, cf. (61), this value is *loc-rel*.

The lexical rule producing verbs which give rise to the non-canonical resultative construction (as e.g. (72), *Ole løb Peter træt*) is shown in (78).

(78)
$$\left[\begin{array}{l}\textit{non-canon-result-rule}\\ \text{IN}\left[\begin{array}{l}\textit{word}\\ \text{SS | LOC | CAT}\left[\begin{array}{l}\text{COMPS}\langle\rangle\\ \text{SYN-ARGS}\langle\boxed{1}\mid \textit{list}\rangle\end{array}\right]\end{array}\right]\\ \text{OUT}\left[\begin{array}{l}\textit{word}\\ \text{SS | LOC}\left[\begin{array}{l}\text{CAT}\left[\begin{array}{l}\text{CO-PRED}\quad\langle[\text{SS | LOC | CAT | SUBJ}\langle\boxed{2}\rangle]\rangle\\ \text{SYN-ARGS}\ \langle\boxed{1},\boxed{2}\rangle\end{array}\right]\\ \text{CONT}\left[\begin{array}{l}\text{SIT1 | CAN-RES}\ \boxed{3}\\ \text{SIT2}\ \boxed{4}\end{array}\right]\end{array}\right]\end{array}\right]\end{array}\right]$$
$$\wedge\ \boxed{3}\neq\boxed{4}$$

It says that the SYN-ARGS list of the output verb contains two elements. The first element is identical to the first element on the SYN-ARGS list of the input verb and the second argument is identical to the element on the SUBJ list of the co-predicate. This means that the result state must be predicated of the object. The input word is constrained to having an empty COMPS list, which means that verbs obligatorily taking objects are ruled out in this construction while verbs like *spise* 'eat', which can be used without object, can be the input to this rules. To ensure that cases where the resulting state corresponds to the canonical state are treated as instances of canonical resultative construction, this type of resultative is constrained to have a SIT2 value that differs from the canonical result state.

4.3 Valence

Constraints like the one in (79) distribute arguments from the SYN-ARGS list to the valence lists.

(79)
$$\left[\begin{array}{l}\textit{word}\\ \text{SS | LOC | CAT | HEAD | VFORM}\ \textit{active}\end{array}\right]\longrightarrow$$
$$\left[\begin{array}{l}\text{SS | LOC | CAT}\left[\begin{array}{ll}\text{SUBJ} & \langle\boxed{1}\rangle\\ \text{COMPS} & \boxed{2}\\ \text{SYN-ARGS} & \langle\boxed{1}\mid\boxed{2}\rangle\end{array}\right]\end{array}\right]\vee$$
$$\left[\begin{array}{l}\text{SS | LOC | CAT}\left[\begin{array}{ll}\text{SUBJ} & \langle \textit{det}\rangle\\ \text{SYN-ARGS} & \langle\rangle\end{array}\right]\end{array}\right]$$

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It says that for verbs in the active voice the first element on the SYN-ARGS list is also an element on the SUBJ list and possible further elements on the SYN-ARGS list are elements on the COMPS list. Weather verbs have an empty SYN-ARGS list, but Danish requires a subject so the expletive *det* 'it' is inserted on the SUBJ list. We assume that similar constraints insert *der* 'there' on the SUBJ list of verbs which do not have arguments suitable for the subject position like verbs with an indefinite first argument realised in object position, (80), and passives of intransitive verbs, (81).

(80) Der ligger en mand på sofaen.
there lies a man on couch-the

(81) a. Der danses på bordene.
there is danced on tables-the

b. Der bliver danset på bordene.
there is danced on tables-the

4.4 Phrase structure

The combination of a verb and its co-predicate is licensed by the following constraint:

(82) $$\textit{head-copred-phr} \longrightarrow \begin{bmatrix} \text{SS} \mid \text{LOC} \mid \text{CAT} \mid \text{CO-PRED} \boxed{1} \\ \text{HEAD-DTR} \mid \text{SYNSEM} \mid \text{LOC} \mid \text{CAT} \mid \text{CO-PRED} \left\langle \boxed{2} \mid \boxed{1} \right\rangle \\ \text{COPRED-DTR} \mid \text{SYNSEM} \boxed{2} \end{bmatrix}$$

It says that a word or phrase with a nonempty CO-PRED list may combine with a co-predicate the synsem value of which corresponds to an element on the CO-PRED list to form a *head-copred*(*icate*)*-phr*(*ase*).

Similarly, a word or phrase with one or more elements on its COMPS list may combine with a complement daughter in a *head-comp-phr*:

(83) $$\textit{head-comp-phr} \longrightarrow \begin{bmatrix} \text{SYNSEM} \mid \text{LOC} \mid \text{CAT} \mid \text{COMPS} \boxed{1} \\ \text{HEAD-DTR} \mid \text{SYNSEM} \mid \text{LOC} \mid \text{CAT} \mid \text{COMPS} \left\langle \boxed{2} \mid \boxed{1} \right\rangle \\ \text{COMP-DTR} \mid \text{SYNSEM} \boxed{2} \end{bmatrix}$$

In the *head-comp-phr*, and in other valence phrase types, elements cancelled from the valence lists are cancelled from the SYN-ARGS list as well.

