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Overcoming discourse-linking difficulties in aphasia: The case of clitic pronouns

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ABSTRACT

The present study aims to contribute to the ongoing discussion about the impact of discourse-linking deficits on the performance of individuals with aphasia by providing new data from a set of rarely investigated constructions: sentences in which a clitic pronoun co-exists alongside with the full DP it agrees with. To do so, we use data of individuals with non-fluent aphasias who need to overcome the difficulties in direct object (accusative) clitic production. This results in overproduction of non-target clitic right dislocations (RDs) and clitic doubling (CD). Data from 15 individual's native speakers of Spanish and Catalan are discussed. Data complement the results of previous investigations on discourse-linking effects in these languages, allowing the interpretation of results across constructions.

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Introduction

Syntactic deficits in aphasia are amongst the most widely characterised deficits cross-linguistically. However, the exact processes involved in syntactic failure are still to be unravelled. One of the main shortcomings is the difficulty to come up with an overarching hypothesis that can capture variability in the experimental outcomes. A second problem is the asymmetry in the distribution of data across different languages studied and across types of aphasia, with most studies focusing on individuals with agrammatism. The data across studies are rather scattered. However, during the past decade, crosslinguistic evidence, indicating that elements which can be processed by narrow syntax alone tend to be better preserved than those requiring access to the broader scope discourse (Avrutin, 2000, 2006) allowed us to make predictions about the behaviour of different constructions across the board. This is the case of past (vs. non-past) time reference (Bastiaanse et al., 2011), *which* (vs. *who*) questions, and clitic pronouns (vs. reflexives) (Avrutin, 2000, 2006; Bos et al., 2014). In this paper, we depart from previous evidence on discourse-linked constructions in Catalan and Spanish speaking individuals with non-fluent aphasia (IWAs;

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Broca's aphasia, transcortical motor aphasia, and global aphasia), and focus on the production of clitic pronouns, more specifically, on the non-target use of right dislocations and /or clitic doubling, which have not been explored before.

Non-fluent aphasia is characterised by effortful speech and a reduced number of words per minute. However, it is not only speech rate that is diminished, but also grammatical structure is reduced as well: sentences are usually very short (with mean number of words per utterance below the normal range). The structures vary from quite informative telegraphic speech, in which many content words are used, but function words are often omitted, to only 'yes' and 'no', which may even be used unreliably. Since lesion sites are not accurate predictors of language deficits (Dronkers, 2000), the aphasia types are distinguished on the basis of the patient's auditory comprehension (Broca's and transcortical motor aphasia: relatively preserved; global aphasia: impaired) and repetition (transcortical motor aphasia: relatively good; Broca's aphasia and global aphasia: impaired).

In the following sections, we present an overview of discourse-linking and clitic pronouns and report previous crosslinguistic results from individuals with different non-fluent syndromes. This is followed by a qualitative description of the trends identified in the performance of IWAs. We then address clitic doubling and right dislocations, including experimental results. The paper closes with a discussion of findings and their theoretical implications.

Beyond the sentence boundary

Most of the elements required to produce or comprehend linguistic output are fully processed within the sentence boundaries. However, a certain subset of elements requires crossing this boundary in order to be fully interpreted, since they need to be linked to their referent/s. These elements, which include (among others) tense, clitic pronouns and certain types of *wh*-words, are referred to as 'discourse linked' (D-linked; Pesetsky, 1987). According to Avrutin (2000, 2006), individuals with Broca's aphasia experience more problems with those elements that involve discourse structure (1a) than those that can be resolved by narrow syntax (1b). In 1(a), full interpretation depends on the familiarity with previously introduced entities: 'her' (out of all familiar entities).

- (1) a. The athlete bandaged *her*.
b. The athlete bandaged *herself*.

The pronoun 'her' in (1a) cannot refer to 'the athlete', it must refer to a person outside the scope of the sentence. Thus, it is discourse linked. However, 'herself' must refer to a person within the sentence, in this case 'the athlete', and can, therefore, be processed by narrow syntax alone. According to Avrutin (2000, 2006), pronouns are expected to be more compromised than reflexives.

