Dissociation between the Nominal and Verbal Domain in Agrammatic Speech

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0. Introduction

Agrammatism is a language disorder associated with Broca's aphasia. Agrammatic speech production is usually defined as the omission and/or substitution of freestanding and bound grammatical morphemes (Menn and Obler 1990). These are for example determiners, auxiliaries, complementizers, and agreement morphemes on verbs, nouns and adjectives. In current linguistic theory (Chomsky 1993) these elements are assumed to head functional projections in the syntactic structure. So, translating the definition of agrammatic speech production into current linguistic terms it runs as follows: agrammatic speech shows an impairment of functional structure (cf. Ouhalla 1993). Recently it was shown that not all functional projections are equally impaired in agrammatic speech (Hagiwara 1995, Friedmann and Grodzinsky 1997).

Hagiwara (1995) presents a study of Japanese agrammatism. The study includes spontaneous speech data and the results of a grammaticality judgement experiment. Hagiwara assumes the following structures for the verbal and nominal domain in Japanese: [ CP [ AgrSP [ TP [ NegP [ AgrOP [ VP ]]]]]] and [ DP [ PP [ NP ]]] respectively. In the spontaneous speech of four patients negatives (NegP), postpositions (PP) and tense markers (TP) were never omitted, while complementizers (CP) and case markers (DP and AgrSP) were quite frequently omitted. A grammaticality judgement experiment was conducted with six additional patients to see whether the results from spontaneous speech analysis could be replicated. Two patients indeed showed the same pattern: good performance on sentences testing Tense, Negation and Postposition conditions, while they both showed problems in the sentences testing Complementizers, WH phrases with Q-morpheme, and Subject related particles (DP and AgrSP). Two patients showed problems in all test conditions, that is with all functional projections, while the remaining two patients did not show any problems at all. Hagiwara concluded that there is a parallel between the projections in the nominal and the verbal domain. She claims that the highest projections of both the nominal and the verbal domain are more susceptible to disruption than the lower projections.

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Kolk and Heeschen (1990) observed a parallel between the nominal and verbal domain in Dutch and German agrammatic speech as well. They state that omission of articles and omission of finite verb inflection co-occurs in agrammatic spontaneous utterances. Or translated into current linguistic terms: an impairment to DP co-occurs with an impairment to the inflectional phrase IP.

In this paper it will be shown that there is not necessarily a parallel between the nominal and the verbal domain in agrammatic speech.

1. Patient and method

The case of patient GS is presented. GS is a right-handed, Dutch female, who suffered a cerebrovascular accident (CVA) at the age of forty-seven. She was classified as an agrammatic Broca's patient on the basis of her results in the Aachen Aphasia Test (AAT) (Graetz et al. 1992). The (semi) spontaneous speech of GS that will be discussed here, was collected in two different test sessions. Session 1 was held at 13 months post onset and session 2 was held at 66 months post onset. The spontaneous speech resulted from the interview of the Aachen Aphasia Test. In this interview GS is telling how her illness started and how she is doing now, and she is telling about her job, her family, the places where she has been living and her hobbies. The semi spontaneous speech resulted from the ANTAT (Blomert et al. 1995). The ANTAT is a test in which aphasic patients are presented with a daily life situation and are asked what they would say in such a situation. Examples of these situations are: going to the shoemaker to get your shoe repaired, inviting your neighbour for coffee and cancelling an appointment with your doctor by phone. In test session 1, one version of the ANTAT was administered, which consists of 10 situations. In test session 2, two versions of the ANTAT were administered, which in sum consist of 20 situations. Examples of the speech of GS are shown in (1) and (2). Example (1) contains an item from the ANTAT, followed by the response of GS. Example (2) is taken from the AAT interview, and shows GS's answer to the question how her disease had started.

(1) U heeft een afspraak met de dokter maar er is iets tussen gekomen. U belt op en wat zegt u?
   'You have an appointment with your doctor but something unforeseen occurred. You call up and what do you say?'
   een andere afspraak maar maken / dan deze maar niet / maar een andere afspraak maken met de dokter / nooit naar de dokter geweest / 't is niet werken / anders allemaal
‘another appointment just make-inf / then this one not / but another appointment make-inf with the doctor / never to the doctor went-part / it is not working / different everything’


‘work-inf / tea / and work-inf / and suddenly / on bed still the hair just do-inf / and gone / and suddenly a haemorrhage / on bed sit-inf / and wait-inf for help / welfare worker De Veste me found-part / the doctor called-part / and to the hospital brought-part’

Before the actual analysis of the speech of GS, the following types of utterances were removed: unintelligible utterances, speech automatisms and direct repetitions of speech of either GS herself or the interviewer.

First, the omission of determiners and finite verb inflection will be investigated. The omission of determiners is expressed as a percentage of the obligatory determiner contexts. The omission of finite verb inflection is expressed as a percentage of obligatory contexts for finite verb inflection, that is, all root clauses that contain a verb. Second, the functional structure of GS’s utterances will be investigated in more detail.

2. Omission of determiners and finite verb inflection

From table 1 below it is clear that the speech of GS hardly shows any determiner omission, while the omission rates of finite verb inflection are very high.

<table>
<thead>
<tr>
<th>linguistic element</th>
<th>Test session 1</th>
<th>Test session 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ANTAT</td>
<td>AAT</td>
</tr>
<tr>
<td>det cont</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>omission</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>[+fin] cont</td>
<td>19</td>
<td>26</td>
</tr>
<tr>
<td>omission</td>
<td>74%</td>
<td>70%</td>
</tr>
</tbody>
</table>
Note that although the omission rates in test session 2 are a bit higher than the omission rates in test session 1, the pattern of present determiners and absent verb inflection is clear at both test moments. Table 1 shows the overall omission rates. However, the dissociation holds true at sentence level as well. So, omission of determiners and omission of finite verb inflection do not co-occur in the speech of GS, in contrast to the claim of Kolk and Heeschen (1990).

3 The nominal domain

3.1 The presence of DP. Since there is hardly any determiner omission, it might be concluded that DP is correctly projected in the speech of GS. This leads to several predictions. First, there is no determiner substitution. Second, different types of determiners show up. Third, pronouns, which are DPs as well (cf. Abney 1987), occur in the speech of GS.

The first prediction is borne out. In sum there are 142 determiners (ANTAT plus AAT in session 1 and session 2). There is no substitution of determiners. Only one determiner is realized incorrectly. In the utterance *een geld ‘a money’* an indefinite determiner is combined with a non-count noun.

The second prediction is also borne out. The speech of GS includes definite articles (*de ‘the’ non-neuter, het ‘the’ neuter*), possessive and demonstrative pronouns, indefinite articles (*een ‘a’*), numerals and quantifiers such as *iedere ‘every’* and *veel ‘many’*. The distribution of determiners is shown in table 2.

<table>
<thead>
<tr>
<th>determiners</th>
<th>Test session 1</th>
<th>Test session 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ANTAT</td>
<td>AAT</td>
</tr>
<tr>
<td>[+def] art</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>poss pron</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>demonstr pr</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>[-def] art</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>numerals</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>quantifiers</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
GS mainly produces articles, both definite and indefinite ones. In addition, all other types of determiners occur as well, albeit in small numbers.²

The third prediction is borne out as well. In sum, GS produces 80 pronouns. They function as subject or object, or show up in predicative PPs or as locative adjuncts. Omission of pronominal arguments will be discussed in section 4.2.

In conclusion, DP is correctly realized in the speech of GS. Determiners are neither omitted nor substituted. All different types of determiners, and pronouns show up. So, there is no evidence for an impairment in the nominal functional domain.

3.2 Functional features in the nominal domain. To support the conclusion that the nominal domain is intact in the spontaneous speech of patient GS, the functional features of the nominal domain will be investigated in some detail in this section. Dutch has three functional features in the nominal domain, [definiteness], [gender] and [number] (cf. Barbiers 1992). These features are relevant for the realization of determiners in the following way. The feature [definiteness] determines the choice between a definite (de, het) and an indefinite (een) determiner. The [gender] feature determines the choice between the definite determiners de (non-neuter) and het (neuter). The feature [number] is relevant in the sense that plural nouns only combine with the definite determiner de. It was already shown in the preceding section that with respect to determiners these features are correctly realized. There is neither omission nor substitution of determiners in the speech of GS.

The feature [number] is realized on nouns as well. GS produces 17 plural nouns in sum (ANTAT plus AAT in two sessions). There are no cases in which a singular noun shows up in a syntactically plural context, that is, in the presence of a plural determiner or as subject of a plural verb.

The nominal features play a role in the adjectival domain in determining adjectival agreement. In [+definite] and [+plural] contexts, the adjective carries the affix -e. In [-definite] contexts, the adjectival agreement marker -e is only required for [-neuter] nouns, while [-definite, -plural, +neuter] contexts show up with a zero affix. GS produces 26 prenominal adjectives (ANTAT plus AAT in two sessions). Only two of these adjectives do not show correct agreement marking. The correct agreement marking shows up with all different feature combinations as is shown in table 3. One of the adjectives is not included, since it functions in some sort of a fixed combination with a noun; maatschappelijk

² Indefinite determiners, such as indefinite articles, numerals and quantifiers, might be generated in a functional projection different from DP, for example QP (cf. Abney 1987, Barbiers 1992). However, this is not important for the issue discussed here.
werkster 'welfare worker'. The noun werkster is [-neuter], but nevertheless the zero marking is required here.3

Table 3: Adjectival agreement marking

<table>
<thead>
<tr>
<th>adjectival agreement</th>
<th>Total</th>
<th>[+plur]</th>
<th>[-plur]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>175</td>
<td>e</td>
<td>e</td>
</tr>
<tr>
<td>required affix</td>
<td></td>
<td>e</td>
<td>0</td>
</tr>
<tr>
<td>correct</td>
<td>4</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>incorrect</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Summarizing the discussion of the nominal domain, there is no evidence for an impairment of the functional structure. There is hardly any omission or substitution of determiners. GS produces different types of determiners and she also produces a lot of pronouns. Moreover, the nominal functional features are not only correctly realized on determiners, but also on nouns and adjectives.

If there would necessarily be a parallel between the nominal and verbal domain in agrammatic speech, the verbal domain would be intact as well in the speech of GS. Table 1 already showed that the omission rate of finite verb inflection is very high in GS's speech, which might be interpreted as an impairment in the verbal domain. In the next section this matter will be pursued in more detail.

4. The verbal domain

4.1 Distribution of root clauses. To investigate the functional structure of the verbal domain, GS's root clauses are subdivided in the following way. First, utterances that do not contain a verb, and consequently do not contain verbal functional structure either are excluded from the analysis. These utterances will not be discussed any further. Second, utterances that contain only a verb that lacks finite verb inflection are treated as a separate group. The presence of verbal functional structure in these utterances is not a priori clear and will be investi-

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3 For two cases, the value of the feature [definiteness] is not clear, since the determiner was omitted. On the basis of the context it was decided to count them as [-definite]. This decision does not have consequences for the correctness of the agreement marking, since both nouns are [-plural] and [-neuter], so the -e marker is required anyway.
gated in section 4.2. The third group of utterances consists of utterances that contain a finite verb, which indicates the presence of verbal functional structure. Finite utterances will be discussed in section 4.3. The distribution of root clauses is shown in table 4.

Table 4: Distribution of root clauses

<table>
<thead>
<tr>
<th>root clauses</th>
<th>Test session 1</th>
<th>Test session 2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ANTAT</td>
<td>AAT</td>
<td>ANTAT</td>
</tr>
<tr>
<td>no verb</td>
<td>15</td>
<td>33</td>
<td>50</td>
</tr>
<tr>
<td>[-fin] verb</td>
<td>14</td>
<td>18</td>
<td>33</td>
</tr>
<tr>
<td>[+fin] verb</td>
<td>5</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>total</td>
<td>34</td>
<td>59</td>
<td>86</td>
</tr>
</tbody>
</table>

4.2 Root non-finites. It is assumed here that Dutch has a basic order SOV. In non-finite utterances the verb remains in VP, so it is in sentence final position and objects precede the verb. In finite root clauses the verb moves to a functional position (via TP and AgrS to C), resulting in the object following the verb. As shown in table 4, GS produces 114 root clauses in which the verb lacks finite inflection. The lack of finite verb inflection might be interpreted as the absence of verb movement to the Tense position, so the verb remains in VP. To investigate the position of the verb we need the presence of an object. GS produces 57 non-finites that contain an object. In table 5 the order of non-finite verbs and objects is shown. This table discriminates between infinitival and participial verbs, and between NP and PP objects.

Table 5: Order of non-finite verbs and objects

<table>
<thead>
<tr>
<th>[-fin] V</th>
<th>NP - V</th>
<th>PP - V</th>
<th>V - NP</th>
<th>V - PP</th>
</tr>
</thead>
<tbody>
<tr>
<td>infinitival</td>
<td>30</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>participial</td>
<td>15</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In 53 utterances the non-finite verb is in final position, that is, it follows the object. There is no difference between infinitival and participial verbs in this respect. In these cases, we will assume that the verb is not moved out of VP to a functional position. In two cases, a PP object follows an infinitival verb, which is a grammatical option in Dutch. There are different proposals for the structure of such ‘PP-over-V’ constructions in Dutch (e.g. Koster 1974, Barbiers 1995).
However, none of these proposals involve movement of a non-finite verb to a functional position. In two cases only the non-finite verb seems to be moved to a higher projection: *uitschrijven mensen* ‘deregister people’, *andere keer inschrijven mensen* ‘another time register people’. From this we may conclude that GS’s root non-finites do not show evidence for the presence of functional projections above VP (TP or AgrSP), since both finite verb inflection and movement of the verb out of VP are lacking.

In the foregoing, the relative order of objects and non-finite verbs showed that the non-finite verbs are in final position, that is, they are not moved to a functional position. Depending on the version of linguistic theory one adheres to, the presence of a direct object itself might give rise to the assumption of functional structure. An extensive discussion of these different versions of the theory is beyond the scope of this paper.

Chomsky (1993) assumes that DP objects are moved to the functional projection AgrOP in order to receive accusative case (cf. Zwart 1993 for Dutch\(^4\)). Following this assumption leads to the conclusion that all 57 non-finite utterances that contain an object are (at least) AgrOPs.

De Hoop (1992) argues that only a subclass of the direct objects move to AgrOP, depending on the semantic interpretation of the NP. Since objects can be both in VP and AgrOP, the position of an adjunct can be used to demonstrate the position of the object. If an adjunct shows up between the object and the non-finite verb, the object is assumed to be in AgrOP. Since maximal projections can only be adjoined to maximal projections (Chomsky 1986), an adjunct that precedes a non-finite verb must be adjoined to VP. If the object precedes the adjunct, the object must be outside VP. It is reasonable to assume that the object is in Spec AgrOP in these cases. GS produces 33 adjuncts in non-finite utterances that contain an object (ANTAT plus AAT in session 1 and 2). In 12 cases the adjunct shows up between the object and the verb. Examples are given in (3).

\[(3)\]

\[
\begin{align*}
\text{een bloeding ook al gehad} & \quad \text{‘a haemorrhage also already had-part’} \\
\text{een kaartje eerst kopen} & \quad \text{‘a ticket first buy-inf’} \\
\text{de telefoon een keer aannemen} & \quad \text{‘the phone a time answer-inf’} \\
\text{en competitie altijd gespeeld} & \quad \text{‘and competition always played-part’}
\end{align*}
\]

It can be concluded that in these cases the object has been raised to Spec AgrOP.

\(^4\) Zwart (1993) assumes that Dutch has a basic order SVO, however, this difference is not important for the issues discussed in this section.
Let us summarize the conclusions about the verbal domain so far. Non-finite verbs do not provide evidence for the presence of functional structure, since they lack marking for tense (provided by T) and agreement (provided by AgrSP), and they are always in final position. The presence of objects might indicate the presence of AgrOP.

If the lack of finite verb inflection is interpreted as an impairment to the verbal functional structure, it should have consequences for the realization of subjects. It is generally assumed that nominative case is assigned to a subject in a [+finite] context (cf. Bennis and Hoekstra 1989 for Dutch). However, there is no agreement in the literature on which inflectional head actually assigns (or checks) nominative case; either AgrS (cf. Chomsky 1993, Ferdinand 1996) or T (cf. Chomsky 1995, Cahana-Amitay 1997). Therefore, we will not discriminate between these inflectional heads here. The realization of subjects in finite and non-finite contexts is shown in table 6. Subjects are contrasted with objects, and ANTAT and AAT in two sessions are taken together.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
arguments & [+fin] contexts & [-fin] contexts \\
& subject & object & subject & object \\
\hline
arg contexts & 22 & 19 & 113 & 82 \\
arg missing & 3 & 0 & 110 & 23 \\
\hline
\end{tabular}
\caption{Realization of subjects and objects}
\end{table}

It is clear that GS does not suffer from some sort of general problem in realizing verbal arguments. In finite contexts, there is hardly any omission of arguments. In non-finite contexts, almost all subjects are missing, while objects are missing in only 28% of the obligatory contexts (that is, with transitive verbs). In general, pragmatic factors might be relevant for the omission of arguments. However, there is no pragmatic explanation for the finding that in the speech of GS omission of subjects and omission of finite verb inflection clearly co-occur. This finding is in accordance with for example Kolk and Heeschen (1990), Blomert and De Roo (1995), Friedmann and Grodzinsky (1997) and Cahana-Amitay (1997). Therefore we will argue that the omission of subjects in non-finite utterances supports the claim that the verbal functional structure is impaired.

The verbal functional projections discussed here are AgrOP, TP and AgrSP. The highest projection in the verbal domain is CP. In Dutch, being a Verb Second language, finite verbs are moved to C in main clauses. The root non-finites provide no evidence for the presence of CP. The verbs, lacking finite inflection, are not moved to C, but remain in VP. In addition, GS does not produce root non-finites introduced by a complementizer or a wh-phrase.
4.3 Finite sentences. GS clearly has a preference for root clauses in which no finite inflection is expressed. At least 85% of GS’s utterances are root non-finites or do not contain a verb at all. In the preceding section it was argued that these utterances do no provide evidence for the presence of verbal functional structure except for AgrOP. Despite this preference, GS does produce finite sentences (23 finite sentences in ANTAT plus AAT in two sessions). The verbal functional structure of these sentences seems to be fully intact. The verbs show correct marking for tense and agreement, they are moved to second or first position, and almost all finite verbs are accompanied by a subject. In addition to the root non-finites and the finite sentences GS produces two embedded sentences. These are infinitives, one of which contains the infinitival complementizer *om.*

Although GS does produce 23 finite sentences, it is questionable whether finiteness is a ‘fully productive option’ for her, since only a very limited range of verbs occur in the finite sentences, see table 7.

Table 7: Distribution of different verbs in [+fin] and [-fin] contexts

<table>
<thead>
<tr>
<th>cont</th>
<th>total V’s</th>
<th>diff V’s</th>
<th>verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>[+fin]</td>
<td>23</td>
<td>4</td>
<td><em>is</em> (17) ‘be 3sg’, <em>zijn</em> (2) ‘be pl’ <em>kom(t)</em> (2) ‘come’, <em>werkt</em> (1) ‘works’, <em>had</em> (1) ‘had’</td>
</tr>
</tbody>
</table>

The 23 finite verbs are mainly forms of *zijn* ‘be’. In non-finite contexts a wide range of different verbs occurs. Note that all verbs that occur in the finite utterances do show up in infinitival form as well, while the opposite is not true. The finite forms of *zijn* ‘be’ are 16 instances of the copula and 3 instances of the
auxiliary of the perfect tense. At present, I have no explanation for GS's preference for copula *zijn* in finite sentences.

5. Conclusions

This paper deals with the spontaneous speech of GS, a Dutch agrammatic patient. The functional structure of the nominal and verbal domain in the speech of GS was investigated. The nominal domain is fully intact. DP is correctly realized, and the nominal features [definiteness], [number] and [gender] are correctly realized on nouns and adjectives as well. The verbal domain is impaired, since at least 85% of the utterances of GS do not provide evidence for the presence of any verbal structure different from AgrOP. These utterances either contain no verb at all, or they are root non-finites, in which finite verbal inflection and subjects are missing. We conclude that there is an obvious dissociation between the nominal and verbal domain. Several researchers already showed that the projections within a functional domain can be selectively impaired (Hagiwara 1995, Friedmann and Grodzinsky 1997, Cahana-Amitay 1997). The speech of patient GS shows that the nominal and the verbal domain can be selectively impaired as well.

The precise locus and nature of the impairment of the verbal domain are not clear, and it is difficult to determine these solely on the basis of spontaneous speech data. As for the locus of the impairment, TP would be a good candidate. The Tense projection might be absent, or Tense might be underspecified or empty (cf. among others Ouhalla 1993, Friedmann and Grodzinsky 1997).

As for the nature of the impairment in the verbal domain, we assume that the impairment is not due to a loss of syntactic or semantic knowledge. GS does produce correct finite sentences, in which the verb is moved and a subject is present. While in her non-finite utterances the verb is in final position and a subject is missing. GS does not suffer from a general problem in handling the referential part of an expression. DP and TP have a similar function in this respect: they specify the reference of the nominal and verbal projection respectively. However, in GS's speech DP is intact while TP is impaired. The impairment is not due to a loss of knowledge about the concept of Time either. GS correctly marks at least the aspect of her root non-finites by using either an infinitival verb or a past participle. In the ANTAT, talking about situations in the here-and-now, most non-finite verbs are infinitives. In the AAT, telling about the start of her disease and former activities and hobbies, GS mainly produces past

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5 The distribution of different verbs in finite and non-finite contexts as shown in table 7 is not in accordance with the results of Cahana-Amitay (1997). She conducted an experiment to elicit finite forms of main verbs and copula *zijn* with 10 Dutch aphasics patients. Seven of these patients were classified as agrammatic. She found no difference between main verbs and copula *zijn.*
participles in her non-finite utterances. If the syntactic and semantic knowledge for generating a correct phrase structure is available, then GS possibly suffers from a processing impairment, which results in less elaborated structures (cf. Hagiwara 1995, Cahana-Amitay 1997).

References


Graetz, P. R. de Bleser and K. Willmes (1992) *De Akense Afasie Test, Nederlandse Versie*, Swets and Zeitlinger, Lisse.


