The *Adverb Argument Intersection Field* in a Left-Branching Grammar of Norwegian

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Summary. This paper presents an account of the position of sentence adverbials in Norwegian within a left-branching grammar HPSG-like design. The assumed left-branching structures open for a treatment of Object Shift in Norwegian as part of a wider phenomenon referred to as the *Adverb Argument Intersection Field*.

Keywords: HPSG, Norwegian, sentence adverbials, grammar engineering.

1   Introduction

A central topic in Scandinavian syntax is the notion of "Object Shift" (see Diderichsen (1946); Hellan (1971); Fretheim and Halvorsen (1975); Holmberg (1986); Holmberg and Platzack (1995); Hellan and Platzack (1995); Vikner (1994, 1995)). Object Shift applies when a pronoun "shifts" from its "normal" position behind the sentence adverb to the position preceding it, after the main verb. This is illustrated in (1). In (1a) the two objects appear after the sentence adverbial *ikke*. In (1b) the indirect object pronoun *henne* is "shifted" to the position preceding *ikke*, and in (1c), both objects (*henne* and *den*) have "shifted".

(1)   a. Jon ga   ikke Marit en blomst.
           Jon gave not Marit a flower
           Jon didn't give Marit a flower.

       b. Jon ga   henne ikke en blomst.
           Jon gave her   not a flower
           Jon didn't give her a flower.

       c. Jon ga   henne den ikke.
           Jon gave her   it   not
           Jon didn't give it to her.

The arguments that undergo Object Shift are usually unstressed pronouns.[1] In this paper, it will be shown show how Object Shift can be seen as a part of a wider phenomenon, involving what will be referred to as the 'Adverb-Argument Intersection Field.' The analysis that will be presented has been implemented in a grammar for Norwegian, Norsyg (Haugereid, 2009). It does not involve movements, just a field with certain ordering constraints. In addition, the analysis does not restrict itself to the position of sentence adverbials with regard to the objects, but also with regard to the subject.

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[1] In Icelandic, full NPs can undergo Object Shift. This is also possible in Norwegian, but it then requires a marked intonation on the verb, and the reference of the NPs must be as salient as that of an unstressed pronoun.

2 The Adverb-Argument Intersection Field (AAIF)

An informal definition of the Adverb-Argument Intersection Field (AAIF) in Scandinavian is given in (2).

(2) The Adverb-Argument Intersection Field is the field after the first verb or complementizer and before the following verb.

The sentence adverbials and arguments in the AAIF obey the following ordering constraints:

(3) a. Focused arguments cannot appear in the position following a sentence adverbial.

b. Unfocused arguments cannot precede a sentence adverbial.

In a main clause with a finite main verb, the AAIF includes the sentence adverbs and arguments that appear after the main verb, since the main verb is the first verb or complementizer. Since the sentence has only one verb (and no complementizer), the AAIF does not have a boundary to the right, other than the clause boundary. An example of an AAIF of a main clause with a finite main verb was given in (1), where it includes all constituents after the verb *ga* ('gave'). Given the constraints in (3), the position of the sentence adverbial with regard to the arguments is accounted for.

If a non-subject constituent is topicalized in a sentence with a finite main verb, the subject becomes a part of the AAIF. This is illustrated in (4), where the AAIF includes the sentence adverbial *ikke*, the subject, and the two objects. In (4a), the subject *Jon* is a full NP and appears after *ikke*. In (4b), the subject is the pronoun *han* ('he'), and it now appears before *ikke*. In (4b), all the arguments are pronouns, and they all precede *ikke*.

(4) a. I dag ga ikke Jon Marit en blomst.
today gave not Jon Marit a flower
Today, Jon didn't give Marit a flower.

b. I dag ga han ikke Marit en blomst.
today, gave he not Marit a flower
Today, he didn't give Marit a flower.

c. I dag ga han henne den ikke.
today gave he her it not
Today, he didn't give it to her.

