

SV AND VS TOTAL INTERROGATIVES IN IBERO-ROMANCE: THE ROLE OF PHONETICALLY UNREALISED ELEMENTS IN AGRAMMATISM

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ABSTRACT

This paper aims to characterise difficulties with the order VS in agrammatic speech. To fulfill this aim, we test the production of yes/no questions in 15 agrammatic subjects and 15 matched non-damaged control native speakers of Catalan, Galician and Spanish. The Ibero-Romance varieties under investigation are null subject languages, i.e. they allow post-verbal subjects with independence of the nature of the verb (Rizzi 1982; Belletti 1988; Belletti and Leonini 2004). This is due to the possibility of licensing a null pronominal subject, an “associate” (Chomsky 1995), in the pre-verbal position. The elicitation of yes/no questions provides us with a suitable testing ground since both the orders SV and VS are accepted. Even though our agrammatic sample revealed mastery of yes/no questions to a level of 67.78% crosslinguistically, their pattern of response diverged from non-pathological adult-like usage (with the SV option preferred by agrammatics). Since the projection of the CP-field is required with independence of subject placement (Rizzi 1997, 2002), structural accounts (Tree-Pruning Hypothesis, Friedmann and Grodzinsky 1997) seem to suffer from some shortcomings in accounting for these results. We explore the possibility that the systematic avoidance of the VS order derives from its involvement of an additional expletive *pro* in pre-verbal position.

KEYWORDS: Agrammatism; Ibero-Romance; null elements; subject placement; yes/no questions.

1. Introduction

According to Grodzinsky (2000), Broca’s area is critically involved in highly structured syntactic abilities and transformational operations. The specificity of its role has led researchers to redefine the concept of agrammatism – etymologically, lack of grammar – as a highly selective grammatical disturbance which affects non-fluent aphasic individuals cross-linguistically. The so-called agrammatic patients tend to show a reduced set of pathological phenomena among which the selective impairment of function

words, i.e. the omission or substitution of both functional morphemes and free-standing elements, is the most relevant feature (see Goodglass and Kaplan 1972; Tissot et al. 1973; Miceli et al. 1989; Grodzinsky 1990; Menn and Obler 1990; or Ouhalla 1993, among many others).

In addition to the deficit in the field of production, the results of controlled tasks demonstrate that comprehension is also compromised (Grodzinsky 2000). Since Zurif, Caramazza and Myerson's (1972) study describing "agrammatic comprehension", it has been generally assumed that the competence underlying both modalities is the same (McCaffrey et al. 2001) or only "partially distinct" (Grodzinsky 2000; Grodzinsky et al. 1993). Therefore, both production and comprehension are expected to be damaged in agrammatism (Grodzinsky 1990), even though to a varying degree.

During the last decade, research in the field of acquired language disorders has been the focus of an increasing number of studies in the generative tradition. This cross-linguistic effort, together with multidisciplinary contributions, has not only taken part in a better understanding on how the brain implements languages, but it has also been considered as "an excellent testing ground for (linguistic) theories" (Grodzinsky 1990: 2). In this article, we aim to characterise two almost unexplored Ibero-Romance varieties (Catalan and Galician) and provide further evidence on agrammatic deficits in Spanish by testing the alternance of the orders SV and VS in the production of yes/no questions.

Complex constructions, such as passive sentences, interrogatives, relative clauses and other subordinate constructions, have been generally agreed to be problematic for agrammatic patients (Menn and Obler 1990). To provide a syntactic characterisation of the pattern of impairment, we depart from the assumptions of the Minimalist Programme (Chomsky 1995) and explore "the mapping out of the functional structure of natural language sentences" (Cinque 2002: 3) developed by Cartographical models (Belletti 2002; Cinque 1999, 2002, 2006; Rizzi 1997, 2004). To fulfill this aim, the article is articulated as follows: In this section, we briefly characterise the Ibero-Romance varieties under investigation (1.1) and provide the relevant theoretical framework for our discussion (1.2). After this introductory section, we detail the experimental conditions (Section 2) together with the results (Section 3). Section 4 analyses competing theories of aphasia and previous results in the field of agrammatism relevant for our discussion (Section 5). The main findings of our experimental task debated throughout this paper are summarised in Section 6.

1.1. SV and VS in Ibero-Romance

Despite the fact that the canonical order of declarative sentences in Catalan, Galician and Spanish is SVO, post-verbal subjects are allowed in the three varieties under investigation (Rizzi 1982; Belletti 1988; Belletti and Leonini 2004). This is due to the existence of the possibility of licensing an expletive *pro* which occupies the pre-verbal position (Chomsky 1995) in these languages.