We assume that a word may combine with a complement and a co-predicate at the same time. To license this, *head-copred-phr* and *head-comp-phr* are given a common subtype, as shown in (84).

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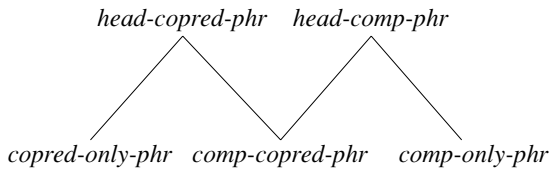
(84)



To ensure that verbs with both a nonempty COMPS list and a nonempty COPRED list can only enter a *head-comp-copred-phr*, we need the following constraints:

(85)

$$\textit{comp-only-phr} \longrightarrow \begin{bmatrix} \text{SS} \mid \text{LOC} \mid \text{CAT} \mid \text{CO-PRED} \langle\rangle \\ \text{HEAD-DTR} \mid \text{SS} \mid \text{LOC} \mid \text{CAT} \mid \text{COPRED} \langle\rangle \end{bmatrix}$$

$$\textit{copred-only-phr} \longrightarrow \begin{bmatrix} \text{SS} \mid \text{LOC} \mid \text{CAT} \mid \text{COMPS} \langle\rangle \\ \text{HEAD-DTR} \mid \text{SS} \mid \text{LOC} \mid \text{CAT} \mid \text{COMPS} \langle\rangle \end{bmatrix}$$

The constraint in (86) applies to *headed-phrase*, which is the common supertype of all the phrase types above.

(86)

$$\textit{headed-phr} \longrightarrow \begin{bmatrix} \text{SS} \mid \text{LOC} \begin{bmatrix} \text{CAT} \mid \text{HEAD} \boxed{1} \\ \text{CONT} \boxed{2} \end{bmatrix} \\ \text{HEAD-DTR} \mid \text{SS} \mid \text{LOC} \begin{bmatrix} \text{CAT} \mid \text{HEAD} \boxed{1} \\ \text{CONT} \boxed{2} \end{bmatrix} \end{bmatrix}$$

It says that the HEAD features as well as the semantics of a headed phrase are identical to that of its head daughter.[20]

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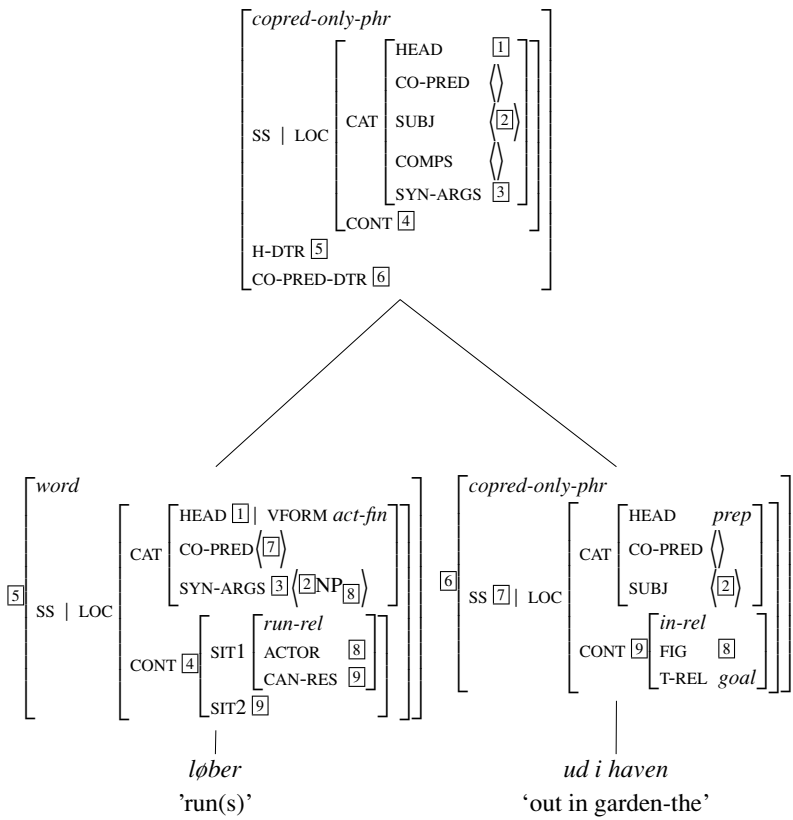
In (87), we give an example of a *head-copred-only-phr*.

(87)



The application of the constraints in (60), (63) and (65) to the lexical entry for *løb-* in (54) ensures that *løb-* has one syntactic argument, an actor. The application of *canon-result-rule* shown in (77) results in a non-empty CO-PRED list. The CONT value of the co-predicate is structure-shared with the verbs' value for the feature CAN-RES which in the case of motion verbs forces the CONT value of the co-predicate to be a subtype of *loc-rel* with the specification T-REL *goal* excluding stative locative phrases, cf. Bjerre (2003a).

4.5 Past participles

Intransitive past participles divide into two groups (plus the small group of meteorological verbs, Ryu's type 4). One group (Ryu's type 2) can be used as prenominal modifiers, (88b). They combine with the auxiliary *være* 'be' (88c), but not with the auxiliary *have* 'have', (88d).

