

Agrammatism in Greek: aspects of production and comprehension

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Abstract

The present paper addresses the question of whether the deficient production and comprehension patterns exhibited by Broca's aphasics is an indication of competence or performance limitations, an issue that has recently become a central focus of cross-linguistic studies of agrammatism. The study presented in this paper investigates the language production of one agrammatic patient involving a range of linguistic impairments co-occurring with a less extended comprehension deficit. With respect to the performance/competence dilemma set from the beginning of this paper, the evidence suggests 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: aphasia, Greek agrammatism, competence/performance

1. Introduction

Few studies have focused on language breakdown in Greek-aphasic patients while no studies of agrammatism in Greek speakers have been included in the more recent large-scale cross-language studies (Menn & Obler 1990; Bates et al. 1991). Modern Greek has a rich system of agreement inflections with flexible word order. Therefore, the study of language breakdown in Greek is important not only for the treatment of hundreds of Greek-speaking aphasic patients, but because, placed within the framework of comparative aphasiology, it can enhance our scientific knowledge of language processing.

Agrammatism has been defined as a deficit in language production primarily characterized by the omission of grammatical functors and inflections and by a marked reduction in syntactic complexity. Two major issues have been argued regarding such a characterization of agrammatism: (i) whether the language deficits demonstrated in agrammatic production are paralleled in comprehension (Grodzinsky 1986; Goodglass et al. 1993) and (ii) whether agrammatic speech is a product of a damaged grammar or rather the result of an impaired access to a preserved grammatical system.

The goal of the current study is to investigate the phenomenon of agrammatism in a Greek-speaking aphasic patient with particular emphasis on the use of grammatical morphology. Using a variety of tasks we analyze the use of particular morphological components of Greek in oral production and auditory comprehension. We further examine the relative retention and loss of specific grammatical structures in Greek. Specifically, we ask if the nature of the aphasic subject's language impairment is better explained within the framework of a processing rather than a structural approach to agrammatism and if the patient's resulting difficulties in production and comprehension can be accounted for by the specific properties of his mother tongue, Greek.

2. Cross-linguistic studies of agrammatism

During the last few decades, much of the research on agrammatism has been conducted with English-speaking patients. As a consequence, the agrammatic symptoms typically described, though primarily exhibited by English-speaking patients, were considered – until very recently – to be universal. Whenever an agrammatic patient from a different L1 background was studied, English agrammatism was used as the base reference and deviations from this pattern were considered exceptions to the universal agrammatic pattern. The use of agrammatic symptoms in English speakers as a baseline could be one of the reasons why there are so many unanswered questions about the nature of agrammatism (Miceli & Mazzucchi 1990). Since the 1980s several systematic cross-linguistic studies have called into question some previously accepted definitions of agrammatism, such as the omission of grammatical functors, and have provided greater insight into the possible underlying mechanisms involved in agrammatism (Menn & Obler 1990; Lu 1994). It has become apparent that, because grammatical markings in different languages are achieved through different structural patterns, the deficit in agrammatism may manifest itself very differently depending on the constraints of the language investigated.

3. Method

3.1 *The subject*

The Greek-speaking subject (SP) used in this study was a neurologically stable, right-handed 65-year-old man with right upper-limb motor problems. Twenty years before entering our study SP suffered an acute right hemi paresis with speech difficulties. He was a non-fluent aphasic, evaluated and diagnosed as a Broca's aphasic using the Greek version of the Boston Diagnostic Aphasia Examination (BDAE: Goodglass & Kaplan 1972) and on the basis of clinical consensus by neurologists.

3.2 *Oral production subtests*

In the oral production tasks, the aphasic subject was asked to either complete a sentence or provide a one-sentence description of a target picture. These production tasks elicited two types of noun phrase morphology (singular/plural, number and gender agreement in the nominal phrase) and two types of verb phrase morphology (past tense, subject/verb agreement). In each of the oral production subtests, the patient was presented with sets of one to two pictures which embodied a contrast related to the targeted grammatical structure. The examiner then used the pictures as a lead-in to the targeted grammatical item. Upon hearing the lead-in sentence, the subject was asked to complete a sentence describing one of the pictures.

