An HPSG Marking Analysis of Danish Determiners and Clausal Adverbials

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Abstract

Determiners and adverbials in many languages occur in a fixed order which is not an issue that has received a great deal of attention in HPSG94[9]. To deal with the order of Italian determiners Allegranza ([2] and [3]) proposes a revision of HPSG94. We have adopted Allegranza's approach to account for the order of Danish determiners and we have extended it to describe the order of cooccurring clausal adverbials. Our extension provides evidence that Allegranza's revision of HPSG can be used not only to account for determiners in other languages than Italian, but also other phenomena that exhibit a similar combinatorial behaviour.

1 Introduction

Danish determiners, like determiners in other languages, combine in a fixed order within the noun phrase. The order of determiners is not an issue that has received much attention in HPSG94[9]. In HPSG94 the class of determiners forms a uniform category having no subcategories. Determiners are lexically assigned the function specifier which is restricted to the category of *functionals*. *Functionals* include the typical minor categories lacking phrasal projections, but are also meant to include words that project [9, chapter 9]. This analysis cannot account for the categorial diversity of determiners which is essential to any description of their order. Since determiners in HPSG94 belong to the same category, the combination of determiners cannot be constrained by letting determiners or nouns select subcategories of determiners. Also, certain determiners may function as either specifier or adjunct depending on the context they occur in. Since function-specification takes place in the lexicon irrespective of context, this analysis would require two lexical entries for each of these determiners, one for when they function as specifier and one for when they function as adjunct.

Danish clausal adverbials also combine within the clause in a fixed mutual order and this order can be described in terms of their subcategories. In this respect they resemble determiners. This property of adverbials is not dealt with in [9] either.

In (2)[1] we present Danish data illustrating the mutual order of determiners in noun phrases

[1]The work described in this paper in part originates from research carried out within the framework of two EU funded projects, MLAP93-09[11] and LSGRAM (LRE 61029[7]).

and clausal[2] adverbials in main and subordinate clauses. Then, in (3), Allegranza's ([2] and [3]) alternative analysis of Italian determiners, within the framework of HPSG, is presented. In (4) we describe how we have adapted Allegranza's approach to formalize Danish determiners which do not exhibit the same cooccurrence patterns as Italian determiners. We further show that the approach can be extended to constrain the mutual order of clausal adverbials[3]. Finally, in (5) we conclude and propose that the order of other categories may be constrained in a similar fashion.

2 The Order of Danish Determiners and Clausal Adverbials

2.1 Determiners

Determiners include the following categories:

(1) a. **articles**: *den* (the), *en* (a)
 b. **demonstratives**: *denne* (this), *disse* (these), ...
 c. **possessives**: *min* (my), *din* (your), ...
 d. **quantificational det.**: *alle* (all), *enhver* (every/each), *mange* (many), ...
 e. **cardinals**: *en* (one), *to* (two), ...
 f. **ordinals**: *første* (first), *anden* (second), ...

Determiners are commonly classified according to their distribution, and hence divided into predeterminers, central determiners and postdeterminers (cf. [10]). The classification is based on their position in the noun phrase with respect to each other, pre- and postdeterminers pivoting on the central determiner. Quantificational determiners cut across all three classes and we may subdivide them into quantificational pre- , central and postdeterminers. Articles, demonstratives and possessives are central determiners, cardinals and ordinals are postdeterminers. (2) shows the successive attachment of a pre-, central and postdeterminer.

(2) a. *alle katte*
 (all cats)
 b. *alle disse katte*
 (all these cats)
 c. *alle disse mange katte*
 (all these many cats)

The classification in [10] which is based on English determiners presupposes that determiners from the different classes are mutually exclusive. However, in Danish, possessives and the definite article may in certain contexts cooccur with a central determiner, as shown in (3) (cf. [5]):

[2]By clausal adverbials we mean adverbials which are placed in the so-called Actualization Field (in Danish "Nexus Felt" following Diderichsen[4]) i.e. they follow the finite verb or the finite verb and the subject in main clauses, while in subordinate clauses they occur in-between the subject and the finite verb.

