Functional categories in agrammatism: Evidence from Greek

Stavroula Stavrakaki,* and Sofia Kouvava

a Department of Psychology, University of Crete, 74100 Rethimno Crete, Greece
b Center for Language Disorders, 16675 Glifada, Athens, Greece

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Abstract

The aim of this study is twofold. First, to investigate the use of functional categories by two Greek agrammatic aphasics. Second, to discuss the implications of our findings for the characterization of the deficit in agrammatism. The functional categories under investigation were the following: definite and indefinite articles, personal pronouns, aspect, tense, subject–verb agreement, wh-pronouns, complementizers and the mood marker na (= to). Based on data collected through different methods, it is argued that the deficit in agrammatism cannot be described in terms of a structural account but rather by means of difficulties in the implementation of grammatical knowledge.

Keywords: Agrammatism; Greek; Task-dependent performance; Structural deficit; Processing deficit; Grammatical sensitivity

1. Introduction

Traditionally, agrammatism is considered to be a symptom which is typically found as a part of the larger syndrome of Broca’s Aphasia. In particular, agrammatic speech is characterized by a difficulty with function words and inflectional morphemes with relative sparing of substantive words (Tissot, Mounin, & Lhermitte, 1973).

Recently, the question of whether the absence of some grammatical categories in the spontaneous speech of agrammatic patients is an indication of competence or...
performance limitations has become a central focus of studies of agrammatism. More specifically, two main approaches have been developed to account for the nature of the language-related deficits in agrammatism.

On the one hand, some researchers have ascribed many linguistic difficulties experienced by agrammatic aphasics to a deficit in the functional categories of grammar and their projections. Such a structural deficit account of agrammatism is recently offered by Friedmann and Grodzinsky (1997) and Friedmann (2001), who maintain that the impairment in agrammatic production is highly selective and lends itself to characterization in terms of a deficit in the syntactic tree. That is, agrammatic patients produce trees that are intact up to the Tense node and “pruned” from this node and up. On the tree-pruning hypothesis, impaired structure building at a lower level of projection entails that no higher level projections can be built. In this respect, variability in the performance of agrammatic patients is expected. More specifically, while some patients may be impaired both in TP-related abilities and in CP-related abilities, others may be impaired only in CP-related abilities. Crucially, no patient is predicted to project the tree up to the CP node in the absence of TP.

On the other hand, it is suggested that the agrammatic patients encounter difficulties in producing particular grammatical structures, because they are not able to implement their grammatical knowledge (Crain, Ni, & Shankweiler, 2001; Friederici & Frazier, 1992; Haarmann & Kolk, 1994, among others). In other words, the grammatical representations are supposed to be intact in agrammatism, but the process of accessing and using grammatical knowledge is considered to be severely impaired. Data indicating a discrepancy between the performance of agrammatic patients on production tasks on the one hand and on the grammaticality judgement tasks on the other (Linebarger, Schwartz, & Saffran, 1983) have been interpreted in favor of the processing approach to agrammatism. Moreover, the attested variability within the agrammatic performance across different tasks was also taken to indicate spared linguistic knowledge but reduced efficiency of the agrammatic parser. Among the most striking findings showing task-dependent changes in the character of agrammatic speech is that reported by Hofstede and Kolk (1994). In their study of German and Dutch Broca’s aphasics, omission rates of grammatical morphemes went down and substitution rates tended to go up in picture description as compared to free conversation.

Within the framework of the processing approach to agrammatism, Kolk and his colleagues put forth the strategic variation hypothesis (Kolk & van Grunsven, 1985) according to which agrammatic speech is the result of avoidance behavior. This behavior occurs when agrammatic speakers do not try to construct complete grammatical sentences, and so shift to utterances requiring a reduced processing capacity in situations such as free conversation where patients feel free to avoid complete sentence forms and omit morphemes. However, when they have to describe a picture as well as they can, they show less avoidance behavior. Consequently, agrammatic aphasics select complete sentence types but nevertheless they produce substitution errors, that is, paragrammatic output, due to their insufficient computational capacity.

