To have or to be eaten Auxiliaries and Participles in Danish

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Abstract

This paper gives an account of the event and argument structure of past particles, 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 argument and valence structure of a past participle is predictable from its semantic type, and that the argument and valence structure predict with which auxiliary a past participle combines in perfect constructions and whether the past participle may occur in passive constructions. It sets itself apart from similar approaches, cf. e.g. Heinz and Matiasek (1994), Kathol (1994) and Pollard (1994), with its emphasis on semantics.

1 Introduction

In section 2 we go through a set of Danish data which shows what perfect and passive constructions are possible in Danish and consequently have to be accounted for. In section 3 we review some previous analyses of perfect and passive constructions which take the same point of departure in assuming that only one past participle form is used in both construction types. In section 4 we present our analysis. First, we show the event and argument structure of different types of verb, and 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, in section 5 we conclude the paper. All analyses presented are formalised within the framework of Head-Driven Phrase Structure Grammar, cf. Pollard and Sag (1994).

2 Data

Danish has three auxiliaries that combine with past participles, *have*, 'have', *være*, 'be', and *blive*, 'be, become'. The distribution of *have* and *være* combining with past participles to form the perfect is as follows.

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

- (1) a. Ole har / *er sovet. Ole has is slept
 - b. Ole har / *er ligget på sofaen. Ole has is lain on sofa_the

Inchoatives (ergatives) are combined with *være*:

(2) Peter *har / er ankommet. Peter has is arrived Transitive non-motion verbs are combined with *have* when the first argument is realized as subject, and with vare when the second argument is realized as subject, the so-called periphrastic stative passive. However, the latter option is not possible with all verbs.

- (3) a. Peter har spist æblet. Peter has eaten apple_the
 - b. Æblet er spist. Apple_the is eaten
- (4) a. Han har kendt løsningen siden i går. He has known solution_the since yesterday
 - b. Løsningen er kendt. Solution_the is known
- (5) a. Pia har kysset Jørgen. Pia has kissed Jørgen
 - b. * Jørgen er kysset. Jørgen is kissed

With motion verbs in combination with directional PPs only *være* is possible:

(6) Peter *har / er løbet ud i haven.
 Peter has is run 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

The passive auxiliary *blive* may combine with transitive verbs realizing the second argument as subject, the periphrastic agentive passive.

(8)	a.	Æblet bliver spist.
		$Apple_the \ was \ \ eaten$
	b.	Bordet bliver skubbet hen i hjørnet.
		$Table_the \ is \qquad pushed \ into \ corner_the$
	c.	Jørgen bliver kysset.
		Jørgen is kissed

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

(9) a. * Peter bliver forsvundet / danset / løbet. Peter is disappeared danced run
b. Der bliver danset / løbet. There is danced run

Finally, as shown in (10), to form the perfect, the past participle of *blive* combines with vare and the past participle of vare with *have*.

(10) a. Æblet er / *har / *bliver blevet spist. Apple_the is has become been eaten
b. Peter har / *er / *bliver været forsvundet længe. Peter has is become been disappeared long

3 Previous Analyses

In this section we will discuss various accounts of perfect and passive constructions with auxiliaries and past participles.

3.1 Heinz and Matiasek (1994)

Heinz and Matiasek (1994) provide an account of the argument structure of participles, auxiliary selection in connection with perfect, and agentive and stative passive constructions.

The account of argument structure is based on Haider's notion of a designated argument, (Haider (1986)). They introduce the feature DA, designated argument. The feature picks out the argument on the SUBCAT list with 'subject properties' and not 'object properties'. 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, (Heinz and Matiasek (1994, p. 219)). The designated argument is blocked, which means that the designated argument is removed from the SUBCAT list.

The Past Participle Rule gives rise to the forms in (11), (Heinz and Matiasek (1994, p. 220)).