[3]In this paper we focus exclusively on the syntax of determiners and adverbials.

(3) a. *dette mit eneste ønske*
(this my only wish)

b. *mine de røde vanter*
(my the red gloves)

c. *dette det første forsøg*
(this the first attempt)

Thus in (3a) the possessive which usually functions as a central determiner cooccurs with a demonstrative determiner. In (3b) the definite article is preceded by a possessive determiner, and finally in (3c) the definite article is preceded by a demonstrative determiner.

2.2 Clausal Adverbials

Adverbs, prepositional phrases, temporal nominal phrases (e.g. *hele dagen* (all day)), participles and subordinate clauses may all function as adverbials modifying clauses.

Main clauses and subordinate clauses have different word order. In main clauses adverbials can occur in the three positions:

- final position, after the main verb and its complements:
  Jeg rejser til Italien om en måned
  (I will travel to Italy in a month)
- initial position, before the finite verb[4]:
  Om en måned rejser jeg til Italien
  (In a month I will travel to Italy)
  (lit. In a month will I travel to Italy)
- in the so called "Actualization field", after the finite verb or after the finite verb and the postpositioned subject[5]:
  Jeg vil faktisk rejse til Italien om en måned.
  (I will actually travel to Italy in a month.)
  and
  Til Italien vil jeg faktisk rejse om en måned.
  (To Italy, I will actually travel in a month.)
  (lit: To Italy will I actually travel in a month)

Some adverbials can occur in all positions (free adverbials), some only in the Actualization field, (clausal adverbials), some cannot occur in the Actualisation field, some occur both in initial position and in the Actualisation field. A few adverbials have different meanings depending on whether they occur in the Actualisation field or not.

In subordinate clauses adverbials can only occur in the Actualisation field (after the subject and before the finite verb) and/or after the main verb and its complements (final position).

Clausal adverbials modify the entire clause and have a fixed order, e.g.

(4) a. *Jeg kan altså faktisk sjældent komme tidligere.*
(I can therefore really seldom come earlier.)

[4]Note that the subject follows the finite verb in main clauses with an initial topicalized element.

[5]In main clauses the subject is postpositioned in simple interrogative clauses and in comment clauses in addition to the previously mentioned clauses with a topicalized element.

b. *Jeg ved at jeg altså faktisk sjældent kan komme tidligere.*
(I know that I can therefore really seldom come earlier.
Lit. I know that I therefore really seldom can come earlier.)

are correct clauses while the following two are not:

(5) a. * *Jeg kan sjældent faktisk altså komme tidligere.*

b. * *Jeg ved at jeg sjældent faktisk altså kan komme tidligere.*

Clausal adverbials are divided into four groups by Allan et al.[1] as follows:

(6)
1. **Short modal adverbs**: *da* (surely), *jo* (certainly), *skam* (you know), *vel* (presumably)...
2. **Conjunctional adverbs**: *altså* (consequently), *derfor* (therefore), *desuden* (additionally), *dog* (still/yet)...
3. **Longer, modal adverbs and prepositional phrases**: *antagelig* (probably), *egentlig* (really), *faktisk* (actually), *i det hele taget* (all together), *oven i købet* (in addition), *trods alt* (in spite of everything), *virkelig* (really...)
4. **Negations**: *aldrig* (never), *ikke* (not)...

The four groups reflect the relative order of clausal adverbials cooccurring in a clause, i.e. short modal adverbials occur first, followed by conjunctional, longer modal and negation adverbials as illustrated in (7):

(7)

Peter har	*vel*	*derfor*	*faktisk*	*aldrig*	*været i København*
	1	2	3	4	

(Peter has presumably therefore actually never been in Copenhagen)

To the fourth group (negations) we have added expressions of frequency such as *altid* (always), *sjældent* (seldom), *ofte* (often). However, the relative order of clausal adverbials is not as simple as described in [1]. Adverbials from the first three groups can cooccur freely with adverbials of the same type[6]. Moreover, in main clauses the main verb occurs before the clausal adverbials while in subordinate clauses it follows them.