Also in yes-no questions, the subject becomes a part of the AAIF, given that the main verb is finite. This is shown in (5). As in (4), the subject appears after the sentence adverbial when it is a full NP (see (5a)), and before the sentence adverbial when it is a pronoun (see (5b) and (5c)).

(5) a. Ga ikke Jon Marit en blomst?
gave not Jon Marit a flower
Didn't Jon give Marit a flower?

b. Ga han ikke Marit en blomst?
gave he not Marit a flower
Didn't he give Marit a flower?

c. Ga han henne den ikke?
gave he her it not
Didn't he give it to her?

In addition to main clauses with a main verb, also subordinate clauses and main clauses with an auxiliary (and a non-subject constituent in the first position) have an AAIF. The field then consists

only of the sentence adverbial and the subject. This is illustrated in (6) and (7). In (6a) and (7a), the subject follows the sentence adverbial. This position is only possible if the subject is a full NP (*Jon*), and not an (unstressed) pronoun (*han* ('he')). In (6b) and (7b), the subject precedes the sentence adverbial. In this position, the subject can be either an unstressed pronoun or a full NP.

(6) a. at ikke Jon/*han ga Marit en blomst
     that not Jon/he gave Marit a flower
     that Jon didn't give Marit a flower

   b. at Jon/han ikke ga Marit en blomst?
     that Jon/he not gave Marit a flower
     that Jon/he didn't give Marit a flower

(7) a. Marit har alltid Jon/*han beundret.
     Marit has always Jon/he admired
     Marit, Jon always has admired.

   b. Marit har Jon/han alltid beundret.
     Marit has Jon/he always admired
     Marit, Jon/he always has admired.

3 Analysis

3.1 Subordinate Clauses

The analysis presented in this paper makes certain assumptions that differ from a standard HPSG analysis. Most importantly, it is a constructionalist approach, and the the structure is not built up around the main verb. Rather, a verb may be selected by a structure headed by a complementizer of an auxiliary. This constructionalist approach allows binary left-branching structures to be built, as shown in Figure 1 (see also Haugereid and Morey (2012)). In this analysis, the complementizer *at* ('that') forms a fundament upon which the rest of the constituents are attached. A complementizer has the constraints shown in (8). The complementizer selects for an argument with subject case via the feature ARG(UMENT),[2] and a finite auxiliary or main verb via the feature VBL(VERBAL).[3]
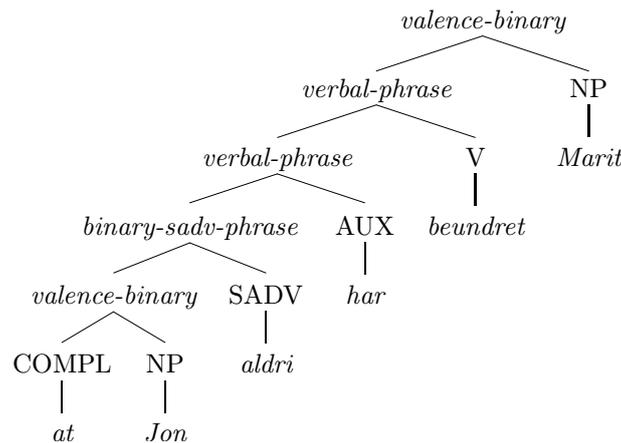

Figure 1: Analysis of *at Jon aldri har beundret Marit* ('that Jon never has admired Marit')

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[2] The function of the ARG(UMENT) feature is to allow a word or phrase to constrain the next argument that it attaches to. It can be seen as a pivot for the arguments of the clause. The grammar has an account of how the individual arguments are linked, but that will not be a topic in this paper.

[3] The function of the VBL(VERBAL) feature is to let words or phrases constrain the verb following them.