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(88) a. Barnet forsvandt.
child-the disappeared

b. et forsvundet barn
a disappeared child

c. Barnet er forsvundet.
child-the is disappeared

d. *Barnet har forsvundet.
child-the has disappeared

For the other group (Ryu's type 1) the reverse is true: they cannot be used as prenominal modifiers, (89b), they cannot combine with the auxiliary *være* 'be', (89c), but they can combine with the auxiliary *have* 'have', (89d).

(89) a. Manden dansede.
man-the danced

b. *en danset mand
a danced man

c. *Manden er danset.
man-the is danced

d. Manden har danset.
man-the has danced

Transitive verbs denoting complex situations pattern with both, depending on which argument is modified or realised as subject.

(90) a. Manden drak øllen.
man-the drank beer-the

b. en drukket øl
a drunk beer

c. Øllen er drukket.
beer-the is drunk

d. Manden har drukket (øllen).
man-the has drunk beer-the

(91) a. Manden drak øllen.
man-the drank beer-the

b. *en drukket mand
a drunk mand

c. *Manden er drukket øllen.
man-the is drunk beer-the

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d. *Øllen har drukket.
beer-the has drunk

Transitive verbs denoting a simple situation pattern with the second group.

(92) a. Manden kyssede bilen.
man-the kissed car-the

b. *en kysset bil
a kissed car

c. *Manden er kysset bilen.
man-the is kissed car-the

d. *Bilen har kysset.
car-the has kissed

Participles from the first group but not from the second may turn up in a context like (93), as exemplified in (94) and (95).

(93) X frygtede / fandt Y [pastpart]
X feared / found Y [*pastpart*]

(94) a. Peter frygtede sit kæledyr forsvundet.
Peter feared his pet disappeared

b. Peter fandt sit kæledyr spist.
Peter found his pet eaten

(95) a. *Peter frygtede sin kone danset.
Peter feared his wife danced

b. *Peter fandt sin kone kysset.
Peter found his wife kissed

Assuming two groups of participles explains not only the data in (88)–(92) but also the data in (94) and (95).

We assume that Y in (93) is the subject of the past participle and thus suggest that past participles of the first type have a subject whereas past participles of the second type do not.

Semantically, the first group is characterised by having a resulting state, i.e. a SIT2, and it is the first argument of this state that may be realised as subject. We refer to this type of participle as *Result* participle. The other group of participles, which we refer to as *Non-result* participles, has a SIT1 with at least one argument and cannot take a subject. Transitive participles with both a process and a result state may be both *Result* participles and *Non-result* participles. An example is *drukket* 'drunk'.

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(96) shows the constraint on the distribution of arguments to the valence lists for past participles parallel to the one for active verbs shown in (79) above.

(96) $\begin{bmatrix} \textit{word} \\ \text{SYNSEM} \mid \text{LOCAL} \mid \text{CAT} \mid \text{HEAD} \mid \text{VFORM } \textit{pastpart} \end{bmatrix}$

$\longrightarrow$

Result participle

$$\begin{bmatrix} \text{SYNSEM} \mid \text{LOCAL} \begin{bmatrix} \text{CAT} \begin{bmatrix} \text{SUBJ} & \langle \boxed{1} \rangle \\ \text{COMPS} & \langle\,\rangle \\ \text{SYN-ARGS} & \textit{list} \oplus \langle \boxed{1} \rangle \end{bmatrix} \\ \text{CONT} \mid \text{SIT2} \mid \text{SEM-ARGS} \langle \boxed{1} \mid \textit{list} \rangle \end{bmatrix} \end{bmatrix}$$

forsvundet 'disappeared', *spist* 'eaten', *løbet ud i haven* 'run out in garden-the'

$\vee$

Non-result participle

$$\begin{bmatrix} \text{SYNSEM} \mid \text{LOCAL} \begin{bmatrix} \text{CAT} \begin{bmatrix} \text{SUBJ} & \langle\,\rangle \\ \text{COMPS} & \boxed{2} \\ \text{SYN-ARGS} & \langle \boxed{1} \mid \boxed{2} \rangle \end{bmatrix} \\ \text{CONT} \mid \text{SIT1} \mid \text{SEM-ARGS} \langle \boxed{1} \mid \textit{list} \rangle \end{bmatrix} \end{bmatrix}$$

danset 'danced', *spist* (*æblet*) 'eaten apple-the', *løbet ud i haven* 'run out in garden-the'

$\vee$

Weather participle

$$\begin{bmatrix} \text{SYNSEM} \mid \text{LOCAL} \mid \text{CAT} \begin{bmatrix} \text{SUBJ} & \langle\,\rangle \\ \text{COMPS} & \langle\,\rangle \\ \text{SYN-ARGS} & \langle\,\rangle \end{bmatrix} \end{bmatrix}$$

regnet 'rained'

The first disjunct licenses *Result* participles. They have a result state and the first argument of this state is via the SYN-ARGS list distributed to the SUBJ list. The COMPS list is empty. The second disjunct licenses *Non-result* participles. They have an empty SUBJ list while a possible second argument may be realised via the COMPS list. The third disjunct concerns meteorological verbs which have no arguments.

Participles with simple situations can only be *Non-result* participles. (97)–(104) show examples of past participles.

