The Amazon Grammar and the Last Part of the Middle Field

Simon van Dreumel

University of Nijmegen

Abstract

In this paper we will discuss the description of the end of the Middle Field in AMAZON, a structuralist parser for Dutch sentences. Within structuralist grammar, the Middle Field is defined as the sentence part between the finite verb in the main clause, or complementizer position in the subclause, and the verbal end cluster. The last part of the Middle Field has recently been subject of linguistic research. It seems to be strongly related to the verbal cluster. In particular, V-particles, R-particles (i.e. particles belonging to pronominal adverbs) and predicative elements seem to indicate the end of the Middle Field and the beginning of the verbal cluster. We will investigate these three elements in some detail. After a brief survey of the AMAZON grammar, we will elaborate on a further formalization of the final part of the Middle Field. We will show that this formalization solves some transparency problems.

Introduction

Parsing natural language can be done in several ways. See for an elaborate overview Reyle and Rohrer (1988), Neijt and Bakker (1990), Berwick et al. (1991) and Bunt and Tomita (1996). We use the structuralist method in which sentences are parsed into constituents without determining their function. The structuralist method aims at dividing the sentence into major constituents and to administrate the verbal structure without determining their thematic dependency. In Dutch, this verbal structure consists of two poles dividing the remaining part of the sentence into three "fields" (§1): Topicalization Field, Middle Field, and Extraposition Field. Thus, detection of those fields is based on the position of the verbal poles. However, any one of the two poles can be empty in Dutch, causing a transparency problem for the parser: the boundary between two fields is invisible. In this paper we will investigate one of those boundaries in detail. More specifically, we will be concerned with the right boundary of the Middle Field, just before the second verbal pole. We will attempt to detect this boundary on the basis of properties of the fields themselves. In other words, the Middle Field will further be refined in order to predict its closing point (§2). For that purpose, we will investigate the Middle Field elements with respect to their "closing properties". We will focus on two elements that have closing properties, namely predicates (§2.1) and R-particles (§2.2). We will then propose a parsing technique to recognize different kinds of particles and predicates (§2.3), and we will determine the internal order between the two (§2.4). Subsequently, we will demonstrate in detail that in detecting the elements described, an important part of the transparency problem is solved (§3).

1   Amazon

AMAZON is a parser for the Dutch language, developed at the University of Nijmegen (Van Bakel 1975, Van Bakel 1984, Oltmans 1994, Coppen 1995, Van Dreumel and Potjer 1998). The main goal of the AMAZON parser is to provide structuralist surface structures for Dutch sentences, at the same time avoiding ambiguity which can lead to a combinatory explosion.

In case of ambiguity the AMAZON parser avoids the combinatory explosion problem by using two strategies: 1. underspecification: AMAZON expresses ambiguity in one structure by means of underspecification; 2. probability: if ambiguity is inevitable, AMAZON will only yield the most probable analysis.

AMAZON is based on structuralist grammars (Rijpma and Schuringa 1978, Haeseryn et al. 1997). The sentence structure is built around two verbal poles in the main sentence: the finite verb (V_{fin}) and the verbal cluster (CL). These two poles divide the sentence into the following three fields: the Topicalization Field (TOP), the Middle Field (MI), and the Extraposition Field (EX).

SE

TOP	V_{fin}	MI	CL	EX
XP	.	XP*	...	XP* (SE)
SE				
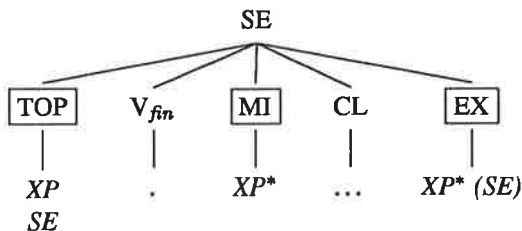
The Topicalization Field is the position before the finite verb in the main clause or before the complementizer in a subordinate clause. This field contains at most one topicalized constituent which can be a phrase or a topicalized subclause. The Middle Field is defined as the part between the finite verb and the verbal cluster in the main clause or between complementizer and verbal cluster in subordinate clauses. The Extraposition Field is the part after the verbal cluster. All extraposed constituents and subclauses are placed here. The Middle Field and the Extraposition Field can contain more than one constituent. Examples of this structuralist main clause structure[1] are given in Table 1.