- (1a) Ha vingut en Marc (Catalan)
 have-pres.3rd.sg come-past.part the Marc
 'Mark has come.'
- (1b) Foi Breogán (Galician)
 be-pret.3rd.sg Breogán
 'It was Breogán.'
- (1c) Lo ha pintado Ana (Spanish)
 it-CL-fem have-pres.3rd.sg paint-past.part Ana
 'Ana has painted it.'

In these varieties, the allowance of the alternation SV–VS is not only restricted to declarative structures but it is also possible in yes/no questions, albeit with discrepancies in the degree of acceptability. In contrast to *wh*-questions, total interrogatives in Catalan, Galician and Spanish do not imply compulsory inversion (Ordoñez 1996; Wheeler et al. 1999). They may be built up by changing constituent order as illustrated for Galician in (2a) or by means of intonation (2b) (Payrató 2002; Suñer 1994; Zagona 2002).

- (2a) ¿Irán os nenos ó parque? (Galician)
 go-fut-3rd.pl the children to-the park
 'Will the children go to the park?'
- (2b) ¿Os nenos irán ó parque?
 the children go-fut-3rd.pl to-the park
 'Will the children go to the park?'

The claim has been made that, since yes/no questions derive from a declarative sentence and therefore present presupposed content, the order VSO constitutes the unmarked option with overt lexical subjects while SVO is marked (see Escandell-Vidal 1999 for Spanish). This distinction is used to account for the asymmetry between (3a) which is open to both a positive and a negative answer vs. (3b) which presupposes a negative response:

- (3a) ¿Ha hecho Juan el más mínimo esfuerzo por ayudarme?
 have-pres.3rd.sg done Juan the most minimal effort to help-me
 'Has John done the most minimal effort to help me?' (Spanish)
- (3b) *¿Juan ha hecho el más mínimo esfuerzo por ayudarme?
Juan have-pres.3rd.sg done the most minimal effort to help-me
 'Has John done the most minimal effort to help me?'
 (Escandell-Vidal 1999: 3953)

The fact that the order SV is marked seems to be especially prominent in Catalan where its acceptability and its interpretation are subject to variation as a function of the dialectal variety analyzed (Solà 1992; Gavarró, pc). In fact, there are some asymmetries between Ibero-Romance varieties. In Galician, despite a clear preference for the order VOS in non-impaired adult speech, the distinction between SV and VS is not as clear as in the case of Spanish, with both pre and post verbal subjects allowed for demanding new information. Variation has also been attested for other Romance varieties such as Portuguese or Italian (Zubizarreta 1998; Costa 2000; or Belletti 2001, 2002).

An additional difference in yes/no question formation is the existence in some varieties of Catalan of an overt operator *que* heading total interrogatives (Rigau 1998; Payrató 2002):

- (4) Que vindràs a la regata? (Catalan)
 INT come- to the yacht race
 fut.2nd.sg
 'Will you come to the yacht race?'

The appearance of similar elements has also been documented in central and southern Italian dialects (*che* in Tuscan, *chi* in Sicilian) by Cruschina (2007):

- (5) Chi a puzzu addumari a luci? (Sicilian)
 INT it be able to-pres.1st.sg switch-on the light
 'Can I switch on the light?'
 (Cruschina 2007)

Despite possible coincidences between the complementiser and the interrogative element, which are homophonous in the case of Catalan, Cruschina (2007) claims that they are two distinct elements as morphologically marked by the distinction between the interrogative particle *chi* and the complementiser *che* in Sicilian.

1.2. Towards a syntactic characterisation of yes/no questions

In traditional GB theory, it has been assumed after Suñer (1994) that the presence of an operator in total interrogatives is not restricted to those varieties with an overt form. In order to satisfy the Wh-Criterion (Rizzi 1991) and to check the required [+wh] feature, a null operator is claimed to be at work in any total interrogative. In this paper, we assume Rizzi's (2002) complex CP-field which includes a whole set of functional nodes (6) to deal with the structural position both overt operators and their null counterparts occupy in the left peripheral area.

(6) Force (*Top) Int (*Top) Focus (*Mod) (*Top) Fin

According to Rizzi (1997, 2002), C is a structural zone delimited by Force (expression of clausal type) and Fin (finiteness agreement with TP) which includes positions for the specification of Topic, Focus, Modifiers and Int. Based on the interaction of overt yes/no interrogative operators with topic and focus positions, Cruschina (2007) claims that the former occupy a position between Force and Focus (landing site for wh-operators). This position has been labeled as Int(errogative):

- (7a) A Maria chi a salutasti? (Sicilian)
 to Maria INT her greet-pret.2nd.sg
 'Did you greet Maria?'
- (7b) Chi a Maria salutasti?
 INT to Maria greet-pret.2nd.sg
 'Was it Maria that you greeted?'