Danse 'dance' denotes a simple situation (a *process-rel*) and has no resulting state, SIT2:

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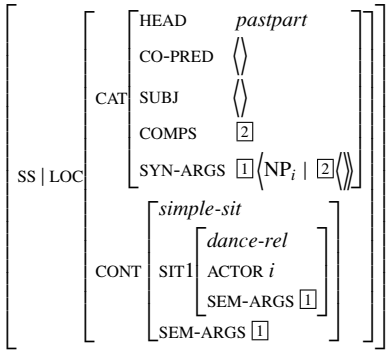
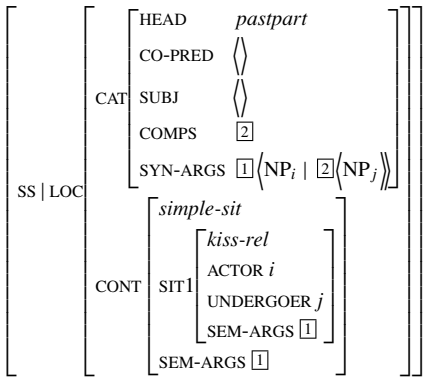
(97) *danset* 'danced'



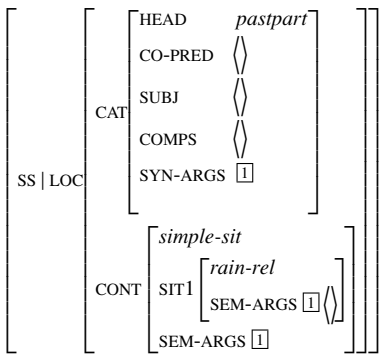
Kysse 'kiss' denotes a simple situation (a *process-rel*) and has no resulting state, SIT2:

(98) *kysset* 'kissed'



Regne 'rain' denotes a simple situation (a *process-rel*) and has no resulting state, SIT2:

(99) *regnet* 'rained'



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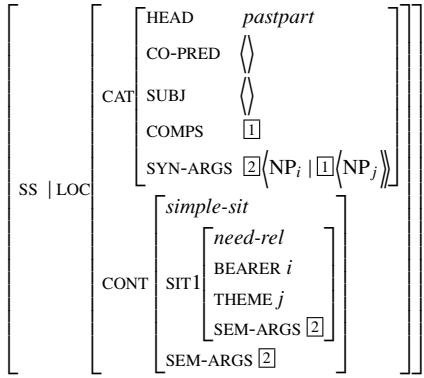
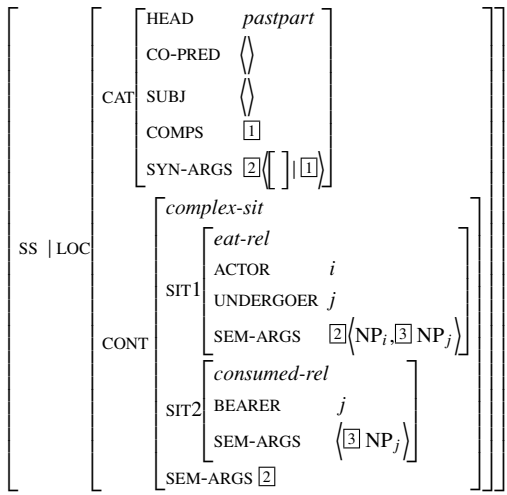
Behøve 'need' denotes a simple situation (a *state-rel*) and has no resulting state, SIT2:

(100) *behøvet* 'needed'



Spise 'eat' denotes a complex situation consisting of an *eat-rel* and a *consumed-rel*, where the second argument in SIT1 is the first argument in SIT2, the thing consumed. 'Eat' may form both types:

(101) *spist* 'eaten'



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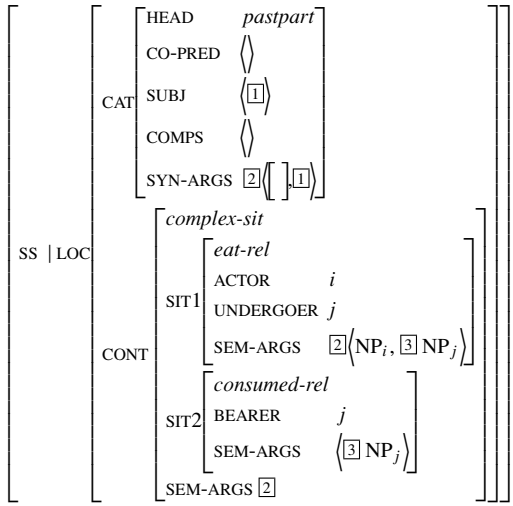
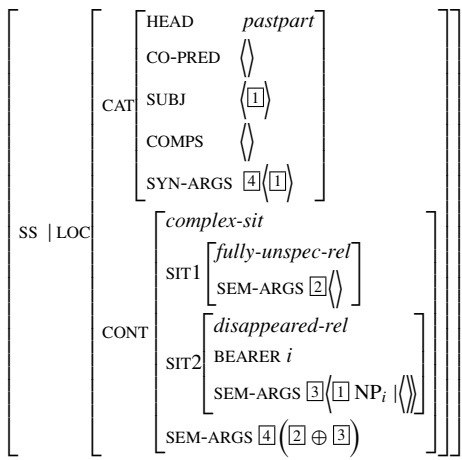
(102) *spist* 'eaten'