Against the above theoretical background, the aim of this study is twofold. First, to investigate the use of functional categories by two Greek agrammatic aphasics across different tasks. The functional categories studied are: definite and indefinite article, personal pronouns, wh-pronouns, aspect, tense, subject–verb agreement, negation, complementizers and the mood marker na (= to). Second, to discuss the theoretical implications of our findings for the characterization of the deficit in agrammatism.
2. Background information on Greek clause structure

Before we move on to the methodology of the study, we will present some preliminary information on the structure of Greek. Greek is a typical null subject language with rich morphology and relatively free word order. There are no infinitival forms and verb suffixes are simultaneously marked for tense, aspect, voice, and agreement (Holton, Mackridge, & Philippaki-Warburton, 1997). It has been claimed that several functional categories are instantiated in Greek, since they form part of the morphology of the Greek verb (Philippaki-Warburton, 1989, among others). The order of functional categories in the extended projection of the Greek verb is as follows:\footnote{The issue of whether TP is higher than IP in Greek or vice versa is among the most controversial issues in the field of Greek Syntax (see Alexiadou, 1999; Tsimpli, 1990). In this paper, TP is taken to be higher than IP (cf. Tsimpli, 1990).}: TP > IP > AspectP > VP.

Negation precedes all inflectional material on the verb. Greek has two negation particles: \textit{den} (\(=\) not), which co-occurs with the indicative mood, and \textit{min} (\(=\) not), which co-occurs with subjunctive mood. More precisely, the negation \textit{min} follows the subjunctive marker \textit{na} (\(=\) to), a category in its own right, referred to as Mood. If a negative element needs to be selected according to the \pm indicative status of the mood, then MoodP is higher than NegP (Tsimpli, 1990). Therefore, the hierarchy of functional categories in Greek is the following: CP > MoodP > NegP > TP > IP > AspectP > VP.

3. The study

3.1. Methodology

3.1.1. Subjects

Two aphasic patients, SC and VF, participated in this study. Both of them were native speakers of Greek. The patient SC was fluent in two foreign languages, namely Ethiopian and English before his CVA. They were non-fluent aphasics, diagnosed as Broca’s aphasics on the basis of a Greek version of the Boston Diagnostic Aphasia Exam (Goodglass & Kaplan, 1982), clinical consensus, and neuroimaging data. The patients exhibited characteristic agrammatic speech at the time of testing. In Table 1, background information on each subject is presented.

3.1.2. Design and materials

To evaluate the use of functional categories by the two patients, different tasks were employed. In this way, the effect of task variation on the agrammatic performance on functional categories can be tested. Testing the linguistic abilities of agrammatic patients across different tasks is theoretically motivated. If the linguistic difficulties in agrammatism proceed from deficits in the representation of grammatical categories, then across different tasks little variation in agrammatic performance on the impaired functional categories and their projections is expected.

The tasks used in this study were the following: (i) Spontaneous speech: data elicited in communicative situations as unforced as possible; (ii) Picture-description task: subjects were presented with pictures and told to describe them as accurately as possible. SC was presented with 37 pictures and VF was presented with 35 pictures; (iii) Grammaticality judgements for grammatical and ungrammatical sentences: The
test sentences examined particular grammatical categories. More specifically, 8 types of grammatical structures were tested: subject–verb agreement, past tense marking, negation den (not), negation min (not), the mood marker na (to), complementizers, operator movement (which-object questions), and operator movement in embedded questions. It should be noted that most of the test structures are associated with high projections of the syntactic tree. In particular, both negators are associated with the NegP, the mood marker na is associated with the MoodP, while the complementizers and the process of operator movement are associated with the CP. Each structure was represented in 10 grammatical and 10 ungrammatical sentences, making a total of 160 sentences. As far as the ungrammatical sentences are concerned each sentence contained only a single grammatical violation. More specifically, the ungrammatical structures testing subject–verb agreement involved violations in number and person agreement, while those testing tense marking involved incorrect tense marking, i.e. present instead of past tense. As far as the ungrammatical sentences testing negators den (not) and min (not) are concerned, the anaphoric negation ohi (no) was used instead of the target negators. The mood marker na (to) was omitted in ungrammatical structures that tested subjunctive mood, while incorrect complementizers were used in ungrammatical structures that tested knowledge of complementizers. Finally, ungrammatical which-NP object questions and embedded questions involving no movement of wh-phrase were tested. Examples of ungrammatical stimulus materials for each of the test structures are presented in the examples from (1) to (8). Grammatical violations are indicated in bold.