---

[1]The complete sentence structure also contains peripheral fields for left- or right-dislocated elements. We will, for the moment, ignore these fields. The reader is referred to Haeseryn et al. (1997), ANS chapter 21, for more examples.

TOP	V_{fin}	MI	CL	EX
—	kijk *look*	—	uit ! *out*	—
ik *I*	heb *have*	thuis op hem *home on him*	zitten wachten IPP-*sit wait*	in spanning. *in suspense*
je *you*	moet *must*	op tijd *on time*	vertrekken. *leave*	—
hij *he*	heeft *has*	—	geprobeerd *tried*	het te begrijpen. *it to understand*
dat hij komt, *that he comes*	heeft *has*	me *me*	verbaasd. *amazed*	—
het *it*	verbaast *amazes*	me *me*	—	dat hij nog komt. *that he still comes*

Table 1: Examples of the structuralist main clause structure

2   Closing the Middle Field

In previous approaches (Van Bakel 1975, Van Bakel 1984, Oltmans 1994), the Middle Field was recursively defined as a sequence of *mi-parts*. Eventually this resulted in a random order of constituents in the Middle Field like NP, PP, AdvP, and AP.

MI
|
mi parts
/ \
mi part   mi parts
/ \
mi part   mi parts
/ \
mi part   ...
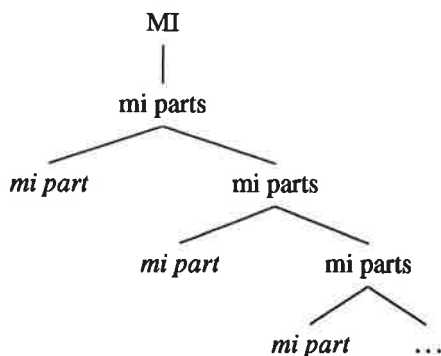
The problem in this approach is that no restrictions are imposed on the order of mi-parts. It makes no attempt to define a clear closing point for the Middle Field. The Middle Field just ends where the verbal cluster starts. The approach

Simon van Dreumel

is, therefore, too permissive and it will cause transparency problems in case of ambiguous elements at the beginning of the verbal cluster (see §2.3) or in case of an empty verbal cluster (see §3).

To improve this, we rebuilt the formation of the Middle Field. We propose a Middle Field with restrictions, dividing it into two parts: the nonclosing mi-parts and the closing mi-parts. Clitics and constituents like NP, PP and AdvP, belong to the nonclosing mi-parts. They may accidentally appear as the last constituent in the Middle Field, but they do not necessarily signal the end of it. The closing parts, however, do announce the end of the Middle Field. We have identified two closing mi-parts: Predicate (§2.1) and R-particle (§2.2).

$$
\begin{array}{c}
\text{MI} \\
\diagup \quad \diagdown \\
\text{nonclosing mi-parts} \qquad \text{closing mi-parts} \\
| \qquad\qquad\qquad\quad | \\
\left\{ \begin{array}{l} \text{clitics} \\ \text{XPs} \end{array} \right\} \qquad \left\{ \begin{array}{l} \text{R-particle} \\ \text{Predicate} \end{array} \right\}
\end{array}
$$
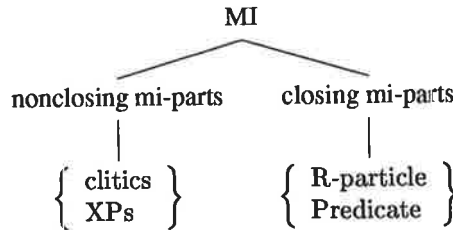
Most closing mi-parts are strongly related to the verbal cluster (Neeleman 1994). In fact, most R-particles resemble adpositional V-particles. R-particles like *in* and *mee* also occur as V-particles, and predicative complements are often incorporated in the verb such as *goed+vinden* (= lit. 'good+consider' = "approve").