(8)
$$
\begin{bmatrix}
\textit{complementizer-word} \\
\text{HEAD} & \textit{compl} \\
\text{ARG}|\text{CASE} & \textit{subj-case} \\
\text{VBL} & \begin{bmatrix} \text{HEAD} & \textit{aux-verb} \\ \text{TENSE} & \textit{finite} \end{bmatrix}
\end{bmatrix}
$$

Arguments are combined with the valence rule shown in (9), where the value of ARG of the first daughter is the second daughter.[4]

(9)
$$
\begin{bmatrix}
\textit{valence-binary} \\
\text{HEAD} & \boxed{1} \\
\text{ARG}|\text{CASE} & \textit{non-subj-case} \\
\text{ARGS} & \left\langle \begin{bmatrix} \text{HEAD} & \boxed{1} \\ \text{ARG} & \boxed{2} \end{bmatrix}, \boxed{2} \right\rangle
\end{bmatrix}
$$

Verbs and auxiliaries are combined with the verbal rule shown in (10). The rule, which is head-initial, unifies the value of VBL of its first daughter with the second. It also unifies the VBL value of its second daughter with that of its mother, which means that a verb can constrain the following verb (if there is any). The rule also has the feature AAIF −, which expresses that the verbal rule has triggered, and that the AAIF is finished. The motivation behind this feature is that the verbal rule functions as a delimiter of the AAIF.[5]

(10)
$$
\begin{bmatrix}
\textit{verbal-phrase} \\
\text{HEAD} & \boxed{1} \\
\text{ARG} & \boxed{3}\begin{bmatrix} \text{CASE} & \textit{non-subj-case} \end{bmatrix} \\
\text{AAIF} & - \\
\text{VBL} & \boxed{2} \\
\text{ARGS} & \left\langle \begin{bmatrix} \text{HEAD} & \boxed{1} \\ \text{VBL} & \boxed{4} \\ \text{ARG} & \boxed{3} \end{bmatrix}, \boxed{4}\begin{bmatrix} \textit{synsem} \\ \text{HEAD} & \textit{aux-verb} \\ \text{VBL} & \boxed{2} \\ \text{ARG} & \boxed{3} \end{bmatrix} \right\rangle
\end{bmatrix}
$$

The rule for sentence adverbial is given in 11. It is a head-final rule which combines a word or phrase to a sentence adverbial. The constraint AAIF + means that it cannot apply after the verbal rule has applied.

(11)
$$
\begin{bmatrix}
\textit{binary-sadv-phrase} \\
\text{HEAD} & \boxed{1} \\
\text{AAIF} & \boxed{2}\,+ \\
\text{ARGS} & \left\langle \begin{bmatrix} \text{HEAD} & \boxed{1} \\ \text{AAIF} & \boxed{2} \end{bmatrix}, \begin{bmatrix} \text{HEAD} & \textit{sadv} \end{bmatrix} \right\rangle
\end{bmatrix}
$$

The position of the AAIF is shown in Figure 2. The feature AAIF reflects where the order of arguments and sentence adverbials is not fixed, namely after the complementizer and before the finite verb, and so it is only the subject *Jon* and the sentence adverbial *aldri* which appear in the AAIF.

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[4] The treatment of valency in the Norsyg grammar is presented in Haugereid (2012).