3 Allegranza's Revised Selection and Marking

As we have shown in section 2 both determiners and clausal adverbials combine in a fixed order. In order to constrain the combination of Italian determiners Allegranza ([2] and [3]) proposes a revision of HPSG94 [9]. This revision allows for a subcategorization of determiners and the specification of a single lexical entry for determiners which may be adjunct or specifier according to the context in which they occur.

In HPSG94 determiners and adverbials are specifiers and adjuncts respectively and, together with markers (complementizers and conjunctions), they are non-head selectors.

The functional specifiers and markers, select their head sister by means of the SPEC head feature according to the HEAD-SPECIFIER and the HEAD-MARKER SCHEMATA. In addition,

[6] Actually, there are some restrictions on the combination of adverbials of the same type, which are not mentioned in [1]. We will not describe them in this paper.

in the HEAD-SPECIFIER SCHEMA the head daughter selects the specifier daughter via the category feature SPR[7]. The substantive adjuncts select the adjacent head-daughter by means of the head feature MOD in the HEAD-ADJUNCT SCHEMA[9, p. 46].

Marking is restricted to markers and is used to block the cooccurrence of markers in the same construction. The value of MARKING, i.e. *marking*, is subtyped into *marked* and *unmarked.* The sort *marked* is subtyped into *complementizer* and *conjunction*, and *complementizer* is again subtyped into *that* and *for*.

Allegranza, similarly to Netter ([8]), generalizes HPSG non-head selection to cover selection by a general functor and extends the marking mechanism to cover all non-head functors. In the revised HPSG a *head-functor-structure* replaces HPSG *head-specifier-structure*, *head-marker-structure* and *head-adjunct-structure* and a FUNCT-DTR substitutes SPR-DTR, ADJ-DTR and MARK-DTR. The FUNCT-DTR has two head features a selecting ARG-SLOT which replaces SPEC and MOD, and a marking feature MARKER. The value of MARKER is structure-shared with the MARKED value of the mother node in a *head-functor-structure.* The SPR which in HPSG was a valency list is treated as a simple boolean feature similar to Netter's FCOMPL[8]. The HEAD-FUNCTOR SCHEMA replacing the HEAD-SPECIFIER, HEAD-ADJUNCT and HEAD-MARKER Schemata in [9] is shown in example (8) (c.f. [3, p. 34]):

(8)
$$\begin{bmatrix} \text{SYNSEM}\,|\,\text{LOC}\,|\,\text{CAT}\,|\,\text{MARKED}\ \boxed{1} \\ \text{DTR} \begin{bmatrix} \text{FUN-DTR}\,|\,\text{SYNSEM}\,|\,\text{LOC}\,|\,\text{CAT} \begin{bmatrix} \text{MARKED}\,|\,\text{SPR}\ + \\ \text{HEAD} \begin{bmatrix} \text{MARKER} & \boxed{1} \\ \text{ARG-SLOT} & \boxed{2} \end{bmatrix}_{head} \end{bmatrix}_{syntagma} \\ \text{HEAD-DTR}\,|\,\text{SYNSEM}\ \boxed{2} \end{bmatrix}_{head\text{-}fun\text{-}struc} \end{bmatrix}$$

Determiners are now functors and thus have the property of marking their head sisters. This is exploited in Allegranza's account of Italian determiners. Italian determiners have the attribute MARKER with the value *marking* which is subtyped as follows:

(9) **Partitions of** *marking: unmarked, marked.*

Partitions of *marked: determination (det), ...*

Partitions of *det: switch-det, source-det.*

Partitions of *switch-det: outer-det, inner-det.*

Partitions of *source-det: inner-det, baretype-det.*

The various partitions are further specified as in (10)-(14)[9]:

(10) $\textit{marked:}\begin{bmatrix}\text{SPR} & \textit{boolean}\end{bmatrix}$

(11) $\textit{det:}\begin{bmatrix}\text{QUAMARK} & \textit{boolean} \\ \text{ORDMARK} & \textit{boolean} \\ \text{POSSPRO} & \textit{list(synsem)}\end{bmatrix}$

[7]This mutual selection giving rise to a recursive structure has been criticized in both [8] and [3].