2.1 Predicate

The first element that closes the Middle Field is a *predicative complement*. We will tentatively call this element PRED, as a structuralist term for the position in which predicative complements occur. The PRED element is therefore neither a constituent type nor a functional category: it is a means to indicate a *position*, just like MI is neither constituent nor function.

We have implemented six different possibilities for PRED: AP, V(PSP), V(TE), V(INF), P+V(INF), and *aan het*-construction.[2] These are illustrated in the following examples:[3]

(1)   a.   dat dit [AP mogelijk] is
          that this [AP possible] is
          "that this is possible"

      b.   dat hij daar [V(PSP) begraven] ligt
          that he there [V(PSP) buried]   lies
          "that he is buried there"

---

[2]For further research on the *aan het*-construction, see Smits (1987), Coppen and Van Dreumel (to appear).

[3]In the examples the subclause ordering is used in order to avoid empty verbal clusters. The Middle Field in subclauses is defined as the part between the complementizer position and the verbal cluster.

c. dat dit [$_{V(TE)}$ op te lossen] is
   that this [$_{V(TE)}$ PRT to solve] is
   "that this can be solved"

d. dat hij [$_{V(INF)}$ vissen] is
   that he [$_{V(INF)}$ fish]   is
   "that he is fishing"

e. dăt hij [$_P$ $_{V(INF)}$ uit vissen] is
   that he [$_P$ $_{V(INF)}$ out fish]   is
   "that he is out fishing"

f. dat zij het probleem [$_{ah}$ $_{V(INF)}$ op aan het lossen] is
   that she the problem [$_{ah}$ $_{V(INF)}$ PRT on the solve] is
   "that she is solving the problem"

None of these constructions can be followed by categories[4] belonging to the Middle Field. To illustrate this, we will use adverbials which are most free in placement in Dutch. .

(2) a. dat dit (nog) [$_{AP}$ mogelijk] (*nog) is
        that this (still) [$_{AP}$ possible] (*still) is

     b. dat hij daar (nu) [$_{V(PSP)}$ begraven] (*nu) ligt
        that he there (now) [$_{V(PSP)}$ buried]   (*now) lies

     c. dat dit (vandaag) [$_{V(TE)}$ op te lossen] (*vandaag) is
        that this (today)   [$_{V(TE)}$ PRT to solve] (*today)   is

     d. dat hij (nu) [$_{V(INF)}$ vissen] (*nu)   is
        that he (now) [$_{V(INF)}$ fish]   (*now) is

     e. dat hij (nu) [$_P$ $_{V(INF)}$ uit vissen] (*nu)   is
        that he (now) [$_P$ $_{V(INF)}$ out fish]   (*now) is

     f. dat ze het (nu) [$_{ah}$ $_{V(INF)}$ op aan het lossen] (*nu)   is
        that she it   (now) [$_{ah}$ $_{V(INF)}$ PRT on the solve] (*now) is

These examples clearly show that the PRED constituents necessarily indicate the end of the Middle Field.

2.2   R-particles

In Dutch, we find what is called *split/separable compound pronominal adverbs*. Examples are *er+mee*, *daar+over*, *hier+in*, and *waar+van*. The R-elements *er, daar, hier,* and *waar*, respectively "there" (unstressed), "there" (stressed), "here", and "where", can be separated from their adverb parts. I will call the stranded adposition like *mee* in [*er ... mee*] an *R-particle*. Examples of the adpositional stranding are:

---

[4]R-particles are not included because these are closing mi-elements themselves. See §2.4 for the order of PRED and R-particle.

(3)   hij houdt rekening [$_{Adv}$ daar+mee]
      he holds account [$_{Adv}$ there+with]

      "he takes that into account"

   a. hij houdt [$_R$ daar] rekening [$_{R-Prt}$ mee]
       he holds [$_R$ there] account [$_{R-Prt}$ with]

   b. [$_R$ daar] houdt hij rekening [$_{R-Prt}$ mee]
       [$_R$ there] holds he account [$_{R-Prt}$ with]

This R-particle is the second constituent that is able to close the Middle Field. No other categories[5] follow this element. To illustrate this, I will use adverbials which can be placed freely after transitive PPs.