Forsvinde 'disappear' denotes a complex situation (an unspecified *process-rel* and a *state-rel*) with a resulting state, SIT2, where the first argument is the first argument of the resulting state:

(103) *forsvundet* 'disappeared'



Danse ud i haven 'dance out into the garden' denotes a complex situation (a *process-rel* and a *state-rel*) with a resulting state, SIT2:

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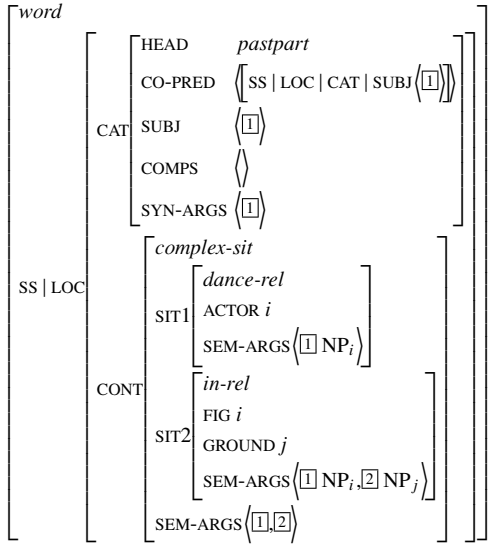
(104) *danset* 'danced', the head-daughter of the *head-copred-phr danset ud i haven* 'danced out in garden-the'



4.6 Auxiliary constructions

The contribution by auxiliaries to the semantics of the sentence is mainly of aspectual nature. We will not have anything to say about that here but assume that our analysis can be extended to cover that area along the lines of Van Eynde (1998).

In our analysis, we will simply let *have* 'have' and *blive* 'be' structure-share the CONTENT value with the CONTENT value of the co-predicate, while *være* 'be' denotes a simple situation and structure-shares its SIT1 value with the SIT2 *state-rel* of the co-predicate. The basis for 'auxiliary selection' is the event, argument and valence structure of the co-predicate.

4.6.1 The auxiliary være

The auxiliary *være* 'be' combines with *Result* participles, (105), but not with *Non-result* participles, (106).

(105) a. Peter er forsvundet.
Peter is disappeared

b. Maden er spist.
food-the is eaten

c. Hunden er løbet ud.
dog-the is run out

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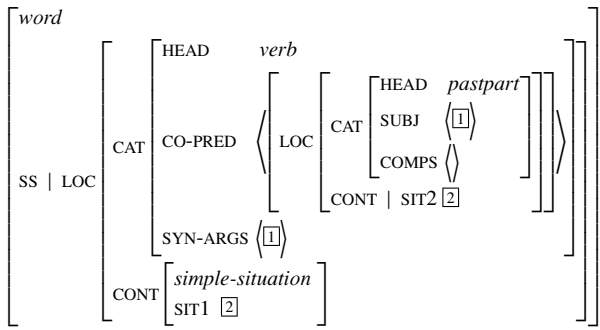
(106) a. *Peter er danset.
Peter is danced

b. *Peter er kysset.
Peter is kissed

We therefore propose the lexical entry for *være* shown in (107).

(107) *være* 'be'



Være takes a co-predicate denoting a complex situation and structure-shares its SIT2 value with its own SIT1 value. The co-predicate must have an empty COMPS list and an element on the SUBJ list which is raised to the SYN-ARGS list of *være*.

(108) gives an example of an apparent problem, the combination of *være* with a motion verb past participle which would normally not be expected to denote a complex situation.

(108) Peter er løbet.
Peter is run

The explanation is that (108) does not mean the same as *har løbet* 'has run' in (110); (108) does have a result state, the state of Peter not being at a certain place anymore. We suggest that *løbet* in (108) is actually a complex predicate consisting of the participle and a phonetically empty co-predicate.

(109) shows the representation of *er forsvundet* 'is disappeared', a *head-copred-only-phr*.

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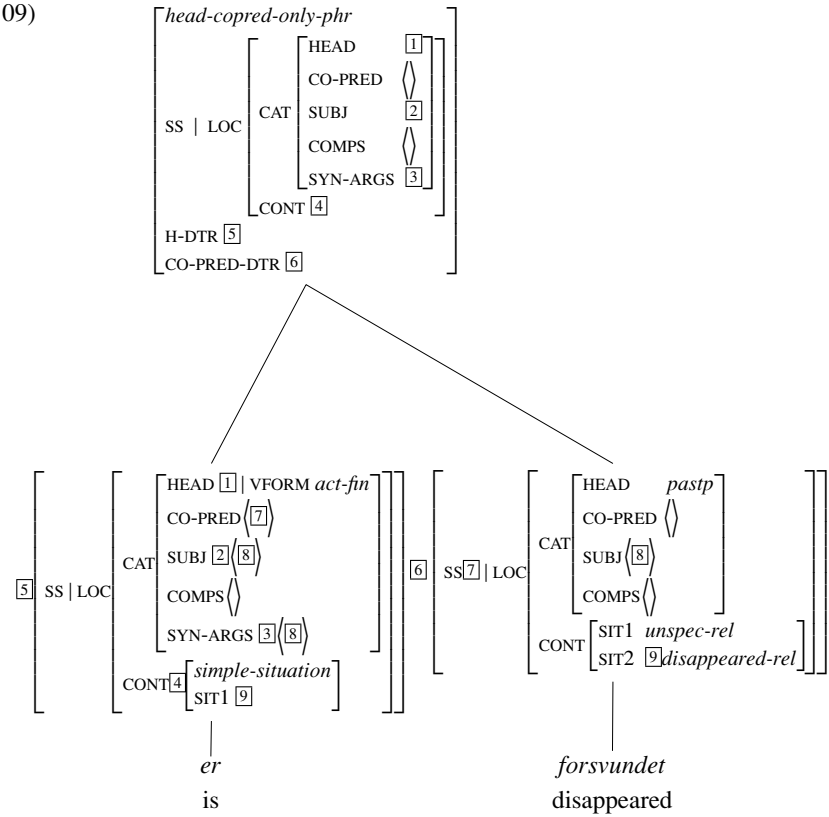
(109)