Subject–verb agreement
(1) *ego diavazete
   I-nom-read-2p
Past tense
(2) *Xtes vlepo ti Maria
   Yesterday-see-1s-present-the-Maria-acc
Negation den (= not)
(3) *oxi agapo ti Maria
   no-love-1s-the-Maria-acc
Negation min (= not)
(4) *thelo na oxi pas ekdromi
   want-1s-to-no-go-2s-excursion

Table 1
Background information on subjects

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Age</th>
<th>Sex</th>
<th>Education (years)</th>
<th>Hand</th>
<th>Hemiplegia</th>
<th>Etiology</th>
<th>Time post onset</th>
<th>No. of recordings</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC</td>
<td>58</td>
<td>M</td>
<td>12</td>
<td>Right</td>
<td>Right hemiplegia</td>
<td>Left CVA, Left parietal ischemic infarct (following bypass operation)</td>
<td>4 years</td>
<td>18</td>
</tr>
<tr>
<td>VF</td>
<td>55</td>
<td>M</td>
<td>12</td>
<td>Right</td>
<td>Right hemiplegia</td>
<td>Left CVA, ischemic infarct in the left hemisphere</td>
<td>2 years</td>
<td>12</td>
</tr>
</tbody>
</table>
Mood marker *na (= to) 
(5) *thelo [ ] kimitho 
want-1s-sleep-1s
Complementizers
(6) *Akusa ja na ise kalos 
heard-1s-for-to-be-2s-good
Operator movement (which + NP)
(7) *pia o fititis agapise kopela? 
Who-acc-the-student-nom-loved-1s-girl-acc
Operator movement in embedded questions
(8) *Xero ide i Maria pion 
know-1s-saw-3s-the-Maria-nom-whom-acc

(iv) Preference test between grammatical and ungrammatical sentences: The subject was orally presented two sentences, one grammatical and one ungrammatical. The first sentence was symbolized by a moon, while the second was symbolized by a star. The subject needed to choose the sentence that sounded better to him, that is, to select between the moon and the star. The same structures as in the grammaticality judgment test were presented. Each structure was represented by 10 ungrammatical and 10 grammatical sentences.

3.2. Results and discussion

3.2.1. Spontaneous speech data

Let us now consider the results. In Table 2, the correct use of functional categories studied is presented.

Consider first the definite article. The definite article in Greek is a modifier placed before common and proper nouns; it can also appear in a preposition + determiner cluster in forms like *ston, stin, sto (= to-the-masc/fem/neut).

As shown in Table 2, the definite article is produced correctly in 18.27 and 34% of cases by SC and VF, respectively. Further analysis to define the type of errors that were made in the incorrect uses of the definite article indicated that the only type of error was omissions. Consider the example in (9) below:

<table>
<thead>
<tr>
<th>Correct use of the functional categories studied in spontaneous speech data</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC</td>
</tr>
<tr>
<td>Definite article</td>
</tr>
<tr>
<td>Strong pronouns (1st, 2nd, and 3rd person)</td>
</tr>
<tr>
<td>Genitive clitics (1st, 2nd, and 3rd person)</td>
</tr>
<tr>
<td>Clitic object pronouns (1st person)</td>
</tr>
<tr>
<td>Clitic object pronouns (2nd person)</td>
</tr>
<tr>
<td>Clitic object pronouns (3rd person)</td>
</tr>
<tr>
<td>Present tense</td>
</tr>
<tr>
<td>Past tense</td>
</tr>
<tr>
<td>Present tense/imperfective aspect</td>
</tr>
<tr>
<td>Past tense/imperfective aspect</td>
</tr>
<tr>
<td>Past tense/perfective aspect</td>
</tr>
<tr>
<td>Future category/imperfective aspect</td>
</tr>
<tr>
<td>Future category/perfective aspect</td>
</tr>
<tr>
<td>Den</td>
</tr>
<tr>
<td>Min</td>
</tr>
<tr>
<td>Na</td>
</tr>
<tr>
<td>Complementizers</td>
</tr>
<tr>
<td>Wh-words</td>
</tr>
</tbody>
</table>
Omissions of the definite article occurred before common names, before proper names, and in PPs. We made a detailed error analysis in order to examine the distribution of omissions in the obligatory contexts of the definite article, that is, before common and proper names as well as in PPs. It should be noted that SC omitted the definite articles before common names in 54/322 (16.77%) cases, in the obligatory contexts of PPs in 106/322 (32.9%) cases, and before proper names in 162/322 (50.31%) cases; the omissions of the definite article by VF were 16/99 (16.16%) cases before common names, 45/99 (45.45%) cases in the obligatory contexts of PPs, and 38/99 (38.38%) cases before proper names. In general, omissions of the definite article are related to contexts of proper names and prepositions, while low error rate was attested in contexts of common names. It thus seems that the omission rate of the definite article is somewhat dependent on particular properties of the contexts where it appears. More specifically, the definite article is omitted when it is completely redundant and without communicative use, as is exactly the case for the definite article before proper names. In these cases, the semantic features of the definite article, i.e. the definiteness, do not contribute to the definiteness of the proper name, and thus, the definite article has an expletive/pleonastic function (cf. Tsimpli & Stavrakaki, 1999). Moreover, the omission of the definite article in PPs may be the effect of syntactic complexity, which is evident in PPs; compare the syntactic structure of a PP (PREP + DP) with that of a DP (DET + NP). It seems that increased syntactic complexity in PPs results in further computational load, hence the omission of the definite article. In this respect, the functional category of definite article is well preserved in the grammar of the two aphasic patients. It should be noted that the correct use of definite article before common names is 41.9% (39/93) for SC and 69.23% (36/52) for VF. Obligatory contexts of indefinite article were not found in spontaneous speech data.

Consider now the correct use of the strong types of personal pronouns (e.g. *ego thelo: I-nom-want-1s = I want) as shown in Table 2; both patients showed ceiling performance. This is also the case for the correct use of clitic pronouns in genitive case (e.g. to vivlio su: the-acc-book-your = your book), as can be seen in Table 2. No obligatory contexts of the second and third person of genitive clitic pronouns were found in the data from SC.

However, the performance of both patients drops on the production of object clitic pronouns, as indicated in Table 2. It should be noted that low performance is exhibited especially on the third person clitic pronouns. Interestingly, object clitic pronouns are not altogether missing, since some correct instances were attested. All incorrect instances were omissions. Consider an example of omissions in (10).

(10) a. SC: *oxi. . . .oxi. . . .milaio. . . .oxi ( = oxi den tu milaio)  
   No. . . . . . . . . . . . . . talk-1s-. . . .no ( = no not-him-gen-speak-1s)  
   “ No, I do not speak to him”

The data concerning pronouns indicated dissociation between the strong types of personal pronouns and the object clitic pronouns, as well as between the possessive clitic pronouns and the object clitic pronouns. Such dissociation may be due to the syntactic–semantic properties of each type of pronoun. In particular, strong pronouns are full noun phrases with a fully fledged functional structure bearing a referential index. This also seems to be the case for genitive clitics, since they always bear a θ-role (e.g. the possessive, the subject or object θ-role), and thus they cannot be but referential (Tsimpli & Stavrakaki, 1999). Unlike genitive clitics, object clitics cannot have the ability to refer directly and so co-reference is indirect. That is, object clitics need a prominent discourse antecedent to be interpreted. Associating a clitic
pronoun with a discourse referent requires a complex computational procedure; hence the omission of object clitics in agrammatic speech.