(4)   a. waar hij (gisteren) *over* (*gisteren) heeft gedroomd
          where hij (yesterday) about (*yesterday) has   dreamt

          "which he dreamt about yesterday"

      b. waar hij (met genoegen) *aan* (*met genoegen) werkte
          where hij (with pleasure) on (*with pleasure) worked

          "on which he worked with pleasure"

These examples show that stranded R-particles are a good indication for the end of the Middle Field.

Stranded R-particles even occur at positions where the full pronominal adverb is not allowed. R-particles seem to "float" rightward in the Middle Field (Beukema and Hoekstra 1983). For example, compare:

(5)   a. ik heb het fornuis *daar+mee* schoon kunnen maken
          I   have the furnace there+with clean IPP-can make

          "I was able to clean the furnace with that"

      b. * ik heb het fornuis schoon *daar+mee* kunnen maken
          I   have the furnace clean there+with IPP-can make

(6)   a. daar heb ik het fornuis *mee* schoon kunnen maken
          there have I the furnace with clean IPP-can make

      b. daar heb ik het fornuis schoon *mee* kunnen maken
          there have I the furnace clean with IPP-can make

The position of the stranded R-particle in (6b) is impossible for the full pronominal adverb in (5b). Therefore, it seems that the stranded R-particle floats rightward. No matter what explanation is given for this phenomenon, it is clear that the R-particle occurs at the right periphery of the Middle Field.

---

[5]PRED is not included because it is a closing mi-element itself. See §2.4 for the order of PRED and R-particle.

2.3   Transparency between MI and CL

As noted, closing mi-parts often are strongly related to the main verb. Predicative complements are often incorporated into the verb, and R-particles are in most cases homonymous to V-particles. For example, an R-particle like *op* in [*er ... op*] also occurs as a V-particle in a verb like *opbellen* ("call by telephone").

This may lead to a transparency situation: a situation in which it is difficult to determine whether a closing mi-element belongs to MI or CL.
For example:

(7) a. hij heeft de deur open willen   maken
         he has   the door open IPP-want make

         "he wanted to open the door"

     b. hij heeft de deur open willen   schreeuwen
         he has   the door open IPP-want scream

         "he wanted to scream the door open"

(8) a. ik zou   graag door   willen lopen
         I would gladly through want   walk

         "I would like to walk on"

     b. hij is onder de tafel door   komen   kruipen
         he is under the table through IPP-come crawl

         "he came crawling under the table"

In the (a) sentences, *open* and *door* are a separable part of the verb *open+maken* (= lit. 'open-make') and *door+lopen* (= lit. 'through-walk') respectively, the so-called V-particles.   In the (b) sentences, *open* is a resultative (the verb *open+schreeuwen* does not exist in the Dutch lexicon), and *door* is a postposition in [*onder ... door*].[6] Disambiguation is possible by considering the main verb and its subcategorization.[7] Only if the main verb selects a certain particle, it can be considered as V-particle. In other cases, it must be R-particle or postposition.
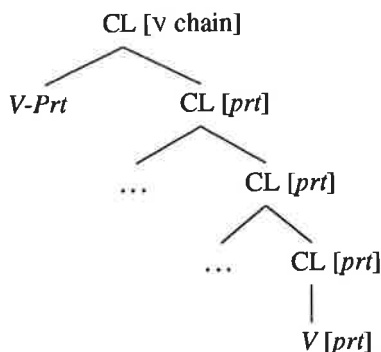
We will express this subcategorization relation as a *V-chain*: the V-particle and the main verb are connected by a chain of features.[8] In AMAZON, this V-chain is implemented by passing a particle selection feature of the main verb to the separated V-particle in the verb cluster.[9]

---

[6]For an analysis of postpositions see: Van Dreumel (to appear b)

[7]I refer to Van Dreumel (1996) and the references therein for a closer look at subcategorization.