[8]Netter[8] introduces the concept of functional completeness in addition to subcategorization to account for projection levels of nominals and suggests an analysis of German NP specifiers as functional heads.

[9]Note that POSSPRO takes a list as its value. Nouns are not assumed to subcategorize for possessives. However, Allegranza notes that possessives are subject to binding theory (cf. [2, p. 69]), and consequently must appear on the subcategorization list of the head noun. To achieve this he structure-shares the possessive's *synsem* with an element on the head noun's subcategorization list via POSSPRO. Therefore the value of POSSPRO is not boolean. It should also be noted that the marking mechanism presupposes a binary branching analysis of constituent structure, which is a departure from HPSG94.

(12) *outer-det:*[SPR +]

(13) *inner-det:*[SPR -]

(14) *baretype-det:*[SPR +]

Allegranza's approach solves the problems the HPSG analysis of determiners presented. Firstly, the type hierarchy reflects the categorial diversity of determiners. The attributes QUAMARK, ORDMARK and POSSPRO reflect the fact mentioned above that determiners do not form a uniform group. Quantificational determiners (QUAMARK), ordinals (ORDMARK) and possessives (POSSPRO) are different subcategories and enter into each their fixed position in the noun phrase. The attributes are used to constrain selection by determiners of their nominal head-sister.

Secondly, the functional variation of determiners as specifiers or adjuncts is formalized by the subtyping and the attribute SPR. Determiners of type *outer-det* are specifiers if they project SPR - nominals into SPR + nominals, in other words if they select *inner-det* nominals. To this group belong Italian articles, demonstratives and central quantifiers, such as *il, questo, ogni* (the, this, every). If, on the other hand, they project SPR + nominals into SPR + nominals, i.e. pass on the SPR value of their head-sister, they are adjuncts (Italian predeterminers are *tutto, entrambi* (all, both)). Determiners of type *inner-det* are always adjuncts and project SPR - nominals. Underspecified *source-det* determiners whose projections are resolved to nominals of type *baretype-det* by external selection are always adjuncts, and the SPR + value originates from the head noun (Italian ordinals and possessives, e.g. *secondo*, *mio* (second, mine)). *Source-det* determiners that are resolved to *inner-det* by the attachment of a preceding determiner are adjuncts, i.e. SPR -. The type *switch-det* is likewise underspecified. A determiner lexically underspecifed as a *switch-det* determiner may end up as either an *outer-det* determiner if no other determiner precedes, hence specifier, or an *inner-det* determiner, hence adjunct, when another determiner precedes. In Italian this holds for cardinals and quantificational postdeterminers, e.g. *due, molti* (two, many), as shown in the following two examples: *due bambini* (two children) and *i due bambini* (the two children) where *due* is a specifier and an adjunct respectively.

4 Formalizing Danish Determiners and Clausal Adverbials

4.1 Determiners

In the following we will show how Allegranza's marking typology can be applied to the formalization of Danish determiners, by going through the successive attachments of determiners in the NP *alle disse de første forsøg* (all these the first attempts).

Danish ordinals, like the Italian ordinals, project ORDMARK + *source-det* nominals and select ORDMARK - *source-det* nominals. Ordinals pass on unchanged the SPR value of the nominal to which they attach. Apart from the ORDMARK marking, the representation of ordinals correspond to the representation of adjectives.