(11)	geschlagen		1	$\[geschlafen \]$		٦	Γ aufgewacht		-
	HEAD	verb [VFORM ppp]		HEAD	verb [VFORM ppp	<u>]</u>]	HEAD	verb [VFORM	ppp
	DA	$\langle NP[str] \rangle$		DA	$\langle NP[str] \rangle$	-	DA	$\langle \rangle$	-
	SUBCAT	$\langle NP[str] \rangle$		SUBCAT	$\langle \rangle$]	SUBCAT	$\left< \mathrm{NP}[str] \right>$	_

These participle forms are selected by auxiliaries to form perfect and passive constructions. The perfect auxiliaries select a past participle and the argument structure of the complex construction is shown in (12), (Heinz and Matiasek (1994, p. 221)).

(12)
$$\begin{bmatrix} DA & I \\ \\ SUBCAT & I \oplus 2 \oplus \left\langle \left[LOC \mid CAT \begin{bmatrix} HEAD & verb [VFORM & ppp] \\ LEX & + \\ DA & I \\ SUBCAT & 2 \end{bmatrix} \right] \right\rangle \end{bmatrix}$$

In effect, the auxiliary reinserts the designated argument on its SUBCAT list together with the SUBCAT list of the participle complement. Heinz and Matiasek do not distinguish between the two auxiliaries, but they nevertheless anticipate that a distinction can be encoded in the lexical entries of the two auxiliaries, so that *sein* selects participles with an empty DA list, and *haben* selects all other participles, presumably this can be generalized to mean participles with a non-empty DA list. These generalisations are only assumed to be default rules. They further assume that it is lexically specified whether participles follow these default rules, or are selected by a non-default auxiliary, encoded with an AUXFORM feature. Heinz and Matiasek claim that auxiliary selection in perfect constructions follow these rules and cannot be given a semantic explanation, (Heinz and Matiasek (1994, p. 222)).

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*. Another entry for *sein* is assumed to form stative passive constructions. The entries for the two passive auxiliaries are given in (13), (Heinz and Matiasek (1994, p. 224,227)).

Agentive passives can be formed with participles which have a designated argument, i.e. a non-empty DA list. This correctly predicts that ergative participles do not occur in agentive passives, and that it is the object of the transitive participle that appears as subject of the auxiliary. The unergative participles have an empty SUBCAT list and an impersonal passive results.

The entry for the stative passive auxiliary predicts that stative passives can be formed with all three types of participle. 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 empty SUBCAT list becomes the subject of the auxiliary.

There a two problems with the analysis. Not all transitive participles occur in stative passive constructions. We find examples such as (14) questionable.

(14) ?Sie ist geküsst She is kissed

Finally, the analysis does not explain why unergative motion verbs may form perfect constructions with both *haben* and *sein*. Perfect *sein* selects a participle with an empty DA list.

3.2 Kathol (1994)

Kathol (1994, p. 268) 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 (15) for the three types of participle.

(15)	$\neg geliebt$	1	$\lceil g \epsilon \rangle$	eschlafen	٦	angekommen	1	
	SUBJ	$\langle NP[ACC] \rangle$	SU	JBJ	$\langle \rangle$	SUBJ	$1\langle NP[NOM] \rangle$	
	COMPS	ò í l	C	OMPS	$\langle \rangle$	COMPS	$\langle \rangle$ $\langle \rangle$	
	EXT	$\langle NP[NOM] \rangle$	E	ΧТ	$\langle \text{NP}[\text{NOM}] \rangle$	EXT	1	

Participles which have SUBJ and EXT features the values of which are different, form perfect constructions with *haben*, as the valence specification for *haben* in (16) shows. 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 a 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.

(16)	haben]	sein	
	SUBJ 3		SUBJ 2	
	$\begin{bmatrix} \text{COMPS } 2 \oplus 1 \oplus \left\langle V \begin{bmatrix} \text{COMPS } 1 \\ \text{SUBJ } 2 \\ \text{EXT } 3 \end{bmatrix} \right\rangle \end{bmatrix}$ $\begin{bmatrix} \text{COMSTRAINT: } 2 \neq 3 \end{bmatrix}$		$\begin{array}{c} \text{COMPS} \ \boxed{1} \oplus \left\langle \mathbf{V} \begin{bmatrix} \text{COMPS} \ \boxed{1} \\ \text{SUBJ} \ \boxed{2} \\ \text{EXT} \ \boxed{2} \end{bmatrix} \right\rangle$	

The participles which can form passive constructions with *werden* are those which have an accusative argument on the SUBJ list, i.e. the transitive participles. The entry for *werden* is given in (17).