The participle *forsvundet* has an element on its SUBJ list and an empty COMPS list as required by *er*. The SIT2 value of the co-predicate *disappeared-rel* instantiates the SIT1 value of *er* and consequently of the entire phrase.

4.6.2 *The auxiliary* have

The auxiliary *have* 'have' may combine with *Non-result* participles, (110), but not with *Result* participles, (111).

(110) a. Peter har ligget på sofaen.
Peter has lain on sofa-the

b. Peter har løbet.
Peter has run

c. Peter har danset.
Peter has danced

d. Det har regnet.
it has rained

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e. Peter har kysset konen.
Peter has kissed wife-the

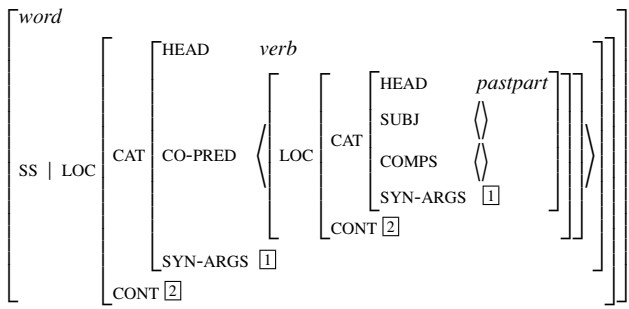
f. Peter har spist maden.
Peter has eaten food-the

(111) a. *Peter har forsvundet.
Peter has disappeared

b. *Flasken har væltet.
Bottle-the has overturned

We therefore let *have* take a co-predicate with an empty SUBJ list. The SYN-ARGS list of the co-predicate is raised to the SYN-ARGS list of *have*. The lexical entry is shown in (112).

(112) *have* 'have'

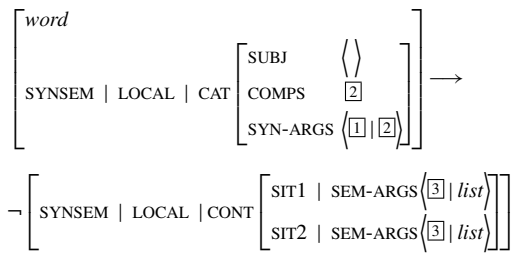


However, nothing we have said so far prevents a sentence like (113).

(113) *Peter har gået ud i haven.
Peter has gone out in garden-the

At this point, we have no real explanation for this, but suggest an additional constraint on *Non-result* participles denoting complex situations which states that the first argument of SIT1 cannot be identical to the first argument of the resulting state.

(114)



This rules out the possibility that complex predicates like *gået ud i haven* 'gone out in the garden' may form *non-result* participles.

(115) shows the representation of the complex predicate *har danset*.

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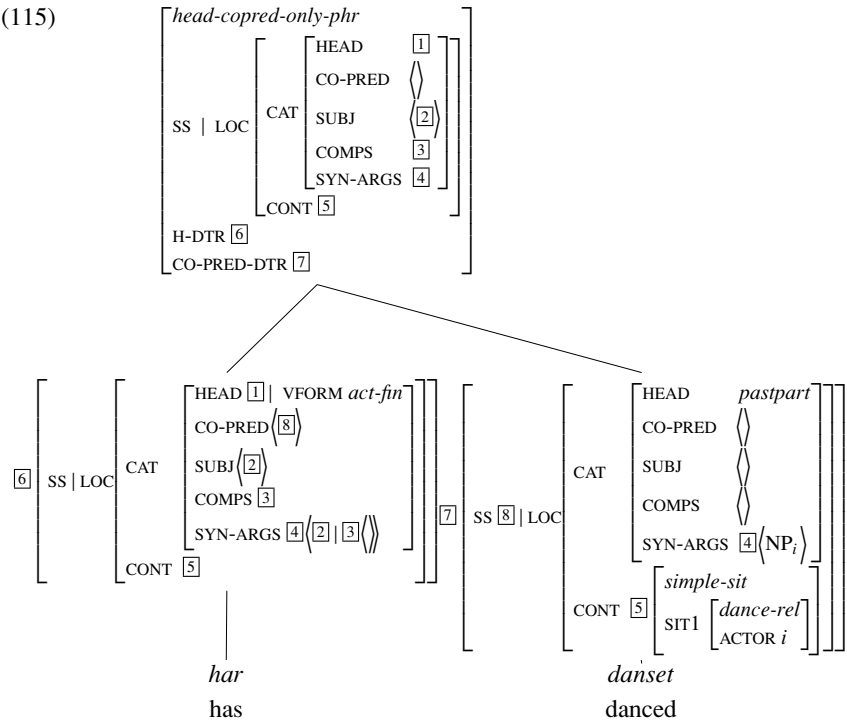
(115)



Danset is a *non-result* participle with an empty SUBJ list, as required by *have*. The argument of the *dance-rel* ends up as the subject of the phrase, and the CONTENT value of the phrase is identical to the CONTENT value of the participle.