In this paper, we assume that Int position is the base-generation site for both null and overt interrogative operators in yes/no questions together with elements such as *why* or *se* 'if' (Rizzi 2001) which have similar properties concerning the scope of the operator over the clause and verb adjacency. This marks a clear distinction with respect to other wh-operators which, among other differences, do not allow for adverbs and focalised elements to interfere between the verb and the interrogative operators (8b vs. 8a) and require the compulsory inversion of the subject and the verb (9).

- (8a) Que potser hem de sortir? (Catalan)
 INT maybe have-pres.1st.pl of go-out-INF
 'Do we maybe have to go out?'
- (8b) *Què potser hem de fer?
 what maybe have-pres.1st.pl of do-INF
 'What maybe do we have to do?'
- (9a) Cando virá Uxía? (Galician)
 when come-fut.3rd.sg Uxía
 'When will Eugene come?'
- (9b) *Cando Uxía virá?
 when Uxía come-fut.3rd.sg
 *'When Eugene will come?'

Regarding the position of the subject, as we have already mentioned and as declarative sentences do, yes/no questions allow for both pre-verbal and post-verbal subjects in

Ibero-Romance. In the case of post-verbal subjects, there have been two traditional competing analysis: (a) the order VS is obtained when the subject remains in its first-merge position in VP (Borer 1986); or (b) it is derived by movement from its base-generation position (Belletti 1988).

However, based on the random performance of 5 Venezuelan Spanish agrammatic subjects in the interpretation of inverted passives, Beretta et al. (1996) claim that not only SV but also VS structures are derived by movement (contra Borer 1986). According to this data, both pre-verbal and post-verbal subjects' surface position is achieved by means of a movement operation.

Following Belletti (1988), the orders VOS or VSO in languages such as Spanish (see 10a and 10b respectively) are due to the right-adjunction of the subject to the VP.

- (10a) Colgó las toallas Juan. (Spanish)
 hang-pret.3rd.sg the towels Juan
 'John hung the towels.'
- (10b) Colgó Juan las toallas.
 hang-pret.3rd.sg Juan the towels
 'John hung the towels.'

Nevertheless, since Kayne's (1984) seminal work, right adjunction processes have been considered problematic. Hence, in this paper, we depart from Koopman and Sportiche's (1991) VP-internal subject hypothesis, according to which subjects originate in SpecVP, and adopt recent cartographical proposals for the analysis of the structural position of subjects. Following Belletti (2001, 2002), we assume that both pre- and post-verbal subjects are derived by movement: since there is no case assignor for the post-verbal subject in low portions of the clause, the subject must move. In order to be licensed, the inverted subject fills a position in one of the designed positions in the clause internal periphery above the VP-area (Belletti 2001).

The syntactic phrase marker of the clause-internal periphery, reproduced in (11), shows significant resemblances with the previously mentioned left-peripheral end including both Topic and Focus positions.

- (11) [_{TopP} Top [_{FocP} Foc [_{TopP} Top ... VP]]]
 (Belletti and Leonini 2004)

The post-verbal subject may occupy the specifier position of one of the topic projections or the focus projection since it can be interpreted as new information, focus (12a), or given information, topic (12b).

- (12a) Chi ha parlato? FOCUS (Italian)
 who have-pres.3rd.sg spoken?
 Who has spoken?

Ha parlato Gianni.
 have-pres.3rd.sg spoken Gianni
 *Has spoken John.

- (10b) Che cosa ha poi fatto Gianni? TOPIC
 what thing have-pres.3rd.sg finally done Gianni
 ‘What has Gianni finally done?’
 Ha (poi) parlato, Gianni.
 have-pres.3rd.sg (finally) spoken, Gianni
 *‘Has (finally) spoken, John.

(Belletti 2002)

To derive the VS order, the verb raises higher to its designed position in the IP-field. As illustrated in (13), the relatively low position of the post verbal subject can be inferred from its relationship with low adverbs.

- (13) Entendeu todo ben/ correctamente Xurxo. (Galician)
 understand-pret.3rd.sg all well/ correctly Xurxo
 ‘George understood everything well/correctly.’

The previously acknowledged difference between Ibero-Romance varieties has been found to reflect in the possible landing sites of post-verbal subjects, while for Spanish and Galician both positions (Topic and Focus) seem to be suitable, in the case of Catalan only Focus position is available (Ordoñez 2007). The crucial piece of evidence is the interaction between the subject and verbal complements. In Spanish and Galician, post verbal subjects may appear in final position or intervene between the verb and its complements (14a and 14b) while in Catalan they must follow all complements (15a).