Deficits in the production and /or comprehension of clitic pronouns in individuals with non-fluent aphasia have repeatedly been demonstrated for different languages over the past decades (Italian: Miceli et al., 1989; Lonzi & Luzzatti, 1993; Miceli & Mazzucchi, 1990; Chinellato, 2004, 2006; Rossi, 2007; French: Nespoulous et al., 1988; Galician: Juncos-Rabadán, Pereiro & Souto, 2001, 2009; Martínez-Ferreiro, 2010; Greek: Stavrakaki & Kouvava, 2003; Nerantzi, 2008). These data indicate that production and comprehension

- (2) a. La niña la comió (Spanish, Declarative)

‘The girl ate it.’

Eat_{IMP.2ND.sg}-her_{CLIT.Acc} ‘

Other studies accounting for production and grammaticality judgment in different

¹Catalan and European Spanish version: J. Elías, modified by M. I. Gómez-Ruiz.

Table 1. Clitic versus Reflexive errors in Catalan and Pan-Spanish non-fluent aphasias.

Study	Nº of participants	Task	Clitic errors (%)	Reflexive errors (%)
Catalan				
Gavarró (2008)	3	Truth conditional task	19.3	0
Martínez-Ferreiro (2010)	6	Elicitation	75	30.6
		Forced-choice	17.5	6.9
Spanish				
Reznik et al. (1995)	1	Spontaneous speech	56.1	—
Baauw and Cuetos (2003)	4	Truth value judgement task	32.25	17.5
Juncos-Rabadán et al. (2009)	14	BAT: Comprehension	63.3	—
Martínez-Ferreiro (2010)	5	Elicitation	69.2	11.7
Sánchez-Alonso et al. (2011)	11	Forced-choice	6.1	10
Reyes and Bastiaanse (2013)	5	Sentence completion	70.3	25
		Sentence completion	+mov: 100	—
			-mov: 78.1	—

± mov: item with/without constituent movement

The problems with clitic pronouns can be associated with syntactic or syntactic-semantic properties of different pronoun types. Direct object (accusative) clitics are more demanding than reflexives because they are bound to a referent outside the sentence (in discourse), that is, they require discourse linking. Reflexives, however, are bound to a referent within the same sentence. They do not require discourse linking, thus reducing the need for processing resources (as illustrated above in 1c-d)². Discourse linking causes a high processing load that individuals with aphasia may fail to overcome (Avrutin, 2000, 2006).

Error analysis of clitic pronoun substitutions in non-fluent aphasias

In the above mentioned production studies, in the event of an error, the aphasic speakers mainly show clitic pronoun omissions or substitutions by full Determiner Phrases (DPs). These errors have been documented for other sensitive morphemes as well (e.g. omission of finite verbs or substitution of the finite verbs by infinitives). No analyses of the possible strategies underlying other documented errors, such as substitutions by other clitic forms or agreement errors (Nespoulous et al., 1988; Miceli et al., 1989; Nerantzini, 2008; Martínez-Ferreiro, 2010), are generally provided.

Different instances of substitutions have been reported for Catalan and Spanish. Diéguez-Vide, Gich-Fullà, Puig-Alcántara, Sánchez-Benavides & Peña-Casanova (2012) report omissions of personal pronouns and substitution by reflexive forms in a Catalan trilingual individual with aphasia. In Martínez-Ferreiro (2010), taking only into consideration those non-target responses including a clitic element, we find examples of: a) incorrect clitic pronoun selection, that is, substitution of a clitic form by another (non-target) form (9/101)³, b) clitic doubling (5/101),

²Note however that, contrary to direct object clitics, reflexive anaphors are morphologically marked so that their interpretation could be salient due to lexical/morphological information (Reinhart & Reuland, 1993). The contrast between clitic and strong pronouns could shed light at this respect. We thank one of the reviewers for the comments on this issue.

³Eight further cases of wrong clitic pronoun selection were found in the sample of 5 Galician speaking individuals with agrammatism studied in Martínez-Ferreiro (2010).