4.6.3 The auxiliary blive

The auxiliary *blive* 'be' combines with past participles to form the so-called periphrastic passive realising the second argument of the participle as subject. (116) gives examples of possible combinations while (117) gives examples of impossible combinations.

(116) a. Æblet blev spist (af Peter).
apple-the was eaten (*by Peter*)

b. Løven blev dræbt (af Peter).
lion-the was killed (*by Peter*)

c. Pia blev kysset (af Peter).
Pia was kissed (*by Peter*)

d. Der blev danset til festen (af gæsterne).
there was danced at party-the (*by guests-the*)

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(117) a. *Der blev forsvundet.
there was disappeared

b. *Peter blev forsvundet.
Peter was disappeared

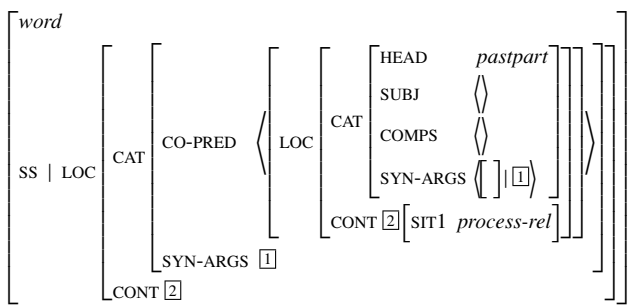
c. *Pia blev behøvet (af Peter).
Pia was needed (by Peter)

d. *Hatten blev haft (af Peter).
hat-the was had (by Peter)

e. *Der blev regnet.
there was rained

We propose the following lexical entry for *blive*:

(118) *blive* 'be'



Blive selects a *Non-result* participle as co-predicate, i.e. a participle with an empty SUBJ list. This rules out (117a) and (117b). The SIT1 value of the co-predicate is constrained to be a *process-rel*, which rules out stative verbs, (117c), (117d). *Blive* raises the SYN-ARGS list of the co-predicate minus the first element. This rules out meteorologic verbs, (117e), which have an empty SYN-ARGS list. If the co-predicate is transitive, the second argument is realised as subject, and, if the co-predicate is intransitive, *der* is inserted as dummy subject.

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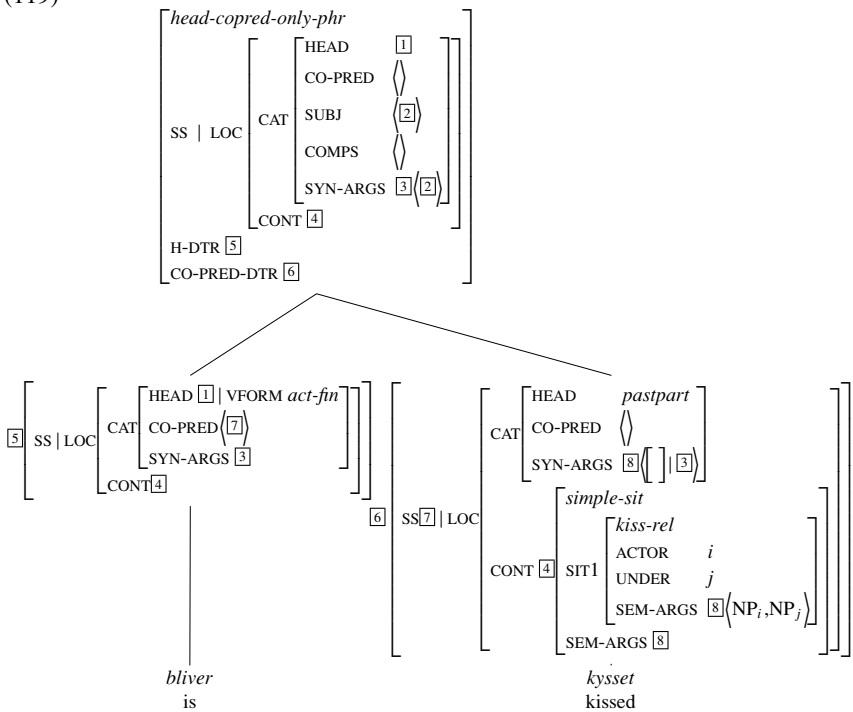
(119) shows the representation of the *head-copred-only-phr bliver kysset*.

(119)



4.7 Past participles in auxiliary-free constructions

Without further mechanisms our theory can account for participles in auxiliary-free raising constructions. The examples with the *Result* participles *forsvundet* 'disappeared' and *myrdet* 'murdered' in (120) are grammatical, whereas the examples in (121) with *Non-result* participles have no subject and cannot appear in this context.