- (14a) Marchou onte pola noite Xan. (Galician)
 leave-pret.3rd.sg yesterday by-the night Xan
 John left yesterday night.

- (14b) Marchou Xan onte pola noite.
 leave-pret.3rd.sg Xan yesterday by-the night
 John left yesterday night.

- (15a) Va marxar ahir nit en Joan. (Catalan)
 leave-pret.3rd.sg yesterday night the Joan
 John left yesterday night.

- (15b) * Va marxar en Joan ahir nit.
 leave-pret.3rd.sg the Joan yesterday night
 John left yesterday night.

With independence of the landing site, in order to check case and agreement, an overt or non-overt expletive element – an associate – is inserted in preverbal subject position (Chomsky 1995; Belletti 2001). Since the post-verbal subject and the preverbal expletive (phonetically null in the varieties under examination) are in a chain relation, case and agreement checking can be achieved.

2. Methodology

In order to obtain the relevant data for our analysis, we designed an elicitation task devoted to observe yes/no question formation both in subjects with agrammatic deficits and in an unimpaired control group.

2.1. Subjects

Thirty subjects participated in the study: 15 mild agrammatic subjects (5 Catalan, 5 Galician, 5 Spanish) and 15 non-impaired controls. Agrammatic subjects were selected from the patient pool of the Associació Sant Pau of Language Disorders (Barcelona), the Hospital Provincial of Pontevedra (CHOP) and the Hospital Meixoeiro of Vigo (CHUVI). They were classified as Broca's ($n=11$), mixed transcortical ($n=3$) and global ($n=1$) aphasics, based upon two main tests: a Catalan and a Spanish version of the Western Aphasia Battery (WAB – Kertesz 1982) and the Spanish version of the Boston Diagnostic Aphasia Examination (BDAE – Goodglass and Kaplan 1972, 1983) by García-Albea et al. (1998). No standardised protocol was used to diagnose Galician subjects in the Hospital Meixoeiro where diagnoses are based on clinical judgments.¹

The participants (ten men and five women) were classified as mild agrammatics with an age ranging from 27 to 83 years (average – 55 years). Time post onset varied from 1 month to 11 years. All patients were right-handed. Individual patients' characteristics are represented in Table 1.

A capital letter (C, G or S) identifies the language in which the test was run while a number from 1 to 5 identifies the subject. Additionally, fifteen non-damaged controls (5 Catalan, 5 Galician and 5 Spanish native speakers), who shared similar characteristics with their pathological counterparts, were also tested. As experimental subjects, controls were all right-handed men and women (8 and 7 respectively) recruited in the areas of Barcelona and Pontevedra. The age ranged from 45 to 85 years old (mean: 53,6) and the level of education varied across subjects.

Out of the fifteen controls under study, four of them had primary studies, seven secondary studies and four had received university training. All the subjects declared themselves as bilingual Catalan–Spanish or Galician–Spanish, with a varying degree of L3 or even L4 knowledge (mainly English and French).

¹ Clinical evaluation was based on the observation of the production and comprehension of spoken language, nominalisation and repetition, reading and writing skills (according to Calderón González et al. 2001).

Table 1. Background information on experimental subjects.

Subject	Gender/ age (years)	Edu- cation	Etiology	TPO
Catalan				
C1	m/63	3	Ischemic CVA – Left Infarction fronto-insular	5
C2	m/66	1	Ischemic CVA – Left middle cerebral artery	4
C3	m/69	1	Ischemic CVA – Left Infarction affecting middle cerebral artery region	2
C4	m/70	3	Ischemic CVA – Left middle cerebral artery	7
C5	m/70	2	Ischemic CVA – Left infarction temporo-media	5
Galician				
G1	f/76	1	Ischemic CVA – Left middle cerebral artery	0,9m
G2	f/83	1	Ischemic CVA – Left, Cardio-embolic	0,5m
G3	f/55	1	Hemorrhagic CVA – Left intraparenchymatous hemorrhage affecting basal ganglia	3
G4	m/74	2	Ischemic CVA – Left infarction affecting middle cerebral artery region	1,7m
G5	f/56	2	Hemorrhagic CVA – Left intraparenchymatous hemorrhage	2
Spanish				
S1	m/27	2	Cranial-Encephalic Traumatism – Left fronto-temporal	3
S2	m/74	1	Ischemic CVA – Left Infarction affecting pre-central area	0,4m
S3	m/61	3	Hemorrhagic CVA – Left intraparenchymatous hemorrhage affecting basal ganglia	11
S4	m/64	1	Hemorrhagic CVA – Left middle cerebral artery affecting basal ganglia	0,1m
S5	f/38	2	Ischemic CVA – Left middle cerebral artery	7

1 = Primary education; 2 = Secondary education; 3 = University studies; TPO = Time post-onset: years, months (m); CVA = Cerebrovascular accident.

2.2. Experimental design

Both populations were tested by means of an elicitation task designed to force the production of total interrogatives. The total number of items included in the task was 10 tokens. An example is reproduced in (16) below.

- (16) Potser toco el piano, pregunta-m'ho. (Catalan)
 maybe play-pres.1st.sg the piano, ask-imperative-2nd.sg-me?it
 'Maybe I play piano, ask it to me.'

Expected question: Toques el piano?
 play-pres.2nd.sg the piano
 'Do you play piano?'

Pragmatic aspects were controlled in order to avoid favouring preverbal subjects over post-verbal ones. This introduces a variation with respect to other methodologies such as those used by Crain and Thornton (1998), Friedmann (2002) or Hamann (2006), among others, which may bias towards the production of the SV order and reduce the task to a mere repetition task (17).

(17) Je sais qu'il aime jouer au Gameboy. (French)
 I know- that'he love- play-INF to-the Gameboy
 pres.1st.sg pres.3rd.sg
 'I know that he loves playing with the Gameboy.'

Demande-lui si'il aime aussi regarder la télé.
 ask-him if'he love-pres.3rd.sg also watch the tv
 'Ask him if he also loves watching TV.'

(Hamann 2006)

Concerning procedural issues, instructions were read aloud by the experimenter at a normal reading speed and tokens were repeated when necessary. Examples were provided at the beginning of the task. The experimental subjects were encouraged to correct their performance whenever they found it convenient. Five-minute pauses were inserted on request.

2.3. Relevant data

In order to check constituent order differences, only correct answers with overt subject were taken into account for the analysis, i.e. 53.19% out of the total number of control responses and 37.93% out of the experimental ones. A summary indicating the distribution of data across languages has been plotted in Table 2.

3. Results

As illustrated in Table 2, concerning the level of success, there are significant differences between the production of partial interrogatives of experimental subjects and their control counterparts at a 1% level ($p < 0.01$, Wilcoxon Signed Ranked test). However, this is not the only dissociation observed. While the analysis of correct responses with overt subject reveals that the order VS is more productive for controls than the order SV

Table 2. Summary of relevant responses.

	Correct	Overt Subject
CONTROL		
Catalan	100% (47/47)	48.94% (23/47)
Galician	100% (46/46)	56.52% (26/46)
Spanish	97.92% (47/48)	55.32% (26/47)
Total	99.29% (140/141)	53.57% (75/140)
EXPERIMENTAL		
Catalan	70.83% (34/48)	44.12% (15/34)
Galician	50% (25/50)	48% (12/25)
Spanish	78.72% (37/47)	75.68% (28/37)
Total	66.21% (96/145)	57.29% (55/96)

Table 3. S–V vs. V–S in yes/no question production.

	SV	VS
CONTROL		
Catalan	43.48% (10/23)	56.52% (13/23)
Galician	32% (8/26)	69.23% (18/26)
Spanish	34.61% (9/26)	65.38% (17/26)
Total	36% (27/75)	64% (48/75)
EXPERIMENTAL		
Catalan	100% (15/15)	0% (0/15)
Galician	83.33% (10/12)	16.67% (2/12)
Spanish	96.43% (27/28)	3.57% (1/28)
Total	94.54% (52/55)	5.45% (3/55)

(64% VS responses vs. 36% SV responses), for agrammatic subjects the reverse pattern is preferred (5.45% VS responses vs. 94.54% SV). The individual results of both controls and agrammatics across languages have been plotted in Table 3.

The general results are illustrated in Figures 1 and 2 overleaf.

4. Theoretical approaches and previous findings in agrammatism

It has been widely documented that the production of questions (both total and partial) constitutes an area of great difficulty for agrammatic subjects (Thompson, Shapiro, Schneider and Tait 1994; Thompson, Shapiro, Tait, Jacobs and Schneider 1996; Friedmann 2001, 2002; among others). Two different approaches have been proposed to account for the pattern of impairment: those accounts based on structural considerations and those which take movement as crucial.

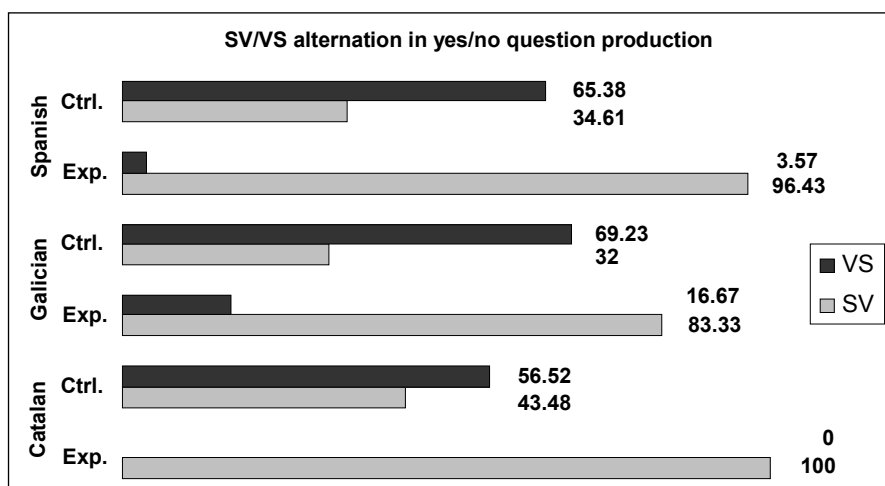


Figure 1. Alternance SV/VS in yes/no question production across Ibero-Romance varieties.

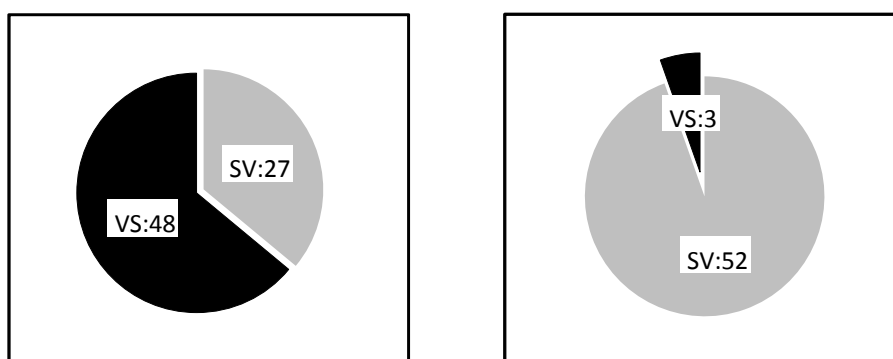


Figure 2. SV/VS alternation in yes/no question production cross populations.

Left: S–V inversion in y/n question production in control subjects.

Right: S–V inversion in y/n question production in agrammatic subjects.

4.1. Truncation and Movement deficits in agrammatism

Structural proposals depart from the assumption that the projection of the full array of functional nodes required for the proper formulation of an utterance is problematic in agrammatic aphasia. According to the Tree Pruning Hypothesis (Friedmann 1994, 1998, 2001, 2005; Friedmann and Grodzinsky 1997, 2000), the syntactic representation is susceptible of being pruned from a specific node up. Consequently, higher portions are hard to access in agrammatism.

Friedmann (2002) provides evidence of total interrogatives in 7 Hebrew, 1 Palestinian Arabic and 1 English agrammatic subject in an elicitation task. The author claims that while Hebrew and Palestinian Arabic yes/no questions may be rooted at TP (e.g. *you like sweets?*), their English counterparts require the projection of the left peripheral area to be correctly produced (e.g. *do you like sweets?*). Under the TPH, it immediately follows that Hebrew and Palestinian Arabic total interrogatives will be better preserved than English ones. The results of her study have been plotted in Table 4.

Table 4. Correct Yes/no question production in Hebrew, Palestinian Arabic and English (Adapted from Friedmann 2002).

	% correct	(correct/total)
Hebrew	90.48%	133/147
Palestinian Arabic	65%	15/23
English	0%	0/24

As expected, while a general deficit is attested in English, the ability to produce yes/no questions is better preserved in Hebrew and Palestinian Arabic. Additionally, structures of the type *you want juice?*, lacking the auxiliary form in initial position, are frequent in the case of English. These questions display a similar structure to grammatical answers in Hebrew and Palestinian Arabic. Similar results have also been documented for English and German by Bastiaanse and Thompson (2003) and Burchert et al. (2005). Difficulties in the access to the CP-field are taken as crucial by Friedmann and Grodzinsky to account for this dissociation.

According to Thompson et al. (2003), linguistic operations – and not syntactic structures – are crucial in aphasia. The prototypical case is that of movement. Agrammatic speakers, whose resources are limited, tend to opt for the avoidance of movement in order to reduce processing costs (De Roo 2001). Even though move *per se* is not necessarily impaired, its cost represents a burden not easy to overcome. The idea of moved constituents as responsible for agrammatic deficits is also developed in Bastiaanse and Thompson (2003) who found that structures with verb-movement are more complex than active structures.

In addition to canonical vs. non-canonical considerations, moved constituents have been also seen as problematic due to the relationship between traces and their antecedents. In the case of wh-questions, Thompson *et al.* (1996) found that some agrammatic patients do not seem to correctly process trace-antecedent relations with moved constituents. This immediately reflects a severe deficit with complex constructions: only 2–33% of the sentences produced by the 7 agrammatic subjects were complex (in opposition to the 57% in non-impaired productions) in narrative and conversational discourse samples.

Finally, problems in the assignment of thematic roles to moved constituents have also been claimed to be operative in agrammatism (see Grodzinsky 1990 for a detailed

account based on comprehension results). However, failure of this type of approach has already been detected by Friedmann and Grodzinsky (2000) or Gavarró (2003) who claim that there are patients who can correctly apply move and that some constructions are problematic with independence of the presence vs. absence of movement (e.g. embeddings in relative clauses and sentential complementation).

On the basis of our Ibero-Romance data, both structural and move-based accounts seem to suffer from some shortcomings since they fail to predict the pattern of response obtained for yes/no question production. As we have already mentioned, yes/no questions in Catalan, Galician and Spanish require the participation of the left periphery – more specifically the projection of INT – to be correctly uttered. In addition both the order SV and VS are derived orders. Why, then, is SV inversion consistently avoided by agrammatic subjects?

4.2. Null elements and agrammatism: Previous evidence

Some studies have investigated the possibility that agrammatic subjects may experience difficulties with phonetically null elements. An instance can be found in Reznik et al. (1995) who provide evidence from subject pronouns in one agrammatic subject native speaker of River Plate Spanish. The authors document an overuse of personal pronouns in subject position in spontaneous speech. The patient produced 23 instances of this type. Since Spanish is a pro-drop language, and no pragmatic reasons force their appearance, Reznik et al. assume that the deficit resides in the patients' inability to process certain non-lexical elements.

In this study, empty elements were found to result in the production of erroneous utterances as well as in substitutions by their overt counterparts. Even though clitic production is problematic – the subject produces only 44.92% of the obligatory pronouns – and despite the optionality of subject pronouns due to language specific properties, non-overt forms are systematically avoided by the tested subject. This is attributed to computational difficulties with non-overt forms.

Further evidence can also be found in Catalan and Galician (Martínez-Ferreiro, in press). If erroneous answers from the elicitation task described in 2 are taken into consideration, the study of the 5 Catalan and the 5 Galician experimental subjects reveal that the main strategy used by agrammatics is the substitution of total interrogatives by *why* questions as in example (18) below.

- (18) Per què tenen fred els pescadors? (Catalan Subject No. 5)
 for what have-pres.3rd.pl cold the fishermen
 'Why are fishermen cold?'
Expected question: Tenen fred els pescadors?
 have.pres.3rd.pl cold the fishermen
 'Are fishermen cold?'

As already mentioned, according to Rizzi (1997, 2001) and Cruschina (2007), there is a clear structural parallelism between yes/no questions and *why* interrogatives: both constructions depending on the projection of INT in the left periphery in order to accommodate the interrogative operator. Additionally, as illustrated in (19) and (20), none of these constructions force SV inversion.

- (19a) Ø Os pescadores teñen frío? (Galician)
 the fishermen have.pres.3rd.pl cold
 ‘Are fishermen cold?’
- (19b) Ø Teñen frío os pescadores?
 have.pres.3rd.pl cold the fishermen
 ‘Are fishermen cold?’
- (20a) Por qué os pescadores teñen frío?
 for what the fishermen have-pres.3rd.pl cold
 ‘Why are fishermen cold?’
- (20b) Por qué teñen frío os pescadores?
 for what have-pres.3rd.pl cold the fishermen
 ‘Why are fishermen cold?’

If a purely structural account was to be assumed, *why* should the derivation enter in a lower position than yes/no questions because otherwise it would not compete with total interrogatives. If we were to subscribe to movement accounts, since both constructions are equivalent in terms of movement operations, substitutions would be left unexplained. The appearance of similar constructions of the type of *com és que* ‘how is it that’ found in the Catalan corpus, which provides agrammatic subjects with an alternative strategy to avoid S–V inversion and fill the position of the null interrogative marker, seems to confirm that substitutions are due to the preference for overt material over phonetically null elements.

Going on with the set of languages under investigation in this paper, Martínez-Ferreiro (in preparation) includes evidence from object clitics and reflexive pronouns both in production and comprehension. The analysis of the results of 15 patients (5 Catalan, 5 Galician and 5 Spanish) provides us with the following data:

Table 5. Correct object clitic and reflexive pronouns in Ibero-Romance.

	Object Clitics	Reflexives
Production	41.54%	85%
Comprehension	89.23%	92.22%

A clear dissociation between object clitics and reflexive forms can be observed in Table 5. Romance reflexive clitics have been claimed to operate on argument structures (Grimshaw 1982, 1990). Under this approach, reflexive elements are critically different from non-reflexive forms since the former absorb one of the arguments from the argument-structure representation (21a) while the latter license and identify a *pro* object (21b).

- (21a) Tú_i te_i miras (Spanish)
 you_i yourself_i look
 You look at yourself.
- (21b) Yo_i te_i miro [*pro*_i]
 I_j you_i look [*pro*_i]
 I look at you

The observed dissociation may be justified in terms of the additional presence of a *pro* element in the case of non-reflexive forms which causes difficulties in pathological populations. Reflexive forms, lacking this element, are almost spared despite the fact that both object clitics and reflexive forms share structural position and require the projection of high portions of the IP-field to be correctly produced.

On the basis of the evidence obtained from erroneous answers in agrammatic speech, it seems plausible that agrammatic patients tend to choose overt forms instead of processing phonologically null elements. However, not only agrammatic subjects seem to experience difficulties with the production of VS structures. Belletti and Leonini (2004) document the case 26 adult L2 learners of Italian who display difficulties with post-verbal subjects occupying focus position. The summary of the results has been plotted in Table 6.

Table 6. S–V vs. V–S in L2 Italian learners and controls.

	*SV	VS	Other
Control	1% (5/390)	98% (381/390)	1% (4/390)
Experimental	45% (458/1016)	43% (432/1016)	12% (126/1016)

By means of an elicitation task, the authors show that most L2 learners do not master the order VS even though the null subject parameter and consequently the possibility of licensing a preverbal associate is claimed to have been acquired. Divergent forms from control performance are also used in this paper to explore intervening factors in agrammatic deficits.

5. Discussion

In order to account for the dissociation between experimental subjects and controls in the production of correct yes/no questions reported in Section 3, we explore two possibilities already pointed out in Belletti and Leonini (2004). Since two are the requirements for inversion to take place, the avoidance of the order VS may derive from:

- (a) Problems with the clause internal periphery
- (b) Problems with the *pro* element in preverbal position

Belletti and Leonini (2004) attribute failure in the production of VS structures to the inability of L2 learners to project the clause internal peripheral positions. Under this view, the deficit would be restricted to structural factors. It is the inability to fully project the syntactic tree what leads L2 learners to show a divergent pattern of performance with respect to control results. Such a move, equivalent to assume that the order SV is favored due to its more reduced syntactic structure, would present similarities with Pancheva and Ullmann's (2001) Complexity hypothesis claiming that the bigger the number of merge operations required for a specific construction, the harder it is for agrammatics to compute. The assumption of discontinuous truncation of the syntactic representation is undesirable on theoretical grounds since no predictions can be made concerning different portions of the syntactic tree. Moreover, our data show that the order SV is favored with independence of the language used (Catalan, Galician or Spanish) and is hence independent of the position occupied by the post-verbal subject.

Avoidance of the VS order can also be attributed to a deficit in licensing a *pro* element in preverbal position. Patients may be opting for the alternative with an overt element in pre-verbal position in order to avoid the use of an expletive element. Expletives (overt or null) do not contribute to the meaning of a sentence, being susceptible of impairment in agrammatic speech. In fact, expletive *pros* may be seen as conceptually problematic on minimalist terms due to their lack of phonetic content and their function as fillers. Since they have no effect either on the articulatory-perceptual system or on the conceptual-intentional system, they have to be considered part of syntax specific machinery (Chomsky 2000, 2001; Mohr 2004).

In this paper, and contrary to Belletti and Leonini (2004), we evoke the presence vs. absence of a null element to justify the observed avoidance of the VS order among our Ibero-Romance agrammatic subjects. Agrammatic subjects favor SV in front of VS total interrogatives to avoid the compulsory presence of the expletive *pro* in preverbal position required for VS constructions. The substitution of total interrogative by questions headed by *how is it that* or *why* seems to reinforce this proposal.

6. Conclusion

The observation of yes/no questions in adult impaired and unimpaired Ibero-Romance subjects seems to indicate that despite the role of structural considerations in agrammatic aphasia, some other factors may be interfering in the production skills of the patients. The nature of the elements entering the derivation have been found to play a role in the level of success of agrammatic aphasics who systematically favor SV in front of VS, contrary to the pattern displayed by control subjects. The contrast between phonologically null and overt material in pre-verbal subject position seems to underlie the observed asymmetries in the production of both populations. Nevertheless, our conclusions have to be cautious. Since syntactic representations are full of null objects, the predictions of such a model would have enormous consequences and massive testing is still required.

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