(3) *Incorrect clitic pronoun selection:*

(S03, Item 19)

(4) *Clitic doubling*:

(S7, Item 3)

(5) *Clitic reduplication*:

(S7, Item 8)

(6) *Reflexive se + DO clitic:*

(C02, item 24)

Errors in clitic pronoun selection may contain gender and /or number or case mismatches between the clitic element and its referent. If an agreement marker can no longer satisfy its requirements without accessing discourse structure, different heuristics may emerge. Among them, the production of direct object clitics agreeing with subject DPs have been documented in Spanish speaking children with SLI (Vares Gonzalez, 2017). The full object DP or an additional clitic element may also be inserted to resolve agreement within the sentence boundaries, thus giving rise to what we have labelled as ‘clitic

doubling' and 'clitic reduplication' in the previous examples (terminology stemming from Martínez-Ferreiro, 2010).

Access to extrasentential information is crucial to link the functional elements to their referent in discourse (Avrutin, 2000, 2006). In the current paper, we pursue the hypothesis that the clitic pronouns fail to link to their referent due to the inability of IWAs to cope with the complexity entailed by the establishment of discourse-linking relationships. Contrary to cases of clitic pronoun omission, clitic substitutions may be taken as indicators of preserved sensitivity for the obligatory nature of clitic pronouns in certain context. In order to get further insights, in the next sections, we restrict our discussion to the redundant use of clitic pronouns in the presence of the full DP they agree with in Catalan and Standard Castilian Spanish.

Clitic doubling and right dislocations in Catalan and Spanish

According to Anagnostopoulou (2006), clitic doubling (CD) is a phenomenon by which a clitic pronoun is substituted by a DP or NP without deleting it (7a vs. 7b). In these cases, the clitic receives the same theta-role and case as the DP.

- (7) a. Lo vimos a Juan. (Rioplatense Sp.: Jaeggli, 1986: 32)
 him_{CLIT.Acc} see_{PRET.1ST.PL} to J.
 'We saw Juan'.
 b. Lo vimos.
 him_{CLIT.Acc} see_{PRET.1ST.PL}
 'We saw him'.

Microvariation emerges for the set of clitic pronouns that can co-exist with the object DP with which they agree. While sentences like (8), which include a dative clitic, are allowed in both Catalan and Spanish, sentences like (7a) above, which include an accusative clitic, are only acceptable in certain varieties such as River Plate or Cordoba Spanish (Argentina), but not in the varieties under investigation (Jaeggli, 1986; Gabriel and Rinke, 2010).

- (8) Le sonrió a la niña.
 her_{CLIT.Dat} smile_{PRET.1ST.PL} to the girl
 '(She) smiled at the girl'.

Right dislocations are constructions in which a clitic pronoun co-occurs with a phrase to its right, as in the Catalan example in (9). There are languages that have right dislocation but disallow clitic doubling. This is the case of Iberian Spanish and Catalan. However, the frequency of use of the construction varies significantly across varieties. While right dislocations are very frequent in Catalan, they are rare in Iberian Spanish (Villalba, 2007, 2011).

- (9) La va veure, la Anna.
 her_{CLIT.Acc} aux_{PRES.3RD.SG} see_{INF} the Anna
 'S/he saw her, Anna'.

The difference with clitic doubling is the relationship between the co-referent clitic element and the DP. In recent works, clitic doubling and right dislocations have been interpreted as deriving from a single ‘big DP’ (Uriagereka, 1995, 2005; Cecchetto, 2000; Cardinaletti, 2002; Belletti, 2005). Here, the clitic pronoun is assigned its theta-role, before moving to the clitic position where it receives case (Belletti, 1999; Sportiche, 1998). The DP, which moves to a clause internal VP peripheral position (Belletti, 2004) in right dislocations and may remain in the argument position in clitic doubling, receives both its theta-role and case from the ‘big DP’. Hence, in clitic doubling contexts, the discussion remains inside the realm of arguments, while in right dislocations, adjunction is necessary (Jaeggli, 1986; Borer, 1984; see Anagnostopoulou (2006) and references cited therein).

According to Gabriel & Rinke (2010), despite similarities in surface order, differences regarding prosodic and syntactic information as well as regarding information structure can be observed. First, following Fernández Soriano (1999), Gabriel & Rinke (2010) restrict their definition of clitic doubling to cases where the object and the co-referential clitic pronoun co-occur within the same prosodic unit. Additionally, clitic doubling requires the presence of the preposition *a* ‘to’ preceding the doubled phrase, but this is not the case in right dislocations. Then, they consider internal differences in syntactic structures. The doubled object is claimed to remain in its base-generation position in contexts of clitic doubling, but not in cases of right dislocation (Suñer, 2006). Finally, in cases of right dislocation, information structure consideration requires that the doubled object is interpreted as Topic, while in contexts of clitic doubling, it can be Focus.

Redundant structures in Spanish and Catalan non-fluent aphasia

As mentioned in before, clitic doubling and right dislocations have hardly been addressed in the literature of Catalan and Standard Castilian Spanish aphasic deficits. In a sentence completion task with pictures reported in Martínez-Ferreiro (2010), only five examples were registered in the speech output of 10 Spanish and Catalan speakers with agrammatism: (2/5) with correct agreement between the clitic pronoun and the DP, and (3/5) including agreement violations (including person and number errors, similar to those observed in the subset of reduplication errors). Are these illegitimate cases of clitic doubling or are they proper examples of right dislocation? See example (10) from Martínez-Ferreiro (2010: ex. 118).

- (10) El canvia el llit.
 it_{CLIT.ACC} change_{PRES.3RD.SG} the bed
 ‘She changes it the bed’.

If taken as a case of right dislocation, the sentence would be fully grammatical in Catalan (*El canvia, el llit* ‘She changes it, the bed’). However, the absence of a pause after the verb was interpreted as an indication that it is an instance of clitic doubling with an accusative pronoun, an ungrammatical construction in Catalan. The number of items ($n = 5$) is too small to be able to draw conclusions.

Two studies were done to study these phenomena. Since D-linking is crucial for the correct interpretation of direct object clitics, and given previously attested difficulties documented with this process in individuals with aphasia, we expect to find attempts to

- ... him carries
 ... carries him’.
- b. Experimenter: Aquí digo ‘hombre cárgala’. Aquí digo ‘mujer...
 here say man carry-her. here say woman...
 ‘Here I say ‘man carry her’. Here I say ‘woman...
Target response: ... cárgalo’.
 ... carry-him
 ... carry him.

Scoring

The answers of the participants were transcribed orthographically and analysed both quantitatively (correct /incorrect) and qualitatively. For the qualitative analysis, from the total pool of non-target responses, we first selected all instances of clitic doubling and/or right dislocations. These were all instances of non-target (incorrect) responses, that is, grammatical and ungrammatical constructions inappropriate in the given context. The error categories were established post hoc on the basis of the most frequently produced errors. Examples of these are given below:

(12) a. *Clitic doubling with dative clitics:*

Mujer dale _{CLIT.Dat} la mano al hombre_{Dat}
 ‘Woman, give-him the hand to the man’

Target: Woman, greet him.

b. *Clitic doubling with dative clitics substituting for accusative clitics:*

*Le_{CLIT.Dat} empuja a la mujer_{Acc}.
 ‘He pushes to him the woman’

Target: He pushes her.

c. *Clitic doubling/right dislocation with accusative clitics:*

Lo _{CLIT.Acc} carga al hombre_{Acc}.
 ‘She carries him the man’

Target: She carries him.

d. *Clitic doubling/right dislocation with accusative clitics + gender violations:*

*Lo _{CLIT.Acc.Masc} besa a la mujer_{Acc.Fem}.
 ‘He kisses him the woman’

Target: He kisses her.

e. *Clitic doubling with accusative clitics substituting for dative clitics:*

*Mujer, pégala _{CLIT.Acc} al hombre_{Dat}
 ‘Woman, hit-her to the man’

Target: Woman, hit him.

Figure 1. Pictures belonging to the item given in (10). Reproduced from the Dutch Verb and Sentence Test (Bastiaanse, Maas & Rispen, 2000) with permission from Lisse: Swets.

Results

The analysis of non-target responses revealed that out of five individuals with aphasia included in the study (providing a total number of 278 responses), four used the combination of clitic pronoun + full DP, although only two participants frequently revert to this strategy (S01: n = 1, S02: n = 1; S04: n = 26; S05: n = 6). Out of the total 34 non-target doubled structures, which represent 12.23% of the total number of responses, 23 were produced in the condition eliciting clitic pronouns in pre-verbal position (declarative sentences), and 11 were produced in postverbal position (imperative sentences)⁴.

These answers included both instances of clitic doubling and /or right clitic dislocations as well as utterances containing case (dative instead of accusative and viceversa) and gender (masculine ↔ feminine) errors. The distribution of responses is illustrated in Figure 2.

Figure 2. Distribution of doubled constructions in Experiment 1.

CD: Clitic doubling/Right dislocation; *: clitic substitution; CD Dat: CD dative clitics; *CD Dat: CD with Dat clitics substituting for accusative clitics; CD Acc: CD with accusative clitics; CD Acc + Gender viol: CD with Acc clitics including a gender mismatch between the clitic and the DP; *CD Acc: CD with Acc clitics substituting for dative.

⁴Nine additional errors were also reported in control conditions not including clitic pronouns.

Figure 3. Picture from the Spanish TART (Martínez-Ferreiro & Bastiaanse, 2013), belonging to the item presented in (12).

At the individual level, three out of the four participants produced direct object clitics + full DPs with correct gender and number agreement (S02: $n = 1$, S04: $n = 9$, S05: $n = 1$). However, participant 4 (S04) also produced instances including gender errors ($n = 10$). These were attested when the intervening subject had different values from those of the antecedent. No number errors were documented. Case mismatches were produced by three individuals (S01: $n = 1$, S04: $n = 7$, S05: $n = 5$). Out of these substitutions, 10 resulted into ungrammatical constructions and three were grammatical (although non-target) instances of clitic doubling with a dative pronoun. Only one example of clitic doubling with a dative pronoun was produced by participants in the control group (SC03). This was a consequence of the substitution of the target lexical verb *empujar* ‘to push (somebody)’ by the light verb *dar* ‘to give’ + the direct object *un empujón* ‘a push (to somebody)’. The result was not only grammatical but also acceptable in the given context. A significance test (Crawford & Howell, 1998; Crawford & Garthwaite, 2002), based on differences between the individual score of an IWA and the mean of the control participants, revealed that S04 and S05 produce a significant number of errors of the sort described in these lines (S04: $t = 52.664$, $p = .000$; S05: $t = 11.839$, $p = .000$).

Experiment 2

Participants

The second study was run with seven Catalan and three Castilian Spanish-speaking individuals diagnosed as non-fluent aphasic speakers (eight Broca’s aphasia, one Mixed Transcortical, one Global; mean age: 58.5, range: 24-76), who were tested in their native language. Background information is given in Appendix B. Notice that, although all subjects reported themselves bilingual, given premorbid proficiency differences, they were only tested in their stronger language. A group of matching right-handed non-brain damaged participants with no history of speech or language impairment was also tested (mean age: 58.5, range: 32-76).

Design

The materials, which included a sentence completion task with the visual support of two images depicting two situations, were adapted from the TART – *Test for Assessing Reference of Time* (Bastiaanse, Jonkers & Thompson, 2008), that originally aimed at assessing time reference, another construction claimed to be affected by discourse-linking difficulties (Bastiaanse, 2013), see (13, Figure 3). Hence, the inclusion of this experiment provides us with the opportunity of comparing two phenomena requiring discourse linking in the same set of conditions and

informants. The total 120 responses per individual consisted of transitive sentences that were distributed in three conditions according to time reference (present, future, and past).

- (13) Experimenter: Ahora, el hombre está escribiendo una carta.
 ‘Ahora, el hombre...
 Now, the man is writing a letter. Now, the man...
 Target response: ... está leyendo una carta /la está leyendo.
 ... is reading a letter/is reading it’.

Scoring

As in the previous experiment, the answers of the participants were transcribed orthographically and analysed both quantitatively (correct /incorrect) and qualitatively. The error categories were established post hoc on the basis of the most frequently produced errors. Three main types of errors were documented: instances of clitic doubling and /or right clitic dislocations with and without gender mismatches (12c-d) and clitic pronoun additions, that is, the production of an additional reflexive form together with the direct object clitic and the object DP (14).

- (14) *Clitic pronoun addition*
 Se_{Refl} la_{Clit.Acc} menjarà la poma.
 ‘He will eat it the apple himself’.
 Target: Soon, the man will eat the apple.

Results

Out of the 10 aphasic individuals, four produced instances of clitic doubling /right dislocations to a varying degree (7.3% of non-target responses; 31/426), and for three out of these four, this strategy is repeatedly used (C03: n = 8; C05: n = 6; C06: n = 16; C07: n = 1). Although all participants declared themselves Catalan-Spanish bilinguals, only participants that selected the Catalan version of the test, that is, those that reported Catalan as their L1, produced examples of the doubled constructions relevant for this study (4/7 participants). As illustrated in (12), and contrary to the previous experiment, full DPs, and not clitic elements, were expected in the completion of the task. This optionality of clitic pronoun use may explain differences in performance between Spanish speaking IWAs across experiments. Participants in the control group for both languages did not produce any doubled object either. This was taken as evidence that the methodology did not induce the use of these constructions.

Regarding the nature of the constructions documented in the Catalan speaking group of IWAs, 23/31 responses were instances of direct object clitic + full DP in otherwise grammatical structures (see Figure 4). Three instances of agreement violations between the clitic pronoun and the full DP were also attested. In all cases, singular masculine DPs coexisted with feminine singular object clitics, the values of the intervening subject. Additionally, five cases of addition of a reflexive were also present (i.e. a reflexive and a direct object clitic produced together with the full DP). Again, these utterances, although non-target, are grammatical in Catalan.

Although non-target in the given context, taken together, 90.3% of these constructions would be grammatical if taken as instances of right dislocations. At the individual level, direct object clitics + full DPs with correct gender and number agreement were produced by the four participants (C03 n = 8, C05 n = 3, C06 n = 11, C07 n = 1), although C05 also produced clusters containing gender errors (n = 3). The presence of additional reflexive forms was only

Figure 4. Distribution of doubled constructions in Experiment 2.

CD: Clitic doubling/Right dislocation; CD Acc: CD with accusative clitics; CD Acc + Gender viol: CD with Acc clitics including a gender mismatch between the clitic and the DP; CD Refl.: addition of a reflexive form.

observed in the performance of C06 ($n = 5$). The significance test (Crawford & Howell, 1998; Crawford & Garthwaite, 2002) could not be applied in Experiment 2, given that no errors were found in the performance of the control group (resulting in a mean and a standard deviation of zero, which renders the test ineffective).

Discussion

Clitic pronouns have consistently been found to be solid candidates for impairment in non-fluent aphasia, especially in cases of agrammatic aphasia (Stavrakaki & Kouvava, 2003; Baauw & Cuetos, 2003; Rossi, 2007; Gavarró, 2008; Nerantzini, 2008; Martínez-Ferreiro, 2010; Sanchez-Alonso, Martínez-Ferreiro & Bastiaanse, 2011; Reyes & Bastiaanse, 2013). We consider the errors on object clitics to be caused by problems with discourse linking, as we will explain below.

Discourse linking and clitic pronouns

The two studies presented in this section indicate dissociation between Catalan and Spanish for the doubled constructions used by IWAs. While Catalan native speakers tend to use doubled constructions with correct agreement between the clitic and the object DP, Spanish speakers produce both case and agreement mismatches both in contexts where the clitic pronoun appears pre- and post-verbally.

According to Villalba (2007, 2011), right dislocations are highly frequent in Catalan, while Spanish makes very marginal use of it. This is reflected in the results of the second experiment. None of the Spanish-speaking participants produced instances of this construction, and those in Study 1 contain multiple grammatical mistakes. Alternatively to the suggestion in Martínez-Ferreiro (2010) that classifies these forms as instances of clitic doubling, we claim that these are actually instances of right dislocations, which are grammatical in Catalan (Villalba, 2007, 2011).

The lack of an intonational break and the presence of the preposition *a* 'to' are taken as arguments to set clitic doubling and right dislocations apart (Anagnostopoulou, 2006).

Additionally, with the exception of Cordoba Spanish, clitic doubling with object clitics tends to be restricted to [+ animate] direct objects (*Lo vimos A Juan* ‘We saw him TO John’; Rio Platense Spanish - Jaeggli, 1986: 32). Although the broken pattern of rhythm characteristic for non-fluent aphasia may be held responsible for the absence of an identifiable break between the verb and the DP in examples such as (15), the absence of preposition and the generalised use of doubling mechanisms with inanimate objects lead us to identify these cases as dislocations.

- (15) *El pinta un cuadro. (Catalan)
 it_{CLIT.Acc} paint_{PRES.3RD.SG} a painting
 *‘She paints it a painting’.

The use of these constructions can be taken as an indication of preserved sensitivity to contexts requiring the use of clitic pronouns. However, despite the retained knowledge of IWAs, failure to delete the object DP suggests a problem with discourse linking (in line with Avrutin, 2000, 2006). Lack of access to discourse syntax forces clitic pronouns to a failure in satisfying their requirements and prevents them from linking to their extra-sentential referents. The object DP is still necessary to host the relevant inflectional information, so that this can be processed by narrow syntax. In the event of an error, individuals with non-fluent aphasia either avoid discourse linking by omitting the clitic pronoun and keeping the full NP, or they use both. Keeping the object DP grants that the clitic pronoun can be locally bound in the sentence.

Clitic pronouns and time reference

Problems with discourse-linking have already been invoked by Martínez-Ferreiro & Bastiaanse (2013) in order to account for the deficits observed in the production and comprehension of past time reference: Past Discourse Linking Hypothesis (Bastiaanse 2013; Bastiaanse *et al.*, 2011). According to the PADILIH, verb forms referring to the past require discourse linking and are, thus, more severely impaired than verb forms that refer to non-past (i.e. present and future time reference). The PADILIH has been tested cross-linguistically in non-fluent individuals (see Bastiaanse, 2013 for an overview), but also in individuals with fluent aphasia (e.g. Bos & Bastiaanse, 2014; Dragoy & Bastiaanse, 2013). These studies show that fluent and non-fluent individuals with aphasia have problems with verb forms referring to the past, irrespective of language.

Deficits in tense (vs. agreement) have been commonly attested in the performance of Catalan and Castilian Spanish individuals with non-fluent aphasia (for recent review, see Martínez-Ferreiro, de Aguiar & Rofes, 2015). However, not many studies provide further details as for the distinction across time frames. Diéguez-Vide (1993) claims that the present tense tends to be spared (<20% errors rate), and the past and the future are impaired in Spanish speaking aphasic individuals. Similar results were reported by Rosell (2005), Martínez-Ferreiro & Bastiaanse (2013), and Rofes, Bastiaanse & Martínez-Ferreiro (2014), among others. Reference to the present was less impaired than reference to the past in Catalan and Spanish, so far confirming the predictions of Avrutin’s theory and the PADILIH.

Interestingly, patients who resort to the use of clitic pronouns in the presence of their referents also display problems with the use of past time reference. In what follows, we restrict our discussion to those participants in Martínez-Ferreiro & Bastiaanse (2013) that produced

instances of clitic pronoun + NP constructions on a task that was meant to test time reference, that is, the participants of Experiment 2. In this experiment, a total of 56.2% correct responses were documented for production of tenses referring to the past versus 65% for tenses referring to the present. Dissociation also emerged in comprehension, with performance higher than 95% for the present, but as low as 67.5% with items aimed at the recognition of past actions. Only one present tense form was substituted, while substitutions of past tenses by non-past referring forms were very frequent (62.5%). ‘Within time-frame substitutions’, to justify 66.7% tense substitutions in the present in the case of C05, C06, and C07, three out of the four individuals produce instances of clitic pronouns + DPs. Preference for non-past time reference, that is, for forms that do not require discourse linking, is confirmed by the high rates of substitutions in items targeting past referring forms.

Hence, individuals producing instances of doubled constructions as a consequence of deficits with clitic pronouns also show problems with past time reference. This is believed to be a result of more general problems affecting discourse linking, which is reflected not only in the number of errors but also in the qualitative analyses, constraining the strategies available for aphasic speakers to overcome processing difficulties as we have seen in the case of clitic pronoun + NP constructions. Further evidence supporting this view includes results from *who* and *which* questions (Avrutin, 2006; Bos, Dragoy, Avrutin, Iskra & Bastiaanse, 2014). Bos et al. (2014) claim that present time reference, *who* questions, and reflexives are relatively spared compared to past time reference, *which* questions, and personal pronouns, respectively, in individuals with agrammatism and fluent aphasia. Discourse linking is the common characteristic that can explain the deficits in the latter three conditions.

Conclusion

The vulnerability of direct object clitics in Catalan and Spanish IWAs can be explained by the need of establishing discourse relationships beyond the scope of the sentence boundary (in line with Avrutin, 2000, 2006). In the event of difficulties, microvariation across Catalan and Iberian Spanish has shown to have an effect in the pattern of responses of these individuals. As predicted, Catalan speakers may overcome linking problems by resolving them sentence internally resorting to the use of clitic pronoun + DP structures, which, although non-target in the above mentioned contexts, are fully grammatical and highly productive construction in this language. However, their Spanish speaking peers fail to put this strategy to work given the absence of right clitic dislocations as a productive construction in their mother tongue. This reflects in the high number of ungrammatical constructions (with gender and case errors) and the use of clitic doubling with datives, which would be grammatical. Errors with discourse-linked elements have been shown not to be restricted to clitic pronouns *per se*, but to the full array of elements requiring this operation to take place in order to be fully interpreted, as illustrated for the production and comprehension of past time reference in the same set of participants (in line with Bastiaanse et al., 2011).

Clinical implications

The qualitative analysis of patients’ performance has shown to have clinical implications, the most important one being that specific characteristics of a language can be used in clinical contexts to enhance communication in IWAs. Although experimental confirmation is very

much needed, our results suggest that the use of doubled structures may facilitate clitic pronoun production. If this proves to be the case, overuse of right dislocations could be used as a strategy to boost the production of clitic pronouns during speech and language therapy. In the event of comprehension deficits, the use of right dislocations also has the potential of ameliorating patients' outcomes by favouring the interpretation of these forms. However, although all participants in Experiments 1 and 2 declared themselves bilingual, the specific characteristics of one language (in this case Catalan) did not show to influence the performance in the other. L1 Spanish speakers did not benefit from their knowledge of Catalan (L2) to be able to overcome linking issues by bounding the clitic pronoun sentence internally to produce a grammatical response.

Declaration of interest

The authors report no conflicts of interest.

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Appendix A

Subject's background information: Experiment 1.

Group 1	Gender/age (y.o.)	Etiology	TPO	Aphasia classification
Spanish				
S01	M/34	Hematoma subsequent to diffuse vasculitis	5	Broca's aphasia
S02	F/59	Ischemic CVA	3	Broca's aphasia
S03	F/53	Middle cerebral artery Ischemic CVA	18	Mixed transcortical
S04	M/68	Middle temporal territory Ischemic CVA	5	Broca's aphasia
S05	M/64	– Ischemic CVA Middle cerebral artery	10	Broca's aphasia

m = male; f = female; CVA = cerebrovascular accident; TPO = time post-onset: years.

Appendix B

Subject's background information: Experiment 2.

Group 2	Gender/age	Etiology	TPO	Aphasia classification
Catalan				
C01	F/66	Ischemic CVA Left fronto-temporal	12	Broca's aphasia
C02	M/68	Ischemic CVA Left middle cerebral artery	9	Broca's aphasia
C03	M/74	Ischemic CVA Multiple infarctions	10	Mixed transcortical
C04	F/24	Ischemic CVA Left fronto-temporal	1	Broca's aphasia
C05	M/75	Ischemic CVA Left middle cerebral artery	10	Broca's aphasia
C06	M/65	Ischemic CVA Left middle cerebral artery	4	Broca's aphasia
C07	M/76	Ischemic CVA Left Sylvian region	12	Global aphasia
Spanish				
S01	F/33	Ischemic CVA Left fronto-temporal	8	Broca's aphasia
S02	F/56	Ischemic CVA Left middle cerebral artery	1	Broca's aphasia
S03	M/70	Ischemic CVA	24	Broca's aphasia

m = male; f = female; CVA = cerebrovascular accident; TPO = time post-onset: years.