(15)

$$\boxed{6}\begin{bmatrix}\text{POSSPRO} & \boxed{1}\\ \text{DEFMARK} & \boxed{2}\\ \text{QUAMARK} & \boxed{3}\\ \text{ORDMARK} & +\end{bmatrix}_{\textit{source-det}}$$

$$\begin{bmatrix}\text{MARKER} & \boxed{6}\\ \text{ARG-SLOT} & \begin{bmatrix}\text{MARKED} & \boxed{5}\begin{bmatrix}\text{POSSPRO} & \boxed{1}\\ \text{DEFMARK} & \boxed{2}\\ \text{QUAMARK} & \boxed{3}\\ \text{ORDMARK} & -\end{bmatrix}_{\textit{source-det}}\end{bmatrix}\end{bmatrix} \qquad \boxed{5}\begin{bmatrix}\text{POSSPRO} & \boxed{1}\\ \text{DEFMARK} & \boxed{2}\\ \text{QUAMARK} & \boxed{3}\\ \text{ORDMARK} & \boxed{4}\end{bmatrix}_{\textit{source-det}}$$

første   forsøg

The Danish definite article may follow a demonstrative or a possessive. This is accounted for by treating it as *switch-det*. To avoid iteration of definite articles the attribute DEFMARK is introduced for Danish. The definite article selects DEFMARK - nominals and projects DEFMARK + marked nominals. They undo a potential QUAMARK + resulting from a previous attachment of a quantificational postdeterminer, allowing predeterminers to attach after a demonstrative even though the nominal may already contain a quantificational postdeterminer.

(16)

$$\boxed{6}\begin{bmatrix}\text{POSSPRO} & \boxed{1}\\ \text{DEFMARK} & +\\ \text{QUAMARK} & -\\ \text{ORDMARK} & \boxed{4}\end{bmatrix}_{\textit{switch-det}}$$

$$\begin{bmatrix}\text{MARKER} & \boxed{6}\\ \text{ARG-SLOT} & \begin{bmatrix}\text{MARKED} & \boxed{5}\begin{bmatrix}\text{POSSPRO} & \boxed{1}\\ \text{DEFMARK} & -\\ \text{QUAMARK} & \boxed{3}\\ \text{ORDMARK} & \boxed{4}\\ \text{SPR} & -\end{bmatrix}_{\textit{inner-det}}\end{bmatrix}\end{bmatrix} \qquad \boxed{5}\begin{bmatrix}\text{POSSPRO} & \boxed{1}\\ \text{DEFMARK} & \boxed{2}\\ \text{QUAMARK} & \boxed{3}\\ \text{ORDMARK} & +\end{bmatrix}_{\textit{source-det}}$$

de   første forsøg

Danish demonstratives have the same marking and selection properties as Italian demonstratives, selecting an *inner-det* which is SPR -, and projecting an *outer-det*, resulting in an SPR + marked nominal.

(17)

$$\boxed{6}\begin{bmatrix}\text{POSSPRO} & \boxed{1}\\ \text{DEFMARK} & \boxed{2}\\ \text{QUAMARK} & -\\ \text{ORDMARK} & \boxed{4}\\ \text{SPR} & +\end{bmatrix}_{\textit{outer-det}}$$

$$\begin{bmatrix}\text{MARKER} & \boxed{6}\\ \text{ARG-SLOT} & \begin{bmatrix}\text{MARKED} & \boxed{5}\begin{bmatrix}\text{POSSPRO} & \boxed{1}\\ \text{DEFMARK} & \boxed{2}\\ \text{QUAMARK} & \boxed{3}\\ \text{ORDMARK} & \boxed{4}\\ \text{SPR} & -\end{bmatrix}_{\textit{inner-det}}\end{bmatrix}\end{bmatrix} \qquad \boxed{5}\begin{bmatrix}\text{POSSPRO} & \boxed{1}\\ \text{DEFMARK} & +\\ \text{QUAMARK} & -\\ \text{ORDMARK} & +\end{bmatrix}_{\textit{switch-det}}$$

disse   de første forsøg

Finally, the distribution of Danish predeterminers differs from that of Italian predeterminers. Italian predeterminers select *outer-det* marked nominals. As (18) shows, Danish predeterminers select for the less specific type *det* further constrained as QUAMARK -, avoiding immediate cooccurrence of quantificational determiners. Thus they select both SPR - and SPR + marked nominals, projecting SPR +.