(17) werden

$$\begin{bmatrix} \text{comps} \ \square \oplus \left\langle \text{v} \begin{bmatrix} \text{comps} \ \square \\ \text{subj} & \left\langle \text{NP}[\text{acc}]_{2} \right\rangle \end{bmatrix} \right\rangle \\ \text{subj} & \left\langle \text{NP}[\text{nom}]_{2} \right\rangle \end{bmatrix}$$

The subject of the participle becomes the subject of the auxiliary, i.e. the passive argument structure is maintained. Kathol does not cover impersonal passives or stative passives in this analysis.

Just as Heinz and Matiasek's analysis, Kathol's analysis does not account for unergative motion verbs which may form perfect constructions with both *haben* and *sein*. The unergative may not form perfect with *sein*, as *sein* requires the SUBJ list and EXT list of the participle to be identical.

3.3 Pollard (1994)

Pollard (1994) aims to give a unified account of Passive in German. Based on Borsley's valence feature analysis, i.e. the division of the SUBCAT list into SUBJ and COMPS lists, (Borsley (1989) and Borsley (1990)), and Kathol's ERGATIVE feature, (Kathol (1991)). The ERG feature encodes the subject of ergative verbs and the accusative object of transitive verbs. 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, p. 282)).

The syntactic argument structures for the three basic types of participle are shown in (18), (Pollard (1994, p. 280)).

(18)	geschlagen	1	[angekommen]	ſ	geschlafen	1
. ,	COMPS (COMPS	$\langle \rangle$	COMPS	$\langle \rangle$
	SUBJ ($\langle NP[str] \rangle$	SUBJ	$\langle 1 \rangle$	SUBJ	$\langle NP[str] \rangle$
	ERG ($\left 1 \operatorname{NP}[str] \right\rangle$	ERG	$\langle 1NP[str] \rangle$	ERG	$\langle\rangle$

Thus transitive and ergative participles group together in having a non-empty ERG list. Unergatives have an empty ERG list. This argument structure predicts the possible passive constructions in German. Ergative participles cannot form passives in German as their SUBJ and ERG features share the same value.

German passive is formed by the auxiliary *werden* followed by a past participle. The entry for *werden* is given in (19), (Pollard (1994, p. 291)).

$$(19)$$
 werden

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

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 an empty list appears as the subject of the auxiliary, resulting in an impersonal passive. Ergative participles do not meet the constraint that the element on the ERG list and the first element on the COMPS list is the same, and they cannot form passives. It should be noted that Pollard's passivization hypothesis is based on the argument structure of the participles, not the passive auxiliary. Pollard's analysis does not extend to stative passives or perfect constructions.

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, p. 250) also notes this.

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*, *være* and *blive* select co-predicates with different argument and valence structure.

4.1 Situations and Argument Structure

Predicates denote situations. Situations split into simple situations where a process or a state holds, and complex situations where a process results in (the coming about of) a state.

The sentence in (20) denotes a simple situation.

(20) Ole dansede. Ole danced

The sentences in (21), on the other hand, denote complex situations.

(21) a. Peter spiste æblet. Peter ate apple_the
b. Bogen forsvandt. Book_the disappeared

(21a) denotes a complex situation consisting of an eating-process, subsituation₁, where Peter is the actor and the apple the undergoer, and the resulting state of the apple being extinct, subsituation₂. (21b) denotes a complex situation where some unknown process leads to the state of the book being gone.

The lexical entries for the stems dans-, spis- and forsvind- are shown in (22).

(22)-stem-word stem-word stem-word PHON $\langle dans - \rangle$ PHON $\langle spis - \rangle$ PHON (forsvind-CAT | HEAD verb CAT | HEAD verb CAT | HEAD verb [complex-sit complex-sit simple-sit CONT CONT SIT1 eat-relSIT1 unspec-rel CONT SIT1 dance-SIT2 extinct-rel SIT2 away-rel

The *unspec-rel* denotes an underspecified process and it has no arguments.