(120) a. Mand frygtes forsvundet.
man is feared disappeared

b. Mand frygtes myrdet.
man is feared murdered

(121) a. *Manden frygtes danset.
man-the is feared danced

b. *Manden frygtes kysset.
man-the is feared kissed

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5. CONCLUSION

In this paper we have presented a set of data showing the range of possible Danish perfect and periphrastic passive constructions. We have also given examples of past participles in constructions that do not contain auxiliaries.

We have discussed previous analyses of perfect and passive constructions. These analyses show that the division of past participles into transitives, unergatives, and ergatives is not sufficiently fine-grained to account for auxiliary selection in perfect constructions and to predict whether participles occur in periphrastic passive constructions. Certain problems became apparent. Firstly, some unergatives group together with ergatives in terms of auxiliary selection in perfect constructions. Secondly, some transitives group together with intransitives in disallowing the passive construction. Finally, choosing an active argument structure for the past participle causes problems accounting for auxiliary-free constructions.

We have presented an analysis which allows for a categorisation of verbs in terms of semantic properties. This semantic approach was shown to solve a series of problems. Directional motion unergatives and ergatives form a natural class in having a resultative subsituation in their semantic content, explaining why they form a group in terms of auxiliary selection and form perfect with *være* 'be'.

Also, non-resultative transitives group together with non-directional motion unergatives in not having a resultative subsituation explaining why they form perfect with *have*. We also accounted for why certain transitive verbs do not occur in periphrastic passive constructions by excluding state verbs.

It was shown how the subject of past participles corresponds to the bearer of a resultative subsituation of the participle. This provided the valence structure required when the participle is used in constructions without auxiliaries.

Interestingly, we have accounted for the above phenomena without stipulating features like DA, ERG, and EXT.

Finally, it is worth repeating the claim made by Heinz & Matiasek that auxiliary selection cannot be given a semantic explanation because of German examples like (21), repeated in (122).

(122) a. Hans hat Maria geholfen.
Hans$_{NOM}$ has Maria$_{DAT}$ helped
'Hans helped Maria.'

b. Hans ist Maria zu Hilfe gekommen.
Hans$_{NOM}$ ist Maria$_{DAT}$ to aid come
'Hans came to Maria's aid.'

The claim does not hold. The examples translate into Danish as shown in (123).

(123) a. Hans har hjulpet Maria.
Hans has helped Maria

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b. Hans er kommet Maria til hjælp.
Hans is come Maria to aid
'Hans has came to Maria's aid.'

Auxiliary selection is based on the following semantic properties of the verbs involved. *Hjulpet* 'helped' denotes a simple situation and it is a *non-result* participle which is selected by *have* 'have'. *Kommet* (*til hjælp*) 'come (to aid)', on the other hand, denotes a complex situation with a resulting state in its non-metaphorical sense, and it is a *Result* participle which is selected by *være* 'be'.

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NOTES

1. In Danish, the auxiliary *blive* is used in agentive passives. English does not have a separate auxiliary for agentive passives, and so both *være* and *blive* are translated as 'be'.
2. As a reviewer remarks, in Danish as well as in German sentences like *Jørgen er kysset* may be felicitous in a context where the kissing is seen as some action that must be performed to accomplish something. We assume that such uses could be licensed via some lexical rule, but we will not pursue this subject further here. We still maintain that without such a context sentences like (4b) are ungrammatical.
3. As a reviewer remarks, in these cases as well as in the cases exemplified in (2) *have* is occasionally used. It is, however, rather infrequent and we shall have nothing to say about it.
4. $\oplus$ stands for the *append* relation which concatenates two lists.
5. $\text{DA}\langle synsem \rangle$ means a list with one element in it.
6. See also Müller (2002) for a comprehensive account of the analysis presented here.
7. See also Müller (2000) for an analysis based on lexical rules to derive several lexical entries for participles.
8. The authors have added the translations.
9. Kathol adopts Borsley's valence features SUBJ and COMPS, cf. Borsley (1987).
10. The authors have added the translations.
11. It should be noted that this entry and the following two entries for auxiliaries do not mention explicitly that they select participle forms.
12. The authors have provided the translations.
13. A lexical entry for the auxiliary *haben* is shown in Pollard (1994:278). However, the problem of auxiliary selection is not addressed.
14. Ryu calls the phenomena Split Intransitivity phenomena indicating that the phenomena do not give rise to a two-way split between intransitive verbs, but rather a four-way split.
15. This is a simplified account, and the reader is referred to Ryu (1997) for details.
16. This paper further develops ideas presented in Bjerre & Neville (2002).
17. The CO-PRED list corresponds to the XCOMP list in Müller (2002). It may contain a verbal, nominal or prepositional *synsem* object and expresses the need of the word to combine with a co-predicate with a matching SYNSEM value.

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18. To account for periphrastic causatives like *lod hunden løbe ud* 'let the dog run out' and *fik hunden til at løbe ud* 'made the dog run out', the value for the feature SIT2 must be *psoa*, but we ignore that here.
20. This is a simplification. In a *head-adjunct-phrase*, which we do not employ here, the adjunct daughter is the semantic head.

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