Examples from each oral production task are given in (1)-(5) below, along with the critical grammatical elements tested. The correctness score for each subtest was based solely on the specified critical elements. Any elaborations beyond the required response, whether correct or not, were not considered in the final score.

Noun singular/plural (9 items)

- (1) Εδώ είναι μια αλεπού. Σ' αυτήν την φωτογραφία υπάρχουν δύο _____/αλεπούδες.

‘Here is a fox. In that picture there are two _____/foxes.’

Critical element → correctly inflected noun.

Past tense morphology (18 items)

- (2) Σ’ αυτήν τη φωτογραφία το κορίτσι ανοίγει το κουτί. Στην άλλη φωτογραφία, το κορίτσι _____/άνοιξε το κουτί.

‘In this picture the girl is opening the box. In this other picture the girl _____/opened the box.’

Critical element → correct tense and correct inflection for subject/verb agreement.

Subject-verb agreement (12 items)

- (3) Κλωτσάτε. Ποιοι κλωτσάτε; _____/Εσείς.

‘You are kicking. Who are kicking? _____/You (are kicking).’

Critical element → correct subject pronoun.

Person & number agreement in verbs (15 items)

- (4) Σ’ αυτήν την φωτογραφία ο τροχονόμος σφυρίζει. Στην άλλη φωτογραφία οι δύο τροχονόμοι τι κάνουν; _____/Σφυρίζουν.

‘In this picture the police officer is whistling. In this other picture the two police officers _____/are whistling.’

Critical element → correctly inflected verb.

Number and gender agreement in the nominal phrase (3 items)

- (5) Τι βλέπεις σ’ αυτήν την φωτογραφία; _____/Δύο κόκκινα κοντά παντελόνια.

‘What can you see in this picture? _____/Two red short pairs of trousers.’

Critical element → correctly inflected adjectives and heads/nouns.

3.3 Auditory comprehension subtests

The three auditory comprehension subtests tapped the comprehension of (i) object & subject relative clauses, (ii) passive and reflexive constructions and, finally, (iii) constructions involving focused and Clitic Left Dislocated (CLLDed) objects. The stimuli in each subtest were intermixed in the test administration, but were scored separately.

For each of the auditory comprehension tests, the examiner presented four pictures that illustrated the contrasting grammatical structure, and then read a sentence corresponding to one of the pictures. The subject was then asked to point to a picture that best described the given sentence. Since 50% correct represented chance performance, scores from 26-75% were considered to be within the range of chance. A score of 75% or more was considered better than chance performance, while a score of 25% or below was taken to indicate a systematic reversal in the interpretation of the particular grammatical construction.

Object & subject relative clauses (12 items)

- (6a) Το κόκαλο που τρώει το σκυλί είναι μέσα στο πιάτο.

the bone.ACC that eats the dog.NOM is in the plate

‘The bone that the dog eats is in the plate.’

- (6b) Το κορίτσι που φιλάει τον άντρα κλωτσάει την κυρία.

the girl.NOM that kisses the man.ACC kicks the lady

‘The girl that kisses the man kicks the lady.’

Passive and reflexive constructions (8 items)

- (7a) Το αγόρι φιλιέται από το κορίτσι.
the boy.NOM kiss.NACT.3S by the girl
'The boy is kissed by the girl.'
- (7b) Η Μαρία πλένεται.
the Maria.NOM wash.NACT.3S
'Mary washes herself.'

Focused and CLLDed constructions (16 items)

- (8a) Την ΑΓΕΛΛΑΔΑ κλωτσάει ο παππούς.
the cow.ACC kicks the old-man.NOM
'The old man kicks the cow.'
- (8b) Τον κύριο με το ψηλό καπέλο τον φιλάει η κυρία.
the man.ACC with the tall hat him-CL kisses the lady.NOM
'The lady kisses the man with the tall hat.'