A number of constraints apply to these lexical entries, in the case of *spis*- yielding the result in (23).



The idea is that relations come with a fixed number of arguments. An eating situation must always have an eater and a thing eaten, and *eat-rel* therefore has the two features ACT and UND, each coindexed with an element on the list of semantic arguments, the SEM-ARGS list. Similarly, the *extinct-rel* has one semantic argument, a bearer. The semantic arguments of the subsituations are put onto a higher SEM-ARGS list. The element on the SEM-ARGS list of subsituation₂ is in this particular case identified with the last element on the SEM-ARGS list of subsituation₁.

4.2 Argument Stucture and Valence

The syntactic arguments a predicate may combine with is a reflection of its semantics. We may therefore state the general lexical rule shown in (24) saying that the output *derived-word* has a SYN-ARGS list corresponding to the SEM-ARGS list of the *stem*.

$$\begin{array}{c} (24) \\ \begin{bmatrix} general \cdot verb \cdot rule \\ \\ IN \\ SS \\ SS \\ IOC \\ \begin{bmatrix} CAT \\ CO-PRED \\ COT \\ SEM-ARGS \\ \end{bmatrix} \\ \\ OUT \\ \begin{bmatrix} derived \cdot word \\ \\ SS \\ IOC \\ CAT \\ SYN-ARGS \\ \end{bmatrix} \end{array}$$

The input stem is constrained to have an empty CO-PRED list ensuring that this rule does not apply to auxiliaries until they have combined with their co-predicate.

This means that all words derived from the same stem and with the same core semantics have identical SYN-ARGS lists. The elements on the SYN-ARGS list are distributed to the valence lists according to more specific lexical rules. (25) shows the lexical rule producing active verbs.



A derived active form of *spis*- has two elements on the SYN-ARGS list of which the first appears on the SUBJ list and the second on the COMPS list.

4.3 Past Participles

(26) shows the lexical rule producing past participles.



Their content-value is a *post-state-relation* with a feature PRE-SIT(UATION) taking the content-value of the verb stem as value.

A context like (27) divides past participles into two types.

 $\begin{array}{cccc} (27) & {\rm X \ frygtede} \ / \ {\rm fandt \ Y \ PastPart} \\ & X \ feared & found \ Y \ PastPart \end{array}$

One type is allowed and the other disallowed in this context as exemplified in (28)

- (28) a. Peter frygtede sit kæledyr spist / forsvundet. Peter feared his pet eaten disappeared
 - b. * Peter fandt sin kone kysset / danset. Peter found his wife kissed danced

Assuming that Y in (27) is the subject of the past participle, we suggest that only one subtype of past participle may have subjects.

Semantically this type is characterized by having a resulting state, i.e. a SIT2 in the PRE-SIT inherited from its stem. Both *spist* and *forsvundet* have such a resulting state, and it is the first argument of this state that may be realized as subject. We refer to this type as *result* participles.

The other type is characterized by having a specified SIT1, either a process or state, in its PRE-SIT, inherited from its stem. If the inherited PRE-SIT is complex, the first argument of the SIT1-relation must not simultaneously be the first argument of the resulting state. We refer to this type as *non-result* participles. Verbs like *danse*, 'dance', and *kysse*, 'kiss', form *non-result* participles.

It should be noted that some transitive stems have both a process and a resulting state, where the first argument of the process in SIT1 is not the first argument of the resulting state. They give rise to both a *result* participle and a *non-result* participle. An example is *spist*, 'eaten', as in (28a). Note, however, also that (28a) is not ambiguous. The subject of *spist* can only be understood as the thing eaten, not as the eater. That is, though *spist* may be both a *result* and a *non-result* participle, only in the former case does it have a subject. The first argument cannot surface as subject.

To model these two types of past participle we split the *post-state-rel* into a *result-state-rel* and a *nonresult-state-rel*.

(29) shows the constraints on *non-result* participles.