[5] The rule is also constrained to apply after the valence rule that links the subject, and before the rules that link the objects, but this is not shown in the present analysis.
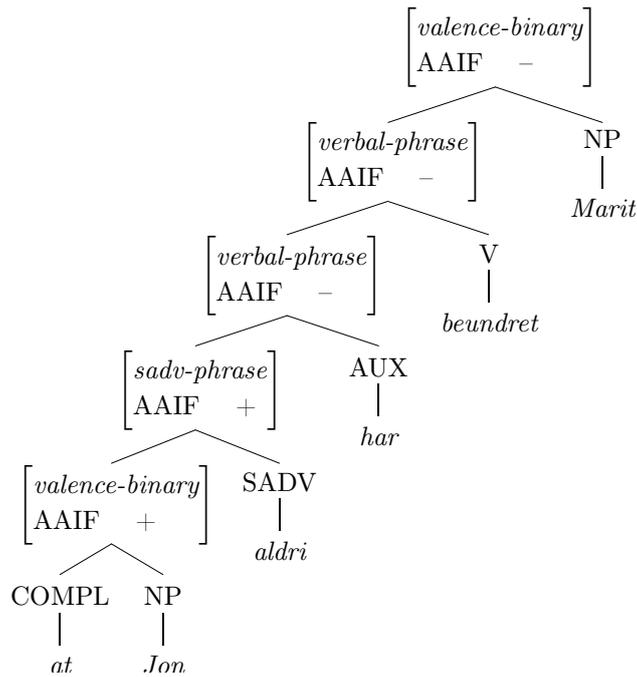
$$
\begin{bmatrix} \textit{valence-binary} \\ \text{AAIF} \quad - \end{bmatrix}
$$

— below, the tree for Figure 2:

```
                    [valence-binary]
                    [AAIF    –      ]
                   /                \
          [verbal-phrase]            NP
          [AAIF    –    ]             |
          /           \            Marit
   [verbal-phrase]     V
   [AAIF    –    ]     |
    /         \     beundret
[sadv-phrase]  AUX
[AAIF    +  ]   |
  /       \    har
[valence-binary]  SADV
[AAIF    +     ]   |
   /      \      aldri
COMPL    NP
 |        |
 at      Jon
```

Figure 2: Analysis of *at Jon aldri har beundret Marit* ('that Jon never has admired Marit')

3.2 Main clauses

In declarative main clauses, it is assumed that the first constituent, including the subject, is extracted. This is a common assumption in the literature on Scandinavian syntax (see Holmberg and Platzack (1995)), and it has also been hinted at in Pollard and Sag (1994, 381). The idea can be traced back to Diderichsen (1946, 185).

The extraction of the first constituent is accounted for by means of a set of extraction rules, which trigger in the canonical position of the extracted element, and a filler rule, which fills in the extracted element in the position before the first verb. The dependency between the filler rule and the extraction rule is accounted for by means of a SLASH feature. An analysis of a transitive main clause with a sentence adverbial is given in Figure 3.[6]
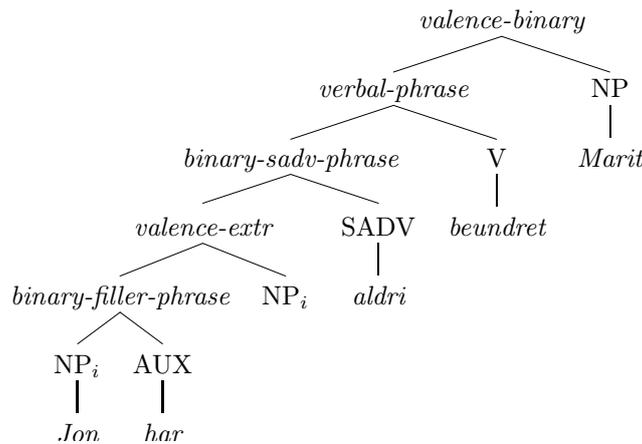
```
                    valence-binary
                   /              \
            verbal-phrase          NP
           /            \           |
   binary-sadv-phrase    V        Marit
    /            \        |
valence-extr    SADV   beundret
  /       \       |
binary-    NP_i  aldri
filler-
phrase
 /    \
NP_i  AUX
 |     |
Jon   har
```

Figure 3: Analysis of *Jon har aldri beundret Marit* ('John never has admired Marit')

The filler rule and the extraction rule employed in the analysis in Figure 3 are illustrated in (12)

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[6] The dependency between the extracted element and its trace is shown with the index i.

and (13). While the filler rule realizes the extracted element as its first daughter, the extraction rule links the extracted element to its ARG value and ensures that it is linked in its canonical position.