Let us now look at tense marking. Greek distinguishes formally between non-past and past tenses. The marked value for tense is [+past] (Philippaki-Warburton, 1973) while present tense represents the default value. As shown in Table 2, both patients, especially patient SC, encountered some difficulties in the production of past tense forms. However, the percentages of correct performance (64.28 and 82.5% for SC and VF, respectively) indicate that the subjects of this study are able to produce past tense forms. Error analysis indicated that present tense forms were produced instead of the past tense forms. More detailed error analysis indicated that most errors occurred in contexts with increased syntactic complexity, that is, in contexts where a complex syntactic structure should be produced. In particular, 7 out of 15 (46.66%) errors produced by the patient SC and 6 out of 7 (85.71%) errors produced by the patient VF occurred in past tense obligatory contexts that can be characterized as contexts of high syntactic complexity. More specifically, such contexts were those where the subject had to use a complementizer, i.e., to produce a CP, or to produce negation + object clitic, or a clitic left dislocated construction (CLLD). CP occupies the highest position in the syntactic tree; negation is also associated with a high position in the syntactic tree, while the interpretation of object clitics is achieved through a complex syntactic procedure. Examples of incorrect tense production in contexts where a complementizer and negation + clitic had to be produced are presented in (11a and b), respectively.

(11) a. VF: * Keti. . i Keti agorazi. . a footkinito (= Otan i Keti agorase to a footkinito) Keti. .the-Keti-nom-buy-3s-car-acc (= When-the-Keti-nom- bought-the-car-acc) “When Keti bought the car”

b. SC: *oxi. .oxi. .vlepo. . .oxi (= oxi den to ida) No. .no. .see-1s-. . .no (= no. .no. .see-1s-. . .no) “No, I did not see it”

Finally, the CLLD construction is a complex syntactic construction involving an operator-variable chain between a clitic and a full DP in an IP-adjunct position (Anagnostopoulou, 1994). Consider the example in (12) below:

(12) SC: *Ta dendra ne. . .fitevo. .ne. ego ego. . . . . .fitevo (= Ta dendra ta fitepsa egho) the-trees. .yes.. plant-1s-yes. .I-nom-I-nom. .plant-1s (the-trees-them- acc-planted-1s-I-nom) “I planted the trees”

It seems that under the load of syntactic complexity of the above structures, the agrammatic patients resort to the unmarked forms in Greek, that is, the present tense forms; these forms dispensed from computational load seem to be easily accessible. This strategy is rather a last resort strategy invoked by increased grammatical complexity. In other words, the higher the degree of complexity of the target form, the higher the chance of resorting to default forms (cf. Kolk, 1998).

Consider now the correct use of aspect. Aspect in Greek interacts with tense, and so, tense-aspect combinations arise as shown in Table 2. Errors were found in the obligatory contexts of perfective past tense. In particular, imperfective past tense forms were produced (e.g. alaz: change-3s-past-imperf) instead of the target ones (e.g. alakse: change-3s-past-perf). These errors may be due to the fact that more computational processes are required for the formation of the past perfective than the formation of past imperfective, since past imperfective (alaz-e) is more predictable from the present stem (alaz-i) than the perfective one (alak-s-e) (cf. Kehayia & Jarema, 1991).
Let us now look at the correct use of subject–verb agreement in the obligatory contexts. Consider Table 3.

As indicated in Table 3, the correct use reaches high percentages; however, there are a few problems with plural suffixes as shown by the data from SC. It should be noted that all errors attested are substitutions, since omission of suffixes is completely impossible in Greek.²

Consider now the correct use of negation den (¼ not) and the embedded negation min (¼ not, in contexts such as: na min: to not), as can be seen in Table 2. Individual variation is evident in the performance of both patients on negation den, since SC performs correctly in 34.6% of cases, whereas VF performs correctly in 72.22% of cases. As far as the negation min is concerned, it is altogether omitted by SC; no obligatory contexts of the negation min were found in the spontaneous speech of VF.