A past participle with a *nonresult-state-rel* has an empty SUBJ list, a COMPS list which contains all elements from the SYN-ARGS list except for the first. The first element on the SYN-ARGS list is constrained to be the first argument of the SIT1-relation. If the participle has inherited a complex situation, the second argument must also be the first argument of the resulting state. These constraints rule out ergatives as they have no SIT1-arguments. The constraint on complex situations rules out directional motion verbs where the first argument of the process in SIT1 is also the first argument of the resulting state.

(30) shows the constraint on *result* participles.

$$(30) \qquad \left[\begin{array}{c} \text{SYNSEM} \mid \text{local} \begin{bmatrix} \text{Cat} \mid \text{head } pastpart \\ \text{cont} \; result\text{-state-rel} \end{bmatrix} \right] \\ \\ \left[\begin{array}{c} \text{Synsem} \mid \text{local} \begin{bmatrix} \text{Subj} & \left\langle \mathbb{1} \right\rangle \\ \text{Cat} \; \begin{bmatrix} \text{Subj} & \left\langle \mathbb{1} \right\rangle \\ \text{comps} \; \mathbb{2} \\ \text{syn-args} \; list \oplus \left\langle \mathbb{1} \mid \mathbb{2} \right\rangle \\ \text{cont} \; \mid \text{pre-sit} \; \mid \text{sit2} \; \mid \text{sem-args} \; \left\langle \mathbb{1} \mid list \right\rangle \end{bmatrix} \right] \end{array} \right]$$

It says that this type of participle has an element on the SUBJ list. The element on the SUBJ list must appear somewhere on the SYN-ARGS list and must be the first argument of the SIT2-relation. This description generalizes over ergatives where it is the only argument, a subclass of transitive verbs like *spise* where it is the second argument of the SYN-ARG list and finally complex predicates consisting of a motion verb and a directional preposition, see below.

4.4 Auxiliaries

Auxiliaries do not contribute much to the semantics of the sentence, in the case of *have* and vare the SIT1-value is structure-shared with the CONTENT-value of the co-predicate. The basis for 'auxiliary selection' is the argument and valence of the co-predicate.

4.4.1 The auxiliary have

The auxiliary *have*, 'have', takes a co-predicate with an empty SUBJ list and the SYN-ARGS list of the participle is raised to the SYN-ARGS list of *have*. Part of the lexical entry is shown in (31).

$$(31) \begin{bmatrix} \text{CO-PRED} & \left\langle \left[\text{LOC} \mid \text{CAT} \begin{bmatrix} \text{SUBJ} & \langle \rangle \\ \text{SYN-ARGS} \end{bmatrix} \right] \right\rangle \\ \text{SYN-ARGS} \end{bmatrix}$$

This means that have may combine with non-result participles, (32), but not with result participles, (33).

- (32) Peter har ligget på sofaen / løbet / danset / kysset konen / spist maden. Peter has lain on sofa_the run danced kissed wife_the eaten food_the
- (33) *Peter har forsvundet / gået ud i haven. Peter has disappeared gone out in garden_the

4.4.2 The auxiliary være

The auxiliary *være*, 'be', takes a co-predicate with a non-empty SUBJ list and raises the element on the SUBJ list and the COMPS list to its own SYN-ARGS list.

(34) shows part of the lexical entry for *være*.

$$\begin{array}{c} (34) \\ \left[\begin{array}{c} \text{co-pred} & \left\langle \left[\text{loc} \mid \text{cat} \left[\begin{array}{c} \text{subj} & \left\langle 1 \right\rangle \\ \text{comps} \end{array} \right] \right\rangle \right] \\ \text{syn-args} & \left\langle 1 \right\rangle \oplus 2 \end{array} \right] \end{array}$$

This means that it may combine with *result* participles as shown in (35).

- (35) 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

(36) gives an example of an apparent problem, the combination of a motion verb with være.

(36) Peter er løbet. Peter is run

The explanation is that (36) does not mean the same as *har løbet* in (32), the former does have a resulting state, the state of Peter not being at a certain place anymore. We suggest

that $l \phi bet$ in (36) is actually a complex predicate consisting of the participle and a phonetically empty co-predicate.

Unergative participles like *danset*, 'danced', and transitive participles of the type without a resulting state like *kysset*, 'kissed', do not occur with the auxiliary vare as they form *non-result* participles that have no subject, cf. (37).