(18)

$$\boxed{6}\begin{bmatrix}\text{POSSPRO} & \boxed{1}\\ \text{DEFMARK} & \boxed{2}\\ \text{QUAMARK} & +\\ \text{ORDMARK} & \boxed{3}\\ \text{SPR} & +\end{bmatrix}_{\textit{outer-det}}$$

$$\begin{bmatrix}\text{MARKER} & \boxed{6}\\ \text{ARG-SLOT} & \begin{bmatrix}\text{MARKED} & \boxed{5}\begin{bmatrix}\text{POSSPRO} & \boxed{1}\\ \text{DEFMARK} & \boxed{2}\\ \text{QUAMARK} & -\\ \text{ORDMARK} & \boxed{4}\end{bmatrix}_{\textit{det}}\end{bmatrix}\end{bmatrix} \qquad \boxed{5}\begin{bmatrix}\text{POSSPRO} & \boxed{1}\\ \text{DEFMARK} & +\\ \text{QUAMARK} & -\\ \text{ORDMARK} & +\\ \text{SPR} & +\end{bmatrix}_{\textit{outer-det}}$$

alle — disse de første forsøg

4.2 Clausal Adverbials

In the following we give a formal account of the mutual order of Danish clausal adverbials by further extending Allegranza's marking system. To control the placement of adverbials in a clause, we introduce a head feature PLACEM the value of which is subtyped into *front, end, nexus*. The value of PLACEM is encoded lexically in the entries of clausal adverbials. The marking system we describe concerns clausal adverbials, i.e. adverbials with the value *nexus*.

We have added the subtype *actualization* to Allegranza's *marked* partition as in (19):

(19) **Partitions of** *marked: actualization (act),...*
Partitions of *act: main_cl, subord_cl.*

main_cl and *subord_cl* constitute the two subtypes of the marking system referring to adverbials in main clauses and in subordinate clauses respectively. The partitions are further specified in (20 and 21):

(20) $\textit{main\_cl:}\begin{bmatrix}\text{ADV1} & \textit{boolean}, \text{ADV2} & \textit{boolean}\\ \text{ADV3} & \textit{boolean}, \text{ADV4} & \textit{boolean}\end{bmatrix}$

(21) $\textit{subord\_cl:}\begin{bmatrix}\text{BADV1} & \textit{boolean}, \text{BADV2} & \textit{boolean}\\ \text{BADV3} & \textit{boolean}, \text{BADV4} & \textit{boolean}\end{bmatrix}$

We now illustrate how the above formalization accounts for the attachment of clausal adverbials described in section 2.2. In particular we look at the attachment of the adverbials in the sentence *Jeg kommer jo derfor* (I come certainly therefore).

Short modal adverbials select main clauses that may contain an adverbial of their type, and project ADV1 +. The short modal *jo* attaches to the clause *Jeg kommer*, which does not contain any adverbials. Thus the marking of the clause unifies with the selecting marking of the short modal and the projected clause receives a positive value for ADV1 as shown in (22).