When negators den and min were omitted, the patients employed the anaphoric negation ohi (¼ no), as shown in (13):

(13) a. SC: *Ohi. .ohi. .ksehnao. .ohi. .ksehnao (¼ Ja na min ta ksehnao)
   No. .no-forget-1s-no-forget-1s (¼ For-to-not-them-acc-forget-1s)
   “So that I do not forget them”

Let us now look at the categories, which are associated with the highest projections of the syntactic tree. Consider the MoodP first. Indicative mood was correctly realized, since no other Mood forms were attested in the obligatory contexts of indicative mood. However, this was not the case for the subjunctive mood, which is realized in Greek in terms of the particle na (¼ to). In our data, there were few obligatory contexts of the mood marker na, in which patients omitted it most of the times. Consider the example below:

(14) VF: *thelo.... .thelo. . .figo. . (¼ thelo na figo)
    want-1s. . want-1s-leave-1s (¼ want-1s-to-leave-1s)
    “I want to leave”

As far as the CP layer is concerned, complementizers were completely absent from the speech of SC, that is, they were always omitted. VF used correctly the complementizer an (¼ if), while other complementizers were omitted.

However, question words, i.e. pronouns and adverbs, which are also associated with the CP layer, were not omitted. It should be noted that patient SC produced formulaic questions, such as what is that, how are you; patient VF made more productive use of questions as 8/15 questions produced by him were not formulaic questions.

All in all, the spontaneous speech data indicated that most of the functional categories studied were not completely missing from the grammar of the two aphasics. However, it is noteworthy that embedded structures, i.e. those structures including complementizers or the mood marker na, were rare in the speech of both patients. Crucially, both complementizers and the mood marker na occupy high positions in the syntactic tree. However, the tree position in the sentence hierarchy is not the only determinant of the agrammatic performance (cf. Rispens, Bastiaanse, &

² In Greek, stems cannot stand on their own without endings.

Table 3
Correct use of subject–verb agreement (spontaneous speech data)

<table>
<thead>
<tr>
<th></th>
<th>1s</th>
<th>2s</th>
<th>3s</th>
<th>1p</th>
<th>2p</th>
<th>3p</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC</td>
<td>125/125 (100%)</td>
<td>13/13 (100%)</td>
<td>100/109 (91.74%)</td>
<td>7/10 (70%)</td>
<td>6/10 (60%)</td>
<td>16/20 (80%)</td>
</tr>
<tr>
<td>VF</td>
<td>35/35 (100%)</td>
<td>25/25 (100%)</td>
<td>70/70 (100%)</td>
<td>32/32 (100%)</td>
<td>17/20 (85%)</td>
<td>18/20 (90%)</td>
</tr>
</tbody>
</table>
van Zonneveld, 2001). Specifically, productive use of wh-questions but not of complementizers was made by VF, although both wh-words and complementizers are associated with the CP layer. Note that complementizers occupy the C0 position in the tree, whereas wh-words occupy the SpecCP position. It may be the case that agrammatic patients have greater problems with the C0 position than with the SpecCP position. Moreover, although both den and min occupy the same position in the tree, namely Neg0, better performance on the negation den than on the embedded negation min is exhibited by agrammatic patients. A possible explanation of this performance is as follows. The overt realization of the mood marker na before the embedded negation min results in further computational processes. Therefore, structures with the embedded negation min cause more difficulties in agrammatic production than structures with the negation den, where MoodP is available specified as [+indicative] with zero morphological context (Philippaki-Warburton, 1993).

### 3.2.2. Picture-description task

The results presented in Table 4 concern the following categories: definite and indefinite articles and AGR-S.4

<table>
<thead>
<tr>
<th></th>
<th>Def art</th>
<th>Indef art</th>
<th>3s</th>
<th>3p</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC</td>
<td>28/50 (56%)</td>
<td>30/48 (62.5%)</td>
<td>41/59 (69.5%)</td>
<td>24/43 (55.8%)</td>
</tr>
<tr>
<td>VF</td>
<td>40/55 (81.8%)</td>
<td>39/45 (86.7%)</td>
<td>50/50 (100%)</td>
<td>32/40 (80%)</td>
</tr>
</tbody>
</table>

It should be noted that the above results are compatible with the strategic variation hypothesis (Kolk & van Grunsven, 1985), as our patients tend to select complete sentence types while producing paragrammatic output.

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3 Similarly, based on cross-linguistic data on negation, Rispens et al. (2001) have suggested that when the negation word is a functional head it is more difficult for agrammatic patients to construct negative sentences than when it is in the specifier.