(37) *Peter er danset / kysset. Peter is danced kissed.

4.4.3 The auxiliary blive

The Danish periphrastic passive is formed with the auxiliary *blive*, 'be, become'. We assume two lexical entries for *blive*, one taking a *non-result* participle, the other a *result* participle as co-predicate.

Part of the lexical entry for $blive_1$ is shown in (38).

$$(38) \begin{bmatrix} (38) \\ CAT \end{bmatrix} \begin{bmatrix} CO-PRED \\ SYN-ARGS \end{bmatrix} \begin{bmatrix} COT \\ COT \end{bmatrix} \begin{bmatrix} COT \\ COT \\ PRE-SIT \\ SIT \end{bmatrix} \begin{bmatrix} COT \\ SIT \end{bmatrix} \end{bmatrix}$$

It says that the co-predicate has a *nonresult-state-rel*, and that *blive* raises the SYN-ARGS list of the co-predicate minus the first element. This means that either the co-predicate is transitive, and the second argument is realized as subject, (39a), or the co-predicate is intransitive giving an empty SYN-ARGS list of *blive*₁ in which case *der* is inserted as dummy subject, (39b).

- (39) a. Pia blev kysset (af Peter). Pia was kissed (by Peter)
 - b. Der blev danset til festen. There was danced at party_the

Part of the lexical entry for $blive_2$ is shown in (40).

$$\begin{array}{c} (40) \\ \left[\begin{array}{c} (40) \\ (40) \end{array} \right] \\ \\ \left[\begin{array}{c} (40) \\ (40) \end{array} \right] \\ \\ \left[$$

It says that the co-predicate has a *result-state-rel*, and that $blive_2$ raises the SYN-ARGS list of the co-predicate minus the first element. $Blive_2$ will realize the second argument of a transitive participle as subject, (41).

(41) Æblet blev spist / skubbet hen i hjørnet. Apple_the was eaten pushed over in corner_the

The SYN-ARGS list of the co-predicate is constrained to have at least two elements the second of which appears on the SUBJ list. This rules out that $blive_2$ may combine with ergative participles since they have only one element on their SYN-ARGS list, (42).

(42) *Der / *Peter blev forsvundet. *There Peter was disappeared*

4.4.4 Multiple auxiliaries

Auxiliaries may combine to form more complex constructions, i.e. the co-predicate may itself be complex. As expected complex predicates with v are which give rise to *non-result* participles can only combine with *have*, (43).

(43) Peter har / *er været forsvundet. Peter has is been disappeared

Complex predicates with $blive_2$ give rise to *result* participles and as expected combine with *være*, (44).

(44) Maden er / *har blevet spist. Food_the is has been eaten

However, it is at present not clear to us why also complex predicates with $blive_1$ combines with *være*.

- (45) a. Der er blevet danset til festen. There is been danced at party_the
 - b. Ulla er blevet kysset af postbudet mange gange. Ulla is been kissed by postman_the many times

We will leave this question for further research.

4.5 Past participles in auxiliary-free constructions

In section 4.3 we used a rasing context to argue for two types of past participle. This also means that the analysis accounts for participles in auxiliary-free constructions, as in (46). The examples with the *result* participles *forsvundet*, 'disappeared', and *myrdet*, 'murdered', are grammatical.

- (46) a. Mand frygtes forsvundet / myrdet. Man is feared disappeared murdered
 - b. *Manden frygtes danset / kissed. Man_the is feared danced kissed

The reason why the analysis accounts for auxiliary-free constructions is that *result* participles have a passive valence structure.

5 Conclusion

In this paper we have presented a set of data showing the range of possible Danish perfect and 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 passive constructions. Three 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 stative passive construction. And 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 the problems the previous analyses were shown to have. 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. Also, non-resultative transitives group together with non-directional motion unergatives in having a process subsituation in their semantic content and no resulting state, explaining why they do not form stative passives. Finally, it was shown how the subject of past participles corresponds to the bearer of a resultative subsituation. This provided the passive valence structure required when the participle is used in constructions without auxiliaries.

The formalisation has been implemented on the ConTroll platform, (Götz et al. (1997)).

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