(12)
$$\begin{bmatrix} \textit{filler-binary} \\ \text{HEAD} \quad \boxed{1} \\ \text{ARG|CASE} \quad \textit{subj-case} \\ \text{VBL} \quad \boxed{2} \\ \text{SLASH} \quad \left\langle \boxed{3} \right\rangle \\ \\ \text{ARGS} \quad \left\langle \boxed{3}, \begin{bmatrix} \text{HEAD} \quad \boxed{1} \\ \text{VBL} \quad \boxed{2} \\ \text{SLASH} \quad \left\langle \right\rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

(13)
$$\begin{bmatrix} \textit{valence-extr} \\ \text{HEAD} \quad \boxed{1} \\ \text{ARG|CASE} \quad \textit{non-subj-case} \\ \text{SLASH} \quad \left\langle \right\rangle \\ \\ \text{ARGS} \quad \left\langle \begin{bmatrix} \text{HEAD} \quad \boxed{1} \\ \text{ARG} \quad \boxed{2} \\ \text{SLASH} \quad \left\langle \boxed{2} \right\rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

A declarative main clause with a topicalized adverbial is given the analysis in Figure 4. As the tree shows, the AAIF includes all the constituents after the main verb.
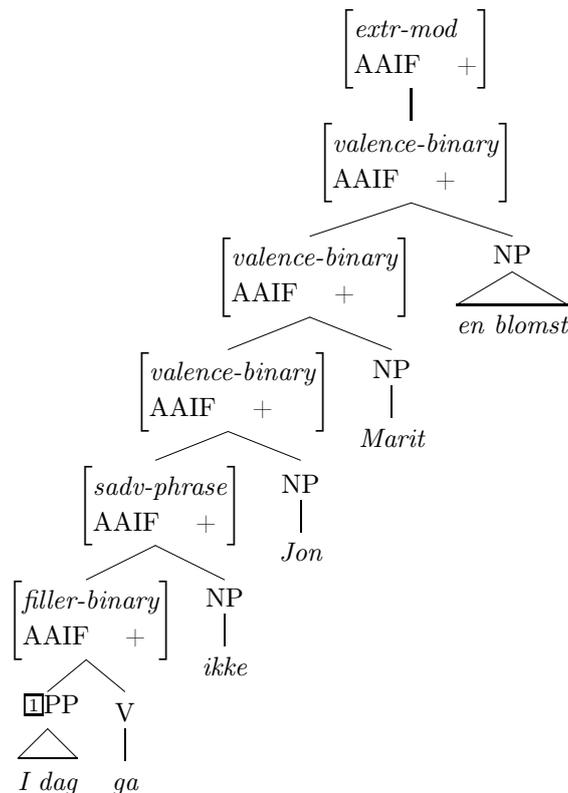
Figure 4: Analysis of *I dag ga ikke Jon Marit en blomst* ('Today, John didn't give Marit a flower')

Given the analysis presented in this section, the AAIF can be given a more formal definition than the one in (2):

(14) The Adverb-Argument Intersection Field of a clause includes the phrases attaching to the head projection before the verbal rule.

Some additional constraints are be needed in order to prevent unstressed pronouns from appearing in the position after a sentence adverbial. This has however not been implemented since it is possible for *stressed* pronouns to appear in this position, and the grammar presented only parses text, which does not differentiate between stressed and unstressed pronouns.

4   Conclusion

An account of the position of sentence adverbials with regard to the arguments in a clause has been presented. A field called the Adverb Argument Intersection Field was introduced. This field includes all constituents that attaches to the projection of the first verb or complementizer before the next verb is attached. In subordinate clauses and clauses with auxiliaries, the field may include only the subject and the sentence adverbial, while in main clauses, the field may include the subject as well as the indirect and direct object and the sentence adverbial. By assuming that verbs that follow an auxiliary or complementizer are attached to the projection of the initial auxiliary or complementizer by means of a special rule, the verbal rule, it was possible to constrain the elements applying after the verbal rule to be outside the Adverb Argument Intersection Field.

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