

**Relative clause production in Basque-
Spanish bilinguals with aphasia:
material testing in a control group**

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ABSTRACT

Research on the comprehension of relative clauses (RCs) in participants with agrammatism has revealed that although this population encounters difficulties with movement-derived constructions in general, subject relatives (SRs) are comprehended more accurately than object relatives (ORs). Research on production, on the other hand, has shown quite consistently that the production of RCs and other structures involving the CP node is impaired in aphasia. However, some recent findings in V-2 movement and interrogative sentences suggest that the inaccessibility to the higher nodes of the tree may not be as robust as it was thought. Regarding bilinguals, several studies on bilingual aphasia have revealed that disorders do not necessarily affect all the languages to the same extent. The aim of the present study is to test the validity of some RC elicitation material with the objective of later using it with Basque-Spanish aphasics to shed light upon their syntactic deficiencies. To that aim, the production of RCs in two groups of unimpaired bilinguals (L1 Basque-early L2 Spanish, and L1 Spanish-early L2 Basque) has been explored in Basque and Spanish¹. The study reveals a better performance in the production of SRs in both groups and languages. Data also points towards an asymmetry in the production of Basque ORs between the Basque and Spanish L1 groups, the former outperforming the latter. In view of the fact that the absence of the ergative marker is the most frequent error, particularly among Spanish native speakers, we suggest that the divergent case systems of both languages, in general, and the ergative nature of Basque, in particular, could be the responsible for the mentioned asymmetries. Finally, the results indicate that the material used is appropriate to assess the production of RCs, although some remodelling could be done to decrease the number of ambiguous responses.

¹ Data were previously collected in a project of a research group from the University of the Basque Country (UPV/EHU) thanks to a collaboration grant from the Basque Government.

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1. Introduction

Research on monolingual speakers with impaired grammar has reported difficulties with movement-derived structures such as RCs. However, it seems that not all types of such constructions are equally impaired. According to some studies on the comprehension of RCs in aphasia, SRs are more easily understood in nominative SVO languages, like English (Caramazza & Zurif, 1976), Hebrew (Friedman & Shapiro, 2003), and Russian (Friedmann, Reznick, Dolinski-Nuger, & Soboleva, 2010). In contrast, nominative and ergative languages with pre-nominal RCs as Chinese (Su, Lee, & Chung, 2007) and Basque (Munarriz, Ezeizabarrena, & Gutierrez-Mangado, submitted) yield opposite results: ORs are comprehended better than SRs in these languages. Interestingly, these findings converge to a great extent with the asymmetries found in monolingual unimpaired children and adults. These two populations have been reported to understand SRs better than ORs in head-initial nominative languages with post-nominal RCs (Utzeri, 2007; Costa, Lobo, & Silva, 2011), and ORs better than SRs in head-final ergative languages with pre-nominal RCs (Carreiras, Duñabeitia, Vergara, de la Cruz-Pavía, & Laka, 2010; Gutierrez-Mangado, 2011). In view of these comprehension deficits in aphasic patients, several hypotheses have been proposed (see Bastiaanse & Jonkers, 2012 for a review).

Regarding production, on the other hand, a number of studies have revealed that aphasic patients encounter problems to produce RCs and other structures which require the highest nodes of the syntactic tree (Friedmann, 2002). The *Tree Pruning Hypothesis* (TPH) suggested by Friedmann and Grodzinsky (1997) and later developed by Friedmann (2002) is one of the hypotheses put forward to account for this deficit (see Bastiaanse & Jonkers, 2012 for other proposals). According to it, agrammatic patients are unable to project the syntactic tree up to the CP. More specifically, the TPH suggests that the tree of agrammatic subjects is pruned at a certain node (depending on the severity of the impairment) and that this leads to the inaccessibility of all the higher nodes (Friedmann, 2002). Hence, the proposal makes a rather strong prediction: as agrammatic patients do not have access to the CP, they will have difficulties in producing any type of construction involving this syntactic node. However, results from some recent studies seem not to be in line with the TPH. For example, Penke (2000) found that four agrammatic subjects moved the verb to the CP to form matrix clauses in German, a V-2 language, in 99% of the cases. Moreover, the scholar revealed that 95%

of the embedded sentences produced by participants in the same study included a base generated CP and a correctly placed verb. In addition, Garraffa and Grillo (2008) observed that a patient produced between 75% and 85% target-like interrogatives in Italian. These findings show that not all agrammatics are impaired at the CP node.