3.4 Procedure

The subject received 1-3 practice trials before proceeding with each subtests, and testing did not continue unless it was clear that the patient understood the task. The patient was tested in his own home for approximately 3 one-hour sessions.

4. Results and comments*4.1 Oral production subtests*

The mean percentages of correct responses for the oral production subtests can be seen in Figure 1 below:

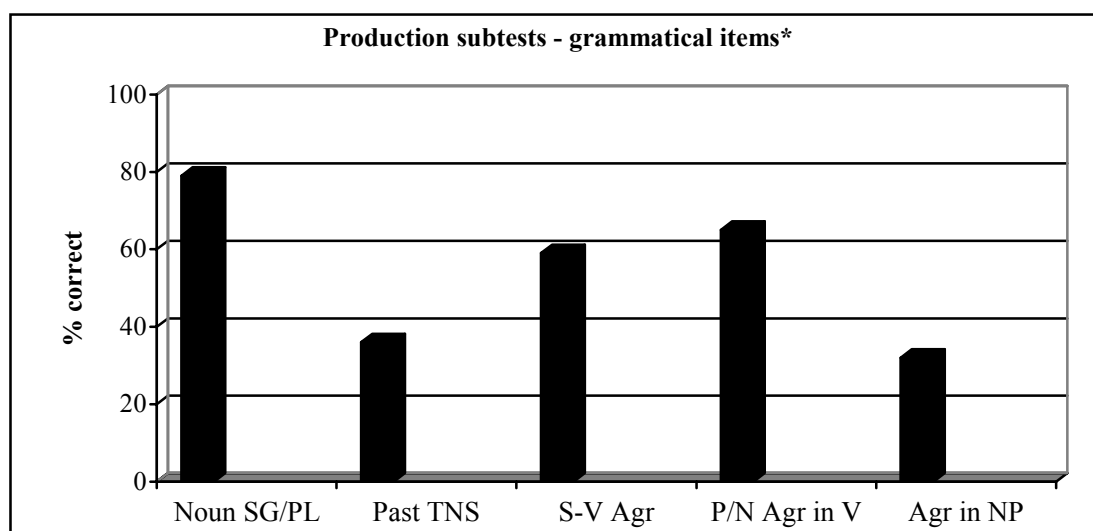


Figure 1. SP's means for the Greek production subtests.

*Subtests are grouped by (i) noun phrase morphology, (ii) verb phrase morphology, subject-verb agreement, (iv) person & number agreement in verbs and (v) production of agreement in the noun phrase. SG/PL = singular/plural; TNS= tense; S-V= subject-verb; P = person; N = number; Agr = agreement; NP = noun phrase

(10b) Examiner: Κάθεστε. Ποιοι κάθεστε;
 sit.PRES.2P who.NOM.PL sit.2P?

SP: Πέντε.
 five

Person and number agreement in verbs. The distribution of errors between verbal agreement suffixes in Table 1 below shows that the production of plural inflectional markers is worse than the production of singular ones.

Table 1. Proportion of substitutions between the three suffixes in the verb agreement task

<i>Target Suffixes</i>	<i>Number of the feature substitutions</i>
2 nd singular person	3/3 (100%)
2 nd plural person	4/4 (100%)
3 rd plural person	2/8 (25%)

Most errors were found in the 2nd person singular and plural suffixes and fewest substitutions occurred in the 3rd person plural form.