(22)

$$\boxed{6}\begin{bmatrix}\text{ADV1} & + \\ \text{ADV2} & - \\ \text{ADV3} & - \\ \text{ADV4} & -\end{bmatrix}_{\textit{main\_cl}}$$

$$\underset{\text{Jeg kommer}}{\boxed{5}\begin{bmatrix}\text{ADV1} & \boxed{1} \\ \text{ADV2} & \boxed{2} \\ \text{ADV3} & \boxed{3} \\ \text{ADV4} & \boxed{4}\end{bmatrix}_{\textit{main\_cl}}} \qquad \underset{\text{jo}}{\begin{bmatrix}\text{MARKER} & \boxed{6} \\ \text{ARG-SLOT} & \begin{bmatrix}\text{MARKED} & \boxed{5}\begin{bmatrix}\text{ADV1} & - \\ \text{ADV2} & - \\ \text{ADV3} & - \\ \text{ADV4} & -\end{bmatrix}_{\textit{main\_cl}}\end{bmatrix}\end{bmatrix}}$$

When the conjunctional adverbial *derfor* (therefore) attaches to the clause *Jeg kommer jo*, its selecting marking unifies with that of the clause as shown in (23). The projected clause structure-shares the value of MARKED with the value of MARKER of the selecting adverbial.

(23)

$$\boxed{4}\begin{bmatrix}\text{ADV1} & \boxed{1} \\ \text{ADV2} & + \\ \text{ADV3} & - \\ \text{ADV4} & -\end{bmatrix}_{\textit{main\_cl}}$$

$$\underset{\text{Jeg kommer jo}}{\boxed{3}\begin{bmatrix}\text{ADV1} & + \\ \text{ADV2} & - \\ \text{ADV3} & - \\ \text{ADV4} & -\end{bmatrix}_{\textit{main\_cl}}} \qquad \underset{\text{derfor}}{\begin{bmatrix}\text{MARKER} & \boxed{4} \\ \text{ARG-SLOT} & \begin{bmatrix}\text{MARKED} & \boxed{3}\begin{bmatrix}\text{ADV1} & \boxed{1} \\ \text{ADV2} & - \\ \text{ADV3} & - \\ \text{ADV4} & -\end{bmatrix}_{\textit{main\_cl}}\end{bmatrix}\end{bmatrix}}$$

Attaching the short modal *vel* to the projected clause *Jeg kommer jo derfor* in (23) is prevented by the marking mechanism. In fact the marking of the clause does not unify with that of the selecting adverbial as shown in (24).

(24)

$$\underset{\text{Jeg kommer jo derfor}}{\boxed{2}\begin{bmatrix}\text{ADV1} & \boxed{1} \\ \text{ADV2} & + \\ \text{ADV3} & - \\ \text{ADV4} & -\end{bmatrix}_{\textit{main\_cl}}} \qquad \underset{\text{vel}}{\begin{bmatrix}\text{MARKER} & \boxed{4} \\ \text{ARG-SLOT} & \begin{bmatrix}\text{MARKED} & \boxed{3}\begin{bmatrix}\text{ADV1} & - \\ \text{ADV2} & - \\ \text{ADV3} & - \\ \text{ADV4} & -\end{bmatrix}_{\textit{main\_cl}}\end{bmatrix}\end{bmatrix}}$$

5 Concluding Remarks

The order of cooccurring determiners in nominal phrases and of clausal adverbials in clauses is not treated in HPSG94. To constrain the ordering of Italian determiners Allegranza proposes a revision of HPSG selection and Marking Principle. The categorial and functional diversity of determiners is reflected in the formalized marking system.

In this paper we have adopted Allegranza's approach to treat the order of Danish determiners and clausal adverbials. Our extension of the marking system provides evidence that Allegranza's approach can be used not only to describe determiners in other languages than Italian, but also to deal with another selecting category that occurs in a fixed order.

Also in other languages than Danish there are order restrictions on certain adverbials. For example in English *He can actually always get away with arriving late* is a correct sentence while *He can always actually get away with arriving late* is not. Although the mutual order of such adverbials is quite flexible, it is possible to find some general rules [10]. The same applies for the combination restrictions on punctuation markers [6]. The ordering involved in these kinds of phenomena can be constrained by means of the extended marking system in a way similar to that presented in this paper.

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