[8]See Den Besten and Broekhuis (1989), Groos (1989), Hoeksema (1991), Bennis (1991), Bennis (1992), Den Dikken (1992), Zwart (1993), Booij (1998) and Van Zonneveld (1998) for recent accounts for the status, distribution, and derivation of separated V-particles.

[9]For more details: see Van Dreumel and Potjer (1998), Van Dreumel (to appear a).

```
                        CL [v chain]
                       /            \
              V-Prt              CL [prt]
                                /        \
                          ...          CL [prt]
                                      /        \
                                ...         CL [prt]
                                                |
                                            V [prt]
```

A verb like *maken* will be marked in the lexicon as a verb accepting the particle *open*. Therefore, a link between *open* and *maken* can be made by AMAZON, even if the two words are separated by auxiliaries. A verb like *schreeuwen* on the other hand, will not be marked as such, and consequently, no V-chain can be constructed. Therefore, in this case, AMAZON will look for other alternatives to parse the word *open*.
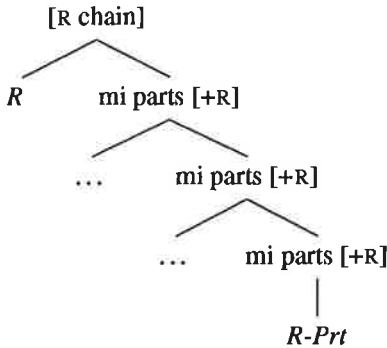
Note that this is a very restricted form of subcategorization implemented in a structuralist grammar. It may seem that the mere implementation of subcategorization into the parser is incompatible with the structuralist character of the AMAZON grammar, since it does not aim at assigning thematic functions. However, we do not look upon this phenomenon as subcategorization as such, but rather as the reconstruction of discontinuous elements (*open+maken*) to lexical units. This is indeed a structuralist aim.

A situation similar to the one that obtains between verbs and V-particles can be observed between R-elements and R-particles:

(9) a. in Nederland   zou   hij hier niet aan kunnen komen
         in Netherlands would he here not on can   come
         "in the Netherlands, he could not get this"

     b. in Nederland   zou   hij om zeven uur   aan zijn gekomen
         in Netherlands would he at seven hour PRT be   PSP-come
         "in the Netherlands, he would arrive at seven o'clock"

In both sentences, a V-chain can be constructed between the particle *aan* and the verb *komen* to form *aan+komen* ("to arrive"). However, in the (a) sentence, a similar chain can be constructed between the R-element *hier* ("here") and the particle, to form *hier+aan* ("on this"). We will call the latter chain an *R-chain*.

The relation between the R-element and the R-particle is implemented as a chain, much like the V-chain above. The [+R] feature is passed on from the separated R-element to the lower embedded mi-parts until the stranded R-particle is reached:

```
                    [R chain]
                   ╱         ╲
          R            mi parts [+R]
                      ╱          ╲
              ...          mi parts [+R]
                          ╱          ╲
                   ...          mi parts [+R]
                                      │
                                    R-Prt
```

Since the R-chain takes precedence in frequency over the V-chain, the former may disambiguate between two possible readings. However, in some cases there is real ambiguity:

(10)   daar zou   ik niet mee willen werken
       there would I not with want   work

In this example, *daar* may be interpreted as a locative expression, causing *mee* to be a V-particle. This interpretation can be paraphrased as "At that place, I would not want to co-operate". But *daar* can also be interpreted as a part of the pronominal adverb *daar+mee*. In that case, an R-chain is built, and the meaning "With that I would not want to work" is the result.
This ambiguity can be illustrated schematically as follows:

(11)   1. [R ...   R-Prt [$_{CL}$ ... V(-PRT/*prt*)]]
       2. [R ...   [$_{CL}$ V-Prt ... V(-PRT/*prt*)]]

In order to tune the Amazon parser to provide the analysis that is most likely, we examined the frequency of these two patterns in the subcorpus *Newspapers* of the Eindhoven Corpus (Uit den Boogaart 1975). The results were:

R	Ambiguous particle	V	Frequency	
1. R	...R-Prt	V	242	(= 93%)
2. R	V-Prt ...	V	18	(= 7%)

The pattern with the R-chain is much more frequent than the pattern with the V-chain interpretation. Therefore, we made the Amazon parser prefer the possibility to build the R-chain. This means that for the transparent pattern in which a particle can be analysed both as an R-particle and as a V-particle, the former option will always be chosen. This may be the wrong choice in a minority of the cases. It is left to modules subsequent to AMAZON to reconsider the alternative.

2.4   The order of Predicate and R-Particle

We have discussed the two closing mi-parts: PRED and R-particle. The next question is the ordering between those closing mi-parts:

PRED   —   R-particle
R-particle   —   PRED

The ordering of PRED and R-particle seems to depend on the nature of the predicative complement. We can distinguish between adjectival PRED (1a) and verbal PREDs (1b-f). Verbal PREDs immediately close the Middle Field. They may never be followed by an R-particle:

(12)   a.   omdat   hij daar niet [in] [begraven] ligt
             because he there not [in] [buried]   lies
             "because he is not buried there"

       b. * omdat   hij daar niet [begraven] [in] ligt [10]
           * because he there not [buried]   [in] lies

(13)   a.   omdat   hij daar niet [mee] [te zien] is
             because he there not with to see   is
             "because he cannot be seen with that"

       b. * omdat   hij daar niet [te zien] [mee] is
           * because he there not [to see] [with] is

(14)   a.   de boot waar hij [in] [vissen] is
             the boat where he [in] [fish]   is
             "the boat in which he is fishing"

       b. * de boot waar hij [vissen] [in] is
           * the boat where he [fish]   [in] is

(15)   a.   het mes   waar ze de appels [mee] [aan het schillen] is
             the knife where she the apples [with] [on the peel]   is
             "the knife she is peeling the apples with"

       b. * het mes   waar ze de appels [aan het schillen] [mee] is
           * the knife where she the apples [on the peel]   [with] is

From these examples, we may conclude that the position for R-particles always precedes the verbal PRED position.

R-particle   <   PRED [+Verbal]

Adjectival predicates[11] can be followed or preceded by R-particles (Neeleman 1994, Coppen 1999).

---

[10]This sentence may be possible in an adjunct reading: "in buried state".

[11]We will, for the moment, assume that idiomatic PPs like *in de war* (= "confused") behave like adjectival predicates. Other PPs, like resultatives and directionals, are problematic because they cannot be detected straightforwardly in a structuralist parser.

(16) a. waar je <voor> [verantwoordelijk] <voor> bent
          where you <for> [responsible]   <for> are
          "for which you are responsible"

      b. waar hij <van> [in de war]   <van> raakte
          where he <from> [in the confusion] <from> became
          "which got him confused"

      c. waar hij het <mee> [in contact] <mee> bracht
          where he it   <with> [in contact] <with> brought
          "with which he connected it"

      d. waar je <van> overtuigd <van> bent
          where you <of> convinced <of> are
          "of which you are convinced"

By contrast, some adjectival predicates either prefer or prohibit a pre-predicate position of R-particles.[12]

(17) a. waar ze erg <*op> trots <op> zijn
          where they very <*of> proud <of> are
          "of which they are very proud"

      b. waar je erg <*van> gelukkig <van> wordt
          where you very <*of> happy   <of> become
          "what makes you very happy"

(18) a. waar je heilig <van> overtuigd <?van> bent
          where you holy <of> convinced <?of> are
          "of which you are absolutely convinced"

It seems that the lexical choice of PRED or particle determines the placement of the R-particle: before or after PRED.

In AMAZON, we implemented the following structure:
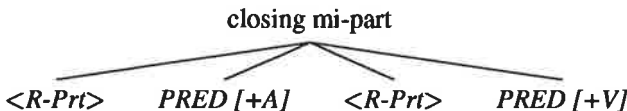
This is a simplified version of the implementation. In the actual AMAZON grammar, it is ensured that only one of the two R-particle positions can be filled. For the exact implementation of the last part of the Middle Field, I refer to Van Dreumel and Potjer (1998).

---

[12]In Corver (1997), this distinction is derived from the features ±N and ±V, depending on whether the adjective in question can be considered as a verb, like [+n,+V] *overtuigd* (= "convinced"), or not, like [+N,+v] *trots* (= "proud") and *leesbaar* (= "readable").

3   Transparency in case of empty verbal clusters

So far we have examined the elements that indicate the end of the Middle Field in Dutch. This exercise is fruitful for a parser of Dutch surface structure, not only to be able to detect a possible start of the verbal cluster, but also, to indicate the position of the verbal cluster in cases of verb second. Cf., for example, the following sentence:

(19)   ik heb er   niet aan gedacht op tijd te vertrekken
       I have there not of thought on time to leave

       "I did not think of leaving in time"

Here, the end of the Middle Field is indicated by the past participle *gedacht*, which forms the second pole of the verbal structure. But now consider the present tense:

(20)   ik denk er   niet aan op tijd te vertrekken
       I think there not of on time to leave

       "I do not (even) think about leaving in time"

Now the second verbal pole is absent, as well as the topicalization field and complementizer of the subordinate clause *op tijd te vertrekken*. Therefore, we have two subsequent Middle Fields *er niet aan* and *op tijd*, which can only be distinguished by virtue of the R-particle *aan* forming an R-chain. Recognizing the R-particle is necessary to make the correct parse, as illustrated in the next tree diagram:

It is true that in many cases, the same transparency situation cannot be solved due to the lack of sufficient cues.[13] The point, however, is that the detection of the closing mi-elements contributes significantly to a more efficient parsing.

---

[13] An anonymous reviewer pointed this out.

4   Conclusion

In this paper, we explored the possibilities to detect the end of the Middle Field in Dutch sentences. We concentrated on predicative complements and particles. We distinguished adjectival and verbal predicative complements, and R-particles versus V-particles. The latter two are handled by means of a chain mechanism relating the particle to either an R-element or a complex verb.

A better detection of the end of the Middle Field is not only fruitful from an efficiency point of view, but it also gives us a means to handle transparency situations in which an empty verb cluster is followed by an infinitival complement without complementizer. These cases formed the real gain of our approach.

We therefore conclude that the properties of closing mi-elements enable the development of more efficient and more robust parsers.

Acknowledgements

References

Van Bakel, J. (1975), *Automatische zinsontleding met de computer*, Foris Publications, Nijmegen.

Van Bakel, J. (1984), *Automatic Semantic Interpretation*, Foris Publications, Dordrecht.

Bennis, H. (1991), 'Theoretische aspekten van Partikelvooropplaatsing II', *Tabu* 21-3, pp. 89-96.

Bennis, H. (1992), 'Long Head Movement: The position of particles in the verbal cluster in Dutch', in: R. Bok-Bennema and R. van Hout (eds.), *Linguistics in the Netherlands 1992*, pp. 37-48, Amsterdam.

Berwick, R.C, Abney S.P. and Tenny, C. (eds.) (1991), *Principle-Based Parsing: Computation and Psycholinguistics*, Kluwer Academic Publishers, Dordrecht.

Den Besten, H. and Broekhuis, H. (1989), 'Woordvolgorde in de werkwoordelijke eindreeks', *Glot* 12, pp. 79-137.

Beukema, F. and Hoekstra, T. (1983), '*Met* met PRO of *met* zonder PRO', *De Nieuwe Taalgids* 75, pp. 532–548.

Uit den Boogaart, P.C. (ed.) (1975), *Woordfrequenties in geschreven en gesproken Nederlands/Werkgroep Frequentie-onderzoek van het Nederlands*, Oosthoek, Scheltema & Holkema, Utrecht.

Booij, G.E. (1998) 'Samenkoppelingen en grammaticalisatie', in: E. Hoekstra and C. Smits (eds.), *Morfologiedagen 1996*, Cahiers van het Meertens Instituut, Vol. 10, pp. 6-20.

Bunt, H. and Tomita M. (eds.) (1996), *Recent Advances in Parsing Technology*, Text, Speech and Language Technology, Vol. 1, Kluwer Academic Publishers, Dordrecht.

Coppen, P.-A. (1995), 'A new version of the AMAZON/CASUS system', in: P. de Haan and N. Oostdijk (eds.), *Proceedings of the Department of Language and Speech*, Vol. 18 (1994), pp. 85–90, University of Nijmegen.

Coppen, P.-A. (1999), 'Linguïstisch Miniatuurtje LVIII: Ergens twee keer aankomen', *Neder-L, Elektronisch tijdschrift voor de neerlandistiek*, no.9904.25, http://baserv.uci.kun.nl/ salemans/bulletin/1999/04/990425.html.

Coppen, P.-A. and Van Dreumel, S. (to appear), 'De *aan het*-constructie'.

Corver, N. (1997), 'The Internal Syntax of the Dutch Extended Adjectival Projection', *Natural Language and Linguistic Theory* 15, pp. 289-368. Kluwer Academic Publishers.

Den Dikken, M. (1992), *Particles*, PhD. Dissertation, HIL, University of Leiden.

Van Dreumel, S. (1996), *Subcategorisatie. Een onderzoek naar subcategorisatie en de verwerking ervan in een NLP-systeem*, Master's thesis, University of Nijmegen.

Van Dreumel, S. and Potjer, J. (1998), *De AMAZON-Grammatica*, Report CSI-R9823, Computing Science Institute, University of Nijmegen.

Van Dreumel, S. (to appear a), Parsing the Verbal Cluster in Dutch.

Van Dreumel, S. (to appear b), Parsing Postpositions in Dutch.

Groos, A. (1989), 'Particle-Verbs and Adjunction', in: H. Bennis and A. van Kemenade (eds.), *Linguistics in the Netherlands 1989*, pp. 51-60, Foris, Dordrecht.

Haeseryn, H., Romijn, K., Geerts, G., De Rooij, J. and Van den Toorn, M.C. (eds.) (1997), *Algemene Nederlandse Spraakkunst (ANS)*, second edition, Martinus Nijhoff, Groningen.

Hoeksema, J. (1991), 'Theoretische aspekten van Partikelvooropplaatsing', *Tabu* 21-1, pp. 18-26.

Neeleman, A. (1994), *Complex Predicates*, PhD. Dissertation, Research Institute for Language and Speech, University of Utrecht.

Neijt, A. and Bakker, D. (eds.) (1990), *Computerlinguïstiek/een overzicht in artikelen*, Foris Publications, Dordrecht.

Oltmans, E. (1994), AMAZON *in AGFL: Een contextvrije herschrijfgrammatica voor de structurele module van het AMAZON/CASUS-systeem, beschreven in het AGFL-formalisme*, Master's thesis, University of Nijmegen.

Reyle, U. and C. Rohrer (eds.) (1988), *Natural Language Parsing and Linguistic Theories*, Studies in Linguistics and Philosophy, Vol. 35, D. Reidel Publishing Company, Dordrecht.

Rijpma, E. and Schuringa, F. (1978), *Nederlandse Spraakkunst* (edited by Jan van Bakel), Wolters-Noordhoff, Groningen.

Smits, R. (1987), 'Over de *aan het* constructie, lexicale morfologie en casustheorie', in: N. Corver and J. Koster (eds.), *Grammaticaliteiten*, Tilburg Studies in Language and Literature, Vol. 7 (1987), pp. 281–329, University of Brabant.

Van Zonneveld, R. (1998), 'Soorten partikelverplaatsingen', *Tabu* 28-2, pp. 57-71.
Zwart, C. J.-W. (1993), *Dutch Syntax: A Minimalist Approach*, PhD. Dissertation, University of Groningen.