The wrong suffixes were arranged into two subgroups (*number feature violation & person feature violation*) depending on which agreement feature of the target suffix was altered. With regard to number feature, there was no such violation error. This means that the checking process of the phi-feature of Number was carried out in an intact manner. Moving on to the person feature violation error-group (referring to the substitution in which a substituted suffix differs from the target in the person agreement feature but not in the number feature) we found that the suffix replaced more often was the 2nd person suffix, which was repeatedly replaced by the 1st person singular and plural agreement marker. The preference for 1st person suffixes may be attributed to the fact that “children acquire the first person suffixes first”¹ (Meszaros 2001: 233) and may explain why this suffix is overused in agrammatic answers or why it disappears later than the others in agrammatism. Furthermore, this result leads us to assume that, in the case of SP at least, production (or checking) of the phi-feature of the 2nd person is disturbed or underspecified. Since inaccuracy in the suppliance of the target suffix is detected only in the case of the person feature group- we are led to assume that person and number features are checked independently.

Number and gender agreement in the nominal phrase. Adjectives/modifiers in Greek agree with head nouns in Number, Case and Gender, while the choice of the inflectional sub-paradigm is governed by the gender of the head noun. SP appeared to be able to access phonological representations in the specific task, but his failure to provide the target agreement suffixes on the adjective could, at least in principle, have been due to impairment in gender information:

¹ Corbett & Frazer (1993) proposed a similar explanation according to which morphosyntactic information is organized in a hierarchical informational tree represented by various types of affixes. Information is inherited in a top-down direction in the tree. The more unmarked a suffix is, the lower it is in the information tree. According to Corbett & Frazer’s theory (1993), the 2nd person appears to be marked, occupying a high position thus rendering itself inaccessible to agrammatic patients, who mostly replace a marked suffix by an unmarked one in spontaneous speech.

- (11a) SP: κόκκινο σκούφο
 red.*NEUT.SG hat.*NEUT.SG
 Target: ένας τρύπιος κόκκινος σκούφος
 one-NOM.MASC.SG with-a-hole-NOM.MASC.SG red-NOM.MASC.SG hat-NOM.MASC.SG
 ‘one red hat with a hole’
- (11b) SP: χαρταετό κίτρινο...όχι, μπλε και κόκκινο
 kite.*NEUT.SG yellow.*NEUT.SG no blue and red.*NEUT.SG
 Target: ένας μεγάλος πράσινος χαρταετός
 one-NOM.MASC.SG big-NOM.MASC.SG green-NOM.MASC.SG kite-NOM.MASC.SG
 ‘one big green kite’

A fuller explanation for the attested phenomenon, according to which SP can access lexemes but has unreliable access to the lemma stage, can be given on the basis of Caramazza’s (1997) lexical retrieval model. This model proposes parallel access to syntactic representations (including gender information) and lexical phonology. The parallel access model has the potential to explain results of the same pattern in terms of preserved access and retrieval of lexical phonology from semantics with impaired access to word-specific grammatical information. In this way, word retrieval may be spared in the presence of impaired access to syntactic information.

In 75% of the cases, SP managed to retrieve the phonological forms of the target nouns but erroneously interpreted critical nouns as neuter, choosing neuter agreement markers for the nouns’ modifiers/adjectives as well. In the light of Caramazza’s (1997) model, one may be tempted to interpret SP’s specific performance pattern as showing a degree of preserved access to lexical phonology when he could not access word-specific gender information—a pattern permitted by parallel access but not by serial access models.

4.2 Auditory comprehension subtests

The mean percentages of correct responses for the auditory comprehension subtests can be seen in Figure 2 below:

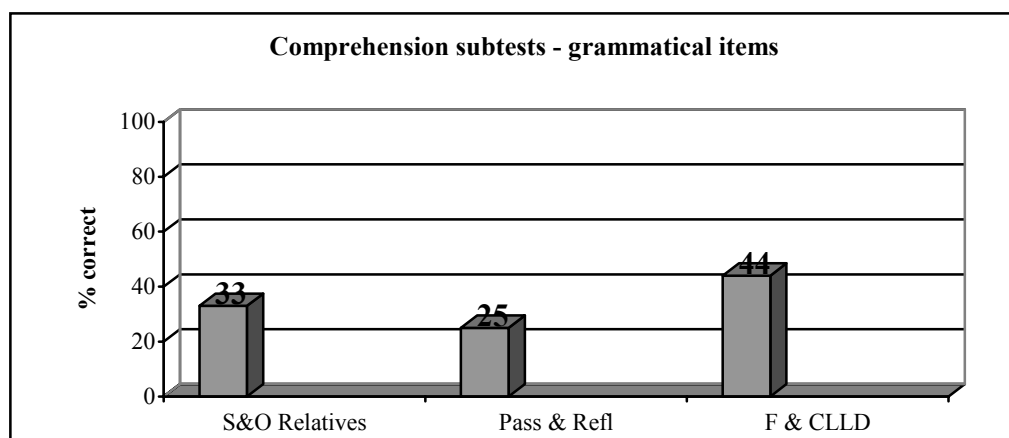


Figure 2. SP's means for the Greek comprehension subtests

Relative clauses. SP’s comprehension rates in the particular test showed that sentences containing object-relative (O-R) clauses (33.33%) were more difficult to process than sentences containing subject-relative (S-R) clauses (50%), the latter being

syntactically simpler structures. Nevertheless, misinterpreted O-R clauses were not parsed by SP as S-R constructions, rendering the possibility of an analysis other than one being strictly syntactically-driven as a serious alternative.

Attempting to reinforce the aforementioned hypothesis, the perspective-shifting account of McWhinney & Pleh (1988) was employed; the latter proposes that syntactic subjects map onto the reader's perspective and that processing is easier when a consistent perspective is maintained, as in S-R clauses, than when perspective shifts, as in O-R constructions. More specifically, in O-R constructions, SP must shift his perspective when he encounters the relative clause subject and again when he returns to the processing of the main clause. Perspective-shifts are presumed to be costly and time-consuming, therefore, SP's parsing of O-R clauses was difficult and in most of the times error-prone.

Passives and reflexives. SP's interpretation pattern of semantically reversible passives was uniform:

(12a) Target: Το αγόρι φιλιέται από το κορίτσι.
'The boy is kissed by the girl.'

(12b) SP's interpretation: Το αγόρι και το κορίτσι φιλιούνται μεταξύ τους.
'The boy and the girl kiss each other.'

The above data provide evidence that there is a stage at which agrammatic aphasics actually entertain the possibility of the same theta-role being assigned to two different NPs. As far as SP's interpretation of non-reversible passive constructions is concerned, his below-chance performance indicated his insensitivity to the [+animate] vs [-inanimate] semantic distinction as well as to the [+agentivity] feature of the verbs involved. E.g.

(13a) Target: Το φορτηγό σπρώχνεται από το αγόρι
'The track is pushed by the boy.'

SP: Το φορτηγό σπρώχνει το αγόρι
'The track pushes the boy.'

(13b) Target: Η κούκλα φιλιέται από το κορίτσι
'The doll is kissed by the girl.'

SP: Η κούκλα φιλάει το κορίτσι
'The girl kisses the doll.'

SP interpreted half of the reflexive constructions as passives; to account for his chance performance, we follow Pesetsky's (1995) view that a reflexive a passivized verb have the same underlying structural representation. Once the functional morpheme REFL(exive)² is affixed to certain classes of passivized verbs in the lexicon, these verbs acquire a reflexive interpretation. Pesetsky (1995) claims that when such affixation is carried out in the lexicon, the verb category is marked as functional because of the presence of the REFL morpheme. In the light of Pesetsky's syntactic account of reflexive verbs, we assume that SP has made successful application of the abstract affixation of the REFL morpheme in the lexicon; yet, his limited capacity in accessing and retrieving functional categories once these enter the syntactic derivation, lead SP to

² It should be made clear that little rests on the assumption that it really is the REFL morpheme, which is affixed to the reflexive verb in the lexicon. The suggestion is that some abstract functional head undergoes this lexical attachment and that this is what triggers a reflexive syntactic representation. REFL is simply the most appropriate candidate at present.

resort to a passive interpretation of reflexives as an adaptation strategy able to decrease his processing overload.

Focus & CLLDed Constructions: The comprehension of OVS sentences was at chance when it involved movement of the verb's object and above chance when it involved CLLD of the object.

SP's performance can be accounted for by the Trace Deletion Hypothesis (TDH) (Grodzinsky 2000), according to which individuals with agrammatic aphasia have a deficit in interpreting sentences that involve movement of a referential NP. Thus, in the agrammatic representation whenever a NP moves outside of its thematic position – as in Focus constructions (Tsimpli 1996) – its trace is deleted, and it can no longer receive the thematic role from the verb through the chain. Deletion of traces leaves the agrammatic patient with an incomplete and deficient information structure.

According to Grodzinsky (1986), when a NP remains role less, it receives a thematic role by a non-structural strategy, according to which theta-roles are assigned in a linear order based on a thematic hierarchy so the role of an agent, for example, is assigned to the first NP in the clause. In the focused structures tested, the NP without a role is a theme receiving an inappropriate agent role. If the sentence includes a logical subject keeping its agent role in addition to the NP that mistakenly received an agent role from the first-NP strategy, the hearer has to choose who the agent is and is forced to guess, thus performing at chance level.

Moving on to the constructions involving a CLLDed object, SP's performance reached, as aforementioned, the percentage of 75%. SP's high score can be attributed to the fact that CLLDed constructions do not involve movement (Philippaki et al. 2002); therefore, there are no chains for SP's parser to disrupt due to its insensitivity to the information carried by empty categories.

5. Conclusion

Based on the tests conducted in the particular experimental study of SP's language deficit, it was observed that his agrammatism involves a range of linguistic impairments in language production co-occurring with an analogous comprehension deficit. As is often found with subjects with non-fluent aphasia, comprehension was less impaired than production. The specific finding pertains to the better cross-language generalization of comprehension when compared to production; comprehension is a more unified heuristic task whereas production is more language-specific, presumably suggesting that agrammatism may be more appropriately characterized as a deficit at the language-specific syntactic level *per se*.

Yet, far from denying the import of a purely syntactic deficit, the intention is to point out that language production and comprehension may be damaged along a variety of processing loci, including specific damage to the mechanism connecting the antecedent to its trace (as proposed by Grodzinsky's TDH), a primary deficit in accessing or processing high syntactic projections, as well as categorial deficits probably stemming from the interference of morphological and broadly semantic variables. Different types of impairment emerge in various combinations, thus substantiating a heterogeneous pattern of damage.

With respect to the performance/competence dilemma set from the beginning of this paper, although it is difficult at times to detect the link between strongly competence-based proposals in theoretical syntax, such as those based on the Minimalist Programme of Chomsky (1995), and performance-deficits observed in aphasia (Ouhalla 1993; Druks & Marshall 1995), the present experiment provides us with evidence that

agrammatic production, like agrammatic comprehension, is to a significant extent a performance deficit rather than a catastrophic loss of grammatical competence.

Interestingly, the aphasic patient of the specific study was able to produce modal markers, i.e. the marker *tha* (will), which is associated with a high projection of grammar. This indicates that the accessibility of the CP-domain is not totally lost at least for the patient of the present study. The subject also demonstrated the presence of functional heads in his syntactic representations, e.g. he performed extremely reliably with regard to subject-verb agreement, which suggests that he has access to AGR-S.

These findings indicate that the tree is spared for SP as high as TP, but does not project systematically higher than that. It is assumed that the lowest part of the tree is preserved, whereas the impaired higher nodes of the syntactic tree render access to the syntactic sites for these projections problematic. Therefore, it cannot be concluded that the whole CP projection is missing. Alternatively, it is suggested that the linguistic problems attested in the performance of SP may be the result of impaired ability to access and exploit grammatical knowledge (Friederici & Frazier 1992; Kolk 1998, among others) rather than the result of impaired grammatical representations.

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