4 The elicitation of other functional categories, e.g. tense, was not possible, since the patients had to respond to the following question: what is going on in this picture? Notice, also, that only the production of the 3rd person singular and plural was possible.

5 It should be noted that obligatory contexts of proper names were not found in the data from the picture-description task. Even if we compare the correct performance on definite article in spontaneous speech data excluding the obligatory contexts of proper names, the improvement is still impressive. The correct performance of SC goes from 21.56% of cases in spontaneous speech data to 56% of cases in the picture-description task, while the correct performance of VF goes from 45.535% of cases to 81.8% of cases.
3.2.3. Grammaticality judgment task

This task was motivated by the question of whether patients could perform correctly especially on those structures where their performance was poor in spontaneous speech data, that is, the structures associated with the higher projections of the syntactic tree, such as negation, CP layer, etc. The crucial results come from the performance of patients on non-grammatical structures where linguistic knowledge should be employed in order to decide about the grammaticality of the structure. Results are presented in Table 5.

The following noteworthy points emerged by the results:

First, individual variation in grammatical sensitivity is exhibited, since VF performs better than SC especially on ungrammatical constructions.

Second, high degree of grammatical sensitivity is shown, as patients are able to detect grammatical violations even in structures occupying a high position in the syntactic tree. Interestingly, both patients judge correctly structures involving a violation in operator movement in embedded questions. Recall that SC produced only formulaic questions in his spontaneous speech. However, his performance on judging ungrammatical embedded wh-questions indicates some knowledge of operator movement and so of CP, as wh-words occupy the Spec-CP position in the tree. It should be noted that although SC exhibits ceiling performance on ungrammatical embedded wh-questions, he shows chance performance (50%) on ungrammatical which-NP questions. However, based on his overall performance on judging structures with operator movement, we can conclude that he exhibits increased grammatical sensitivity compared to his performance in free conversations. Although both patients exhibit knowledge of the Spec-CP position in the syntactic tree, they encounter some difficulties with the C0 node, as shown by their performance (50% for SC and 60% for VF) on structures involving incorrect complementizers. As far as the mood marker na is concerned, the patient VF exhibits impressive performance in detecting constructions in which the mood marker is omitted, whereas low level of correct performance is shown by SC. Increased grammatical sensitivity is also shown by both patients in detecting ungrammaticality in structures with the anaphoric negation ohi (= no) instead of the embedded negation min. Recall that negation min was always omitted by SC in his spontaneous speech and there were no obligatory

Table 5

The correct performance on the grammaticality judgement task

<table>
<thead>
<tr>
<th>Stimuli</th>
<th>SC</th>
<th>VF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject–verb agreement</td>
<td>11/12 (91.66%)</td>
<td>12/12 (100%)</td>
</tr>
<tr>
<td>Subject–verb agreement</td>
<td>11/12 (91.66%)</td>
<td>12/12 (100%)</td>
</tr>
<tr>
<td>Past tense marking</td>
<td>10/10 (100%)</td>
<td>10/10 (100%)</td>
</tr>
<tr>
<td>Negation den</td>
<td>9/10 (90%)</td>
<td>10/10 (100%)</td>
</tr>
<tr>
<td>Negation min</td>
<td>8/10 (80%)</td>
<td>10/10 (100%)</td>
</tr>
<tr>
<td>Mood marker na</td>
<td>8/10 (80%)</td>
<td>10/10 (100%)</td>
</tr>
<tr>
<td>Mood marker na</td>
<td>4/10 (40%)</td>
<td>8/10 (80%)</td>
</tr>
<tr>
<td>Complementizers</td>
<td>7/10 (70%)</td>
<td>9/10 (90%)</td>
</tr>
<tr>
<td>Complementizers</td>
<td>5/10 (50%)</td>
<td>6/10 (60%)</td>
</tr>
<tr>
<td>Operator movement (which + NP)</td>
<td>7/10 (70%)</td>
<td>9/10 (90%)</td>
</tr>
<tr>
<td>Operator movement (which + NP)</td>
<td>5/10 (50%)</td>
<td>9/10 (90%)</td>
</tr>
<tr>
<td>Operator movement in embedded questions</td>
<td>10/10 (100%)</td>
<td>10/10 (100%)</td>
</tr>
<tr>
<td>Operator movement in embedded questions</td>
<td>10/10 (100%)</td>
<td>10/10 (100%)</td>
</tr>
</tbody>
</table>

* Asterisk (*) indicates ungrammaticality.
contexts of min in the data from VF. High level of performance is exhibited by both patients on structures including violations in negation den, past tense marking, and subject–verb agreement, as shown by Table 5.

Third, as mentioned before, the high or low tree position in the sentence hierarchy is not the only determinant of the aphasic performance (cf. Rispens et al., 2001). Again, patients perform better on negation den than on negation min, as in spontaneous speech data. Better performance is also exhibited on judging ungrammatical embedded wh-questions than on judging ungrammatical which-NP questions although the wh-word and the which-NP phrase are associated with the same syntactic position in the tree, namely the Spec-CP position. Obviously, this performance indicate knowledge of the [+WH]-CP Principle (Ouhala, 1994), according to which CPs whose head (C) is marked with the feature [+WH] (i.e. wh-clauses) require their Spec position to be filled by a wh-phrase. The difficulties imposed by which-NP questions to the patient SC may be related to the special discourse requirements of the which-NP questions. In particular, it has been suggested that due to their D-linked status, the which-object questions require the integration of the syntactic and discourse related knowledge simultaneously ((Avrutin, 2000). In this sense, these questions are “expensive”, hence the drop of the SC’ performance on them.

3.2.4. Preference test between grammatical and ungrammatical sentences

High level of performance is exhibited by both patients on the preference test, except for the performance of SC on complementizers. Consider Table 6.

As shown by Table 6, SC has consistent problems with a specific type of functional category, i.e. the complementizers.

4. General discussion

In the present study, we initially set out to investigate the use of functional categories by two Greek agrammatic aphasics across different tasks. The results obtained show a clear task effect on agrammatic performance, since different performance is exhibited on different tasks, i.e. spontaneous speech, picture-description tasks, grammaticality judgement tasks, and preference test. Such variation is rather incompatible with structural accounts (cf. Friedmann & Grodzinsky, 1997) postulating a grammatical impairment in the ability to project the tree up to its highest nodes. In particular, as shown by results from the grammaticality judgement task and the preference test, high degree of grammatical sensitivity was found even for those structures associated with the highest projections of the syntactic tree, e.g. CP, and hardly attested in spontaneous speech data. However, the highest node, i.e. the C node, causes some difficulties to the patients. Recall that SC exhibits chance performance on complementizers, which occupy the C position in the tree, even in the preference test. However, this performance cannot constitute evidence of the
aphasic patients’ inability to project the tree up to its highest nodes. First, both patients perform well on detecting violations related to operator movement, as mentioned before. Second, only SC exhibits chance performance on complementizers in the preference task, whereas VF exhibits high level of correct performance (80%). Therefore, based on the data presented in this study, it cannot be concluded that the whole CP projection is missing per se. Alternatively, it is suggested that the linguistic problems attested in the performance of the patients in this study may be the result of impaired ability to access and exploit grammatical knowledge (Friederici & Frazier, 1992; Kolk, 1998, among others). Crucially, the results obtained by the picture-description task indicate that agrammatic speakers are able to behave according to the task demands and, thus, to produce more complete sentences than those produced in free conversations (cf. Hofstede & Kolk, 1994). Interestingly, incorrect agrammatic performance in free conversations has been analyzed as the effect of computational load. For example, present tense forms are produced instead of the past ones in syntactically complex contexts. A similar analysis was also suggested for the omission of definite articles in PPs as well as for the problems with the perfective past tense forms, and object clitics.

To conclude, our findings suggest that at least for the cases reported in this paper, grammatical knowledge concerning the highest projections in agrammatism is not absent. However, the highest projections, although they are not missing per se, cause difficulties in free conversations of agrammatic patients. These difficulties were attributed to impaired access to grammatical representations, rather than to impaired grammatical representations.

References