Concerning the production of RCs in unimpaired children and adults, Ezeizabarrena (2012a) found that, in line with results in comprehension, in Spanish, a nominative-accusative language with postnominal RCs, children produced more target-like SRs than ORs. Nevertheless, no asymmetries were observed among adults. Similarly, Gutierrez-Mangado and Ezeizabarrena (2012) revealed that in Basque, an ergative-absolutive language with prenominal RCs, SRs are produced more accurately than ORs by both children and adults. Interestingly, these findings contrast with the abovementioned asymmetry in the comprehension of Basque RCs.

Most of the studies in RCs production and comprehension have been based on monolingual agrammatic speakers, while research on bilingual aphasia has been rather scarce. Indeed, studies carried out with bilingual aphasics have shown that impaired bilinguals do not always recover their languages concurrently and to the same extent (Paradis, 2004). That is, there are different recovery patterns: *parallel recovery*, when both languages are recovered at the same pace, *differential*, when one is recovered to a greater extent, and *selective*, when only one language is recovered (Paradis, 2004). Interestingly, as Fabro (2001) indicated, the last two patterns do not necessarily involve the (earlier) recovery of the L1. Moreover, a number of studies have revealed that the treatment of a language may lead to the improvement of the untreated one. However, factors such as language distance, seem to have an influence on the first/better recovered language and on the cross-language transfer of therapy benefits (Ansaldo, Marcotte, Scherer, & Raboyeau, 2008). These results point towards the need of assessing both languages in impaired bilinguals.

In the light of controversial results in the syntactic abilities of patients with agrammatism and the scarcity of research on bilingual aphasia, the objective of this study is to test the validity of some RC elicitation material to be later used with Basque-Spanish bilinguals with language disorders. To this end the performance of two groups of unimpaired bilingual adults (Basque L1 speakers and Spanish L1 speakers) in Basque and Spanish, two distant languages, will be analysed.

The paper is organized in six sections. Section 2 describes the characteristics of RCs in Basque and Spanish and includes the predictions made for each language.

Section 3 presents the participants, materials and procedure used to carry out the study, while section 4 reports the results of the experiment. Section 5 discusses the major findings and, finally, section 6 concludes the paper by summing up its main ideas.

2. Basque and Spanish RCs

Basque and Spanish are typologically distant languages and, hence, the characteristics of RCs in each of the languages will be presented separately.

Basque is a head-final richly inflected SOV language with a highly flexible word order. The finite verb agrees with the subject, the direct object and the indirect object, which enables the dropping of the three arguments. Moreover, it is an ergative-absolutive language, where subjects of transitive predicates bear the ergative case marker *-k*, whereas direct objects and subjects of intransitive sentences bear the absolutive \emptyset (Artiagoitia, 2000). With regard to RCs, SRs (1) and ORs (2) are prenominal constructions which involve movement to COMP. They are not introduced by *wh*-elements, but rather signalled with the subordinating suffix *-en* attached to the auxiliary (see references in Gutierrez-Mangado, 2011). Because of some of the issues discussed later in the paper, it is important to note that in SRs there is a case mismatch between the gap and the head of the RC; while the former bears the ergative case marker, the latter bears the absolutive (1) (Gutierrez-Mangado, 2011).

