Why in agrammatic aphasia: Evidence from Galician and Catalan.

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Abstract

Problems in the production of complex structures by agrammatic subjects have been documented for many languages (Menn and Obler 1990, Friedmann 2001). To provide further evidence, the present paper aims to characterize the abnormal behavior of yes/no questions in Catalan and Galician by means of a elicited production task run with 10 mild agrammatic speakers (five per language group). Departing from the assumption of a structural account, the Tree-Pruning Hypothesis (Friedmann 1994ss, Friedmann and Grodzinsky 1997ss), attention is focused on the production of *why* questions as a substitution strategy for yes/no.

According to Rizzi (2001), the interrogative element *why* is first merged in Int, a position higher than and different from other wh- operators. To enter in competition with yes/no questions, it seems plausible that both *why* and the null operator in y/n questions (Suñer 1994) should occupy the same position in the syntactic representation. Since yes/no questions have been found to be better preserved than wh- questions (Martínez-Ferreiro, this volume), this observation provides further evidence that structural position is not enough to account for the findings. We will try to show that a combination of factors (including nature of the relevant elements) is at play in agrammatic deficits.

1. Introduction

Complex structures such as interrogatives, relatives and subordinate structures constitute an area of great difficulty for agrammatic subjects (see Menn and Obler 1990 for a cross-linguistic review). Departing from the assumption that patients retain the notion of question (Friedmann and Grodzinsky 2000, Friedmann 2002), the present study aims to explore the pattern of impairment of yes/no question production in two Romance varieties: namely Catalan and Galician. To fulfill that aim, a question elicitation task was run with a group of 5 Catalan and 5 Galician mild agrammatic subjects and contrasted with 2 control

groups (a non-impaired adult group including 10 subjects and the results of a moderate agrammatic subject).

Total interrogatives, those requiring an affirmative or a negative answer, differ from their partial counterparts (wh-questions) in many senses. Both in Catalan and Galician, they may be expressed by means of two strategies which vary in application of S-V inversion (1):

(1) a. La Maria sortirá? (Catalan)
Mary will go out?
b. Sortirá la Maria?
Will Mary go out?

As shown by Torrego (1984), in the absence of wh-movement the obligatory inversion does not apply and therefore, yes/no questions can be constructed by means of intonation in an otherwise declarative structure (SVO) or by changing constituent order (VSO) (Payrató 2002, Suñer 1994). Nevertheless, in the cases of overt lexical subjects, the order SVO is slightly more marked than the order VSO due to the fact that, as it departs from a previous declarative, it may present a presupposed content.

Despite commonalities, there is a difference between Catalan and Galician yes/no questions. While total questions in Catalan can be headed by *que* (2), at least in some dialectal varieties (Payrató 2002), the possibility of using such introductory forms is banned in the case of Galician. Catalan *que* resembles the forms found in some Romance varieties such as central and southern Italian dialects (*che* in Tuscan, *chi* in Sicilian) (Cruschina 2007).

(2) Que hi ha una esquerda al sostre? (Catalan)
INT there is a fissure in-the roof
Is there a fissure in the roof?

In spite of the coincidence between the complementizer and the yes/no interrogative operator (which is homophonous in the case of Catalan), Cruschina (2007) claims that they are in fact different elements. This is morphologically marked by the distinction between the interrogative particle *chi* and the complementizer *che* in Sicilian varieties.

Regarding the structural position where yes/no structures are rooted, different claims have been made. Friedmann (2002), after the observation of a dissociation between wh- and yes/no question production in Hebrew and Palestinian Arabic, support the claim that total interrogatives (which are the better preserved group) are TP-rooted in these languages. The results show that percentages of correctness reach 90,71% in the case of Hebrew (7 agrammatic speakers tested) and 65% in the case of Palestinian Arabic (1 agrammatic speaker tested). According to her proposal, inserted in the frame of the Tree-Pruning Hypothesis, CP involvement, which is considered to be language specific, is crucial for the degree of preservation of different types of interrogatives.

For Germanic languages such as German or English, an increase in the number of errors is expected since higher parts of the syntactic structure are involved in the correct production of the structures under investigation. Burchert, Swoboda-Moll and Ria De Bleser (2005) provide us with evidence from 8 agrammatic subjects who perform correctly to a 38% for yes/no questions. Nevertheless, at the individual level, there is an observable double dissociation. While for subjects such as MD they are preserved to a 96%, subjects such as RG were unable to correctly produce any of the experimental tokens (0% correct).

In the case of Ibero-romance, traditionally since Suñer (1994), it has been assumed that a null operator in SpecCP will be at work in total interrogatives in the two varieties under study (Catalan and Galician) so that the required [+WH] feature in C^0 can be justified and the Wh-Criterion satisfied. Consequently, we would expect error rates similar to those attested for Germanic languages.

If we assume that all yes/no questions are headed by an interrogative operator, it seems plausible that both the null and the Catalan *que* share the same structural position. Following a cartographical framework and thus assuming a split CP-field as proposed by Rizzi (1997, 2001), the interaction of overt operators with topic and focus positions has been taken by Cruschina (2007) as evidence for the claim that overt yes/no operators occupy a position between Force and Focus, namely Int. We will claim that Int position is the base-generation site for both the null and overt interrogative operators in

Catalan and Galician yes/no questions. The position is shared by some other elements such as *why* or *se* 'if' (Rizzi 2001) which have similar properties concerning adjacency to the verb (Cruschina 2007).

As supporting evidence, the position of both adverbs and focalized elements, which are allowed to interfere between both the operator and the verb, is presented. An example of an adverb has been included in (3).

(3) Que potser hem de sortir? (Catalan)
INT maybe have-pres.1st.pl of go-out-INF
Do we maybe have to go out?

According to these assumptions, yes/no questions crucially depend on the correct projection of the CP-field to be realized thus, findings will not only provide us with further evidence to characterize the degree of preservation of the left periphery in agrammatic deficits but it will also let us make some insights into its inner structure and how different elements are accommodated within it.

2. Methodology

A yes/no question elicitation task including 12 items (see also Martínez-Ferreiro, this volume) was run with a sample of 10 mild and 1 moderate agrammatic subjects and contrasted with 10 controls (5 Catalan and 5 Galician) [1]. In opposition to the methodology in Crain and Thornton (1998) or Friedmann (2002), which may bias towards the production of a yes/no question without S-V inversion (see (4) for an example extracted from Hamann 2006), tokens in our task were controlled for their neutrality in relation to the expected answer (5). While (4) allows the copy of the last part of the sentence as a possible answer, reducing the exercise to a mere repetition task, this effect is softened in (5), an example extracted from the Catalan version of the test.

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

(5) 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?

Concerning procedure, it ran as follows: To get started, experimental subjects were given the relevant examples and encouraged to correct their performance whenever they found it convenient. After this brief training, instructions were read aloud by the experimenter at a normal reading speed and tokens repeated when necessary. Five-minute pauses were inserted if requested by the experimental subjects.

3. Results

To test the validity of the experimental design and in order to obtain contrastive evidence, the test was first run with the control group formed by 5 Catalan and 5 Galician non-pathological adult speakers recruited in the area of Pontevedra and Barcelona [2]. The results show 100% success for all the subjects in both language groups.

An analysis per item was then run with our experimental subjects. This analysis revealed that all tokens lead to some failure but there was no token such that was problematic for all the members of our sample. The experimental results of the mild agrammatic group have been plotted in table 1:

TABLE 1: Yes/no question elicitation in Ibero-romance.

		Y/N	
		% correct	*(correct/total)*
Catalan	C1	100%	(12/12)
	C2	83.33%	(10/12)
	C3	91.67%	(11/12)
	C4	75%	(9/12)
	C5	8.33%	(1/12)
Mean		71.67%	(43/60)

Galician	G1	41.67%	(5/12)
	G2	0%	(0/12)
	G3	83.33%	(10/12)
	G4	58.33%	(7/12)
	G5	75%	(9/12)
Mean		51.67%	(31/60)

While in the case of Catalan yes/no questions are preserved to a 71.67% (43/60), the results for Galician are lower, indicating preserved abilities at chance level (51.67%). In addition to this cross-linguistic variation, individual results reveal not only differences among subjects but a double dissociation similar to what had been observed for German in Burchert, Swoboda-Moll and Ria De Bleser (2005). Despite the fact that differences among individuals are common in agrammatic speech (Grodzinsky 1990), this double dissociation represent a problem for a purely structural account. While for some patients such as C1 (Catalan experimental subject number 1) yes/no question production was completely spared (12/12 correct), G2 (Galician experimental subject number 2) was unable to correctly produce any of these constructions (0/12 correct). Differences with respect to the control group were found to be significant at a 1% level in a Wilcoxon Signed Rank test.

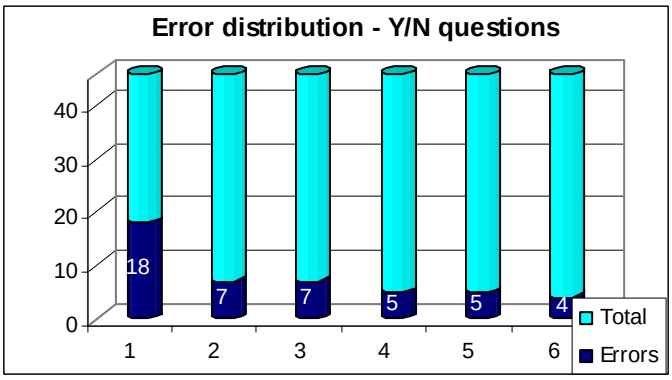
Regarding the results of a moderate agrammatic patient (CM), he presented a general deficit in question production. None of the experimental tokens was produced correctly what may be seen as an indicator of a correlation between degree of severity of the agrammatic deficit and increase in the number of errors.

Based on Friedmann's (2002) analysis, the errors produced by agrammatic subjects were classified according to type and frequency (6) and illustrated by graph 1:

(6)
1. '*Why*' substitutes for Y/N questions (18/42)
2. Declarative sentences (7/42)
3. '*Don't know*' responses (7/42)
4. '*How is it*' substitutes for Y/N questions (5/42)
5. Wh- questions substitute for y/n questions (5/42):
   - *What* (1 + 1 '*in what*')
   - *Where* (2)
   - How many (1)

6. Unexpected questions (4/42)

GRAPH 1: Agrammatic y/n question production [3].



The substitution by *why* appears as the most outstanding strategy to face the production of a total question. This operator is employed to substitute for a y/n question 18 times. The use of declarative sentences and *don't know* responses follow in this classification (with seven examples each). The case of C5 and G2 deserve a special mention due the abnormal behavior they display. In the case of C5, error pattern is quite marked. Out of 11 errors, 4 are substitutions of the expected yes/no question by a question headed by *why* and 5 substitutions by *how is it that*. This pattern is paralleled by G2 who was unable to produce any yes/no question substituting them by a *why* question in 10 out of the 12 trials.

In addition, the control of right answers also provides us with a divergent pattern with respect to that of control subjects. While controls mainly produce structures with S-V inversion (63% vs. 37%), the opposite behavior was found among experimental subjects (7% vs. 93%). Similar findings have been also attested in English agrammatism. Friedmann (2002) provides evidence of severe deficits with cases of auxiliary omission and absence of S-V inversion. Ibero-romance control results have been plotted in table 2 and illustrated in graph 2. Table 3 summarizes experimental results which are illustrated in graph 3.

TABLE 2: Subject-verb inversion in yes/no questions – Control subjects.

CTRL	*Correct*	*Overt Subject*	*S-V*	*V-S*
Catalan	100% (47/47)	48.94% (23/47)	43.48% (10/23)	56.52% (13/23)

Galician	100% (46/46)	56.52% (26/46)	32% (8/26)	69.23% (18/26)

GRAPH 2: S-V inversion in control y/n question production.

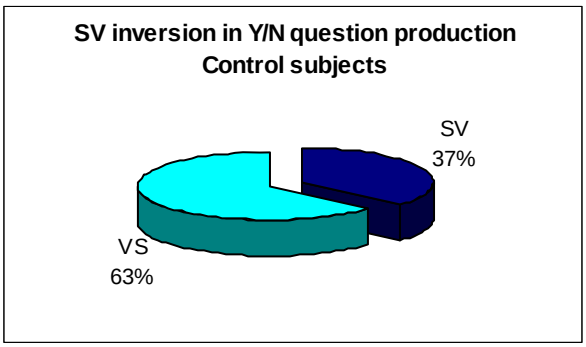
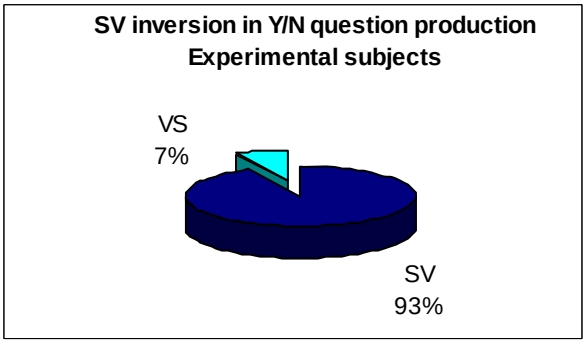


TABLE 3: Subject-verb inversion in yes/no questions – Experimental subjects.

EXP	*Correct*	*Overt Subject*	*S-V*	*V-S*
Catalan	70.83% (34/48)	44.12% (15/34)	100% (15/15)	0% (0/15)
Galician	50% (25/50)	48% (12/25)	83.33% (10/12)	16.67% (2/12)

GRAPH 3: S-V inversion in agrammatic y/n question production.



No cases of the overt use of the total interrogative operator *que* in the Catalan version of the test have been documented in our sample (neither experimental nor control). This is attributed to the dialectal variety subjects belong to, i.e. metropolitan area of Barcelona.

4. Discussion

Our findings reveal the vulnerability of the left peripheral area in agrammatic subjects since their ability to produce total interrogatives shows significant

asymmetries with respect to non-pathological controls ($p < 0.01$ – Wilcoxon Signed Rank test). The degree of impairment has been documented to increase with the degree of severity of the agrammatic deficit as seen through the results of a moderate agrammatic subject (CM). Since control results (100% correct) have been claimed to confirm the validity of the experimental design, syntactic factors may underlie the deficit observed in agrammatic patients' ability to build up total questions (Friedmann 2001, 2002).

Departing from the assumptions of the Tree-pruning hypothesis (Friedmann 1994ss, Friedmann and Grodzinsky 1997ss), since total interrogatives in Catalan and Galician have been claimed to occupy a high position in the CP-field, they are expected to be problematic for agrammatic patients. Nevertheless, a detailed analysis of both correct and incorrect answers reveals some patterns that need to be further analyzed. In this section, we will first deal with the case of *why* and its use in substitution for yes/no questions. Then, similar structures not forcing the compulsory inversion of S-V will be discussed. The general account proposed for our findings will immediately follow.

For the 50% of our sample (5/10 subjects), questions headed by the interrogative element *why* seem to enter into competition with y/n questions. Out of the errors produced by our mild agrammatic sample (n = 46), 18 were substitutions for a partial question of this type while only 5 were substitutions by another wh-operator. This is taken as an indicator of the asymmetries between *why* and the other members of the wh-paradigm.

The peculiarities manifested by the interrogative element *why* have been already documented in the literature (Rizzi 1990, 2001). Contrary to other wh-elements, S-V inversion is not compulsory with *why*, as illustrated in the example from Catalan included in (7).

(7) a. Per què la nena menja pa?
why the girl eats bread
b. Per què menja pa la nena?
why eats bread the girl

In addition in some languages such as French, it cannot appear in situ. This can be easily attested in example (8) where question marks correspond to

the original source. While in (8a) the wh-element can appear in situ, in (8b) this possibility is not available. Further evidence of the distinction is provided by the impossibility of stylistic inversion (8c).

(8) a. Il a parlé comment
He spoke how
b. *?Il a parlé pourquoi
He spoke why
c. *?Pourquoi a parlé Jean
Why spoke Jean
(Rizzi 1990 : 47)

As already mentioned in the introduction section, according to Rizzi (2001), the interrogative element *why* is directly base-generated in the position of Int (9). This stands in opposition to other wh-operators which are moved to the left periphery, more specifically to Foc position, from a lower node leaving a trace behind.

(9) Force (*Top) Int (*Top) Focus (*Mod) (*Top) Fin IP

Therefore, it seems plausible to claim that in order to enter into competition, both *why* and the null operator in y/n questions should occupy the same position in the syntactic representation, i.e. they should be base-generated in Int. Nevertheless, this is problematic for a purely structural account such as the TPH since no reason would justify the substitution of an element by another equally higher and hence equally difficult for agrammatic patients to produce.

Another interesting phenomenon problematic for a truncation account is the apparition of *how is it that* found in the Catalan data (C5). This construction parallels the French 'wh + *est-ce que*' commonly attested in non-pathological L1 acquisition. The results obtained in this field indicate that the chunk can be seen as a routine and therefore decomposition into smaller parts avoided. According to Rooryck (1994), *est-ce que* is a complex wh-morpheme which is base generated in C^0. The fact that *est* cannot be used in any other tense together with the lack of intonation argues for the treatment of the construction as a complex wh-morpheme meaning *is it true that* (Zuckerman 2001).

For our agrammatic patients, the use of these forms allows them to produce non-inverted structures since expressions of this type are built up without S-V inversion. Moreover, they provide the interrogative sentence with an overt operator in initial position. A similar attested construction is *Do you know if*, produced by C2 and C4 and catalan control 4 which parallels both *How is it that* and *why* regarding both S-V inversion and the presence of an overt operator. The consistent avoidance inversion coincides with our observations of the correct yes/no questions included in the results section which show that while only 7% of the correct answers were produced with inversion, 93% were produced following the order SV.

This findings seem to indicate that in addition to problems with moved constituents (in line with Martínez-Ferreiro, this volume), what may lead them to prefer declarative-like structures, there are also other factors intervening in the agrammatic deficits. Theories such as the Tree-Pruning Hypothesis, only considering the relative position of a construction in the tree-structure, suffer from some shortcomings despite its high predictive validity. Agrammatic subjects, whose resources are limited, have been found to avoid the projection of the higher nodes of the syntactic tree. Nevertheless, if they are present, utterances involving movement add an extra cost to the representation not present in the case of base-generation and will be therefore avoided on the basis of its costly nature (wh- vs. yes/no questions results).

Since both y/n questions and questions headed by *why* depend on high structures of the syntactic representation and have no moved operator, their apparition would be interchangeable in terms of cost. Therefore, the contrast between null and overt material seems to underlie the observed deficit. Agrammatic subjects that display this phenomenon seem to prefer the overt interrogative operator involved in the partial question headed by *why* than the null form in total questions. Such a move would equally justify the appearance of forms such as *how is it that* as fillers of the operator position. Hence, a possible explanation for the agrammatic phenomena documented in this paper would necessarily combine, at least, structural position and nature of the elements involved in the representation to be able to account for our data.

5. Conclusion

Even though further research is still needed, the production of complex structures has been shown to be problematic for agrammatic speakers (in line with Menn and Obler 1990, Friedmann 2001, 2002). The observation of total interrogatives in Catalan and Galician reveal that mastery of the left periphery is problematic for agrammatic subjects. Far from being a purely structural matter, the analysis of the results show that a combination of factors is necessary to properly account for the results.

Structural position is only one factor in the observed agrammatic deficit. Even though agrammatic subjects do not have problems with the movement operation per se, its cost seems to constitute an extra burden not easy to overcome (Martínez-Ferreiro, this volume). In addition, the nature of the elements involved in the representation is also determinant with overt forms preferred over null forms.

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NOTES:

[1] Background information on experimental subjects:

Subject	Gender/age	Etiology	Aphasia classification (severity)

	(years)		
Catalan			
C1	m/63	Ischemic CVA Left Infarction fronto-insular	Motor aphasia (mild)
C2	m/66	Ischemic CVA Left middle cerebral artery	Mixed Transcortical (mild)
C3	m/69	Ischemic CVA Left Infarction affecting middle cerebral artery region	Motor aphasia (mild)
C4	m/70	Ischemic CVA Left middle cerebral artery	Global (mild)
C5	m/70	Ischemic CVA Left infarction temporo-medial	Mixed Transcortical (mild)
CM	m/28	Hemorrhagic CVA Left intraparenchymatous hemorrhage affecting basal ganglia	Motor aphasia (moderate)
Galician			
G1	f/76	Ischemic CVA Left middle cerebral artery	Motor aphasia (mild)
G2	f/83	Ischemic CVA Left, Cardio-embolic	Motor aphasia (mild)
G3	f/55	Hemorrhagic CVA Left Intraparenchymatous hemorrhage affecting basal ganglia	Motor aphasia (mild)
G4	m/74	Ischemic CVA Left infarction affecting middle cerebral artery region	Mixed Transcortical (mild)
G5	f/56	Hemorrhagic CVA Left Intraparenchymatous hemorrhage	Motor aphasia (mild)

[2] In order to avoid interferences of dialectal varieties in our data, control subjects correspond to the same regional area of their agrammatic counterparts.

[3] Numbers in the *x*-axis correspond to the different error types listed in (6).