(1) SR: *Hau da [t_i anai-a- \emptyset entzu-ten du-en] ume-a- \emptyset _i*
 this is ____{ERG} brother-the-ABS listen-IPF AUX-REL child-the-ABS
 ‘This is the child that listens to his brother’

(2) OR: *Hau da [anai-a-k t_i entzu-ten du-en] ume-a- \emptyset _i*
 this is brother-the-ERG ____{ABS} listen-IPF AUX-REL child-the-ABS
 ‘This is the child that his brother listens to’

On the other hand, Spanish is a head-initial pro-drop SVO language with free word order, where finite verbs agree only with the subject. Yet, subjects as well as objects can be null in this language, regardless of there being a clitic coindexed with the object or not (see references in Ezeizabarrena, 2012a). Unlike Basque, it is a nominative-accusative language, where transitive and intransitive subjects bear the

nominative case and direct objects bear the accusative. RCs (3, 4) are post-nominal structures involving movement to the CP and introduced by a complementizer (e.g. *que* ‘who/that’, *cuando* ‘when’) (see references in Ezeizabarrena, 2012a). Furthermore, in ORs the preposition *a* often precedes animate objects and this may appear either in its source position or pied-piped (4). Finally, despite the fact that OVS is more natural (4a), in ORs, the OSV alternative (4b) is also possible.

(3) SR: *Este es el niño_i [que t_i le_j escucha al hermano_j]*
 this is the.masc boy that __ him listen to_the.masc brother
 ‘This is the boy that listens to his brother’

(4) OR: a. *Este es el niño_i [al que le_i escucha el hermano t_i]*
 this is the.masc boy to_the.masc that him listen the.masc brother __
 ‘This is the boy that the brother listens to’

b. *Este es el niño_i [al_i que el hermano le_i escucha t_i]*
 this is the.masc boy to_the.masc that the.masc brother him listen __
 ‘This is the boy that the brother listens to’

On the basis of the fact that in both languages RCs involve movement to the CP, we predict aphasic participants to have difficulties in their production. However, in case they are able to produce RCs, we expect asymmetries between SRs and ORs in both languages: With respect to Spanish, participants would probably produce more target-like SRs, as in other head-initial nominative languages with pre-nominal RCs. In the case of Basque, on the other hand, we could also foresee a better performance in SRs, following Gutierrez-Mangado and Ezeizabarrena (2012). However, we cannot forget that in comprehension, just the opposite asymmetry was found in this language, and that this may also have an influence in production. Regarding the unimpaired control participants in the present study, these same predictions are made for each language in case difficulties are attested (Gutierrez-Mangado & Ezeizabarrena, 2012; Ezeizabarrena 2012a).

3. The study

3.1 Participants

The participants in this study were two groups of unimpaired Basque-Spanish bilingual adults. The first group included 10 native speakers of Basque (5 males, 5 females) whose major exposure to Spanish started around age 6 at school. Their ages ranged from 17 to 26 (mean: 22). The second control group consisted of 10 individuals (5 males, 5 females) aged between 14 and 32 (mean: 23) whose mother tongue was Spanish but started acquiring Basque when they were either 3 years old (the case of 9 out of 10 participants) or 10 years old (1 out of 10 participants).

Data about the linguistic background of participants were collected using a language history questionnaire modified from Weberfox and Neville (1996) and the questionnaire developed by the research group The Bilingual Mind at the University of the Basque Country UPV/EHU (see De La Cruz-Pavía, Elordieta, Sebastián-Gallés & Laka, 2014). All participants rated themselves as highly proficient in both languages according to the following four-point scale: 1- native-like proficiency, 2- full proficiency, 3- moderate proficiency, and 4- limited proficiency (Zawiszewski, Gutiérrez, Fernández, & Laka, 2011). Basque native speakers rated their proficiency as 1 in Basque (L1) and 1.3 in Spanish (L2), while Spanish native speakers rated their proficiency as 1.3 in Basque (L2) and 1.2 in Spanish (L1). These values indicate that the two control groups considered themselves almost equally proficient in both languages². However, it must be noted that, with the exception of three Spanish native speakers who viewed themselves as Basque dominant, all participants reported feeling more comfortable using their respective mother tongues. Additionally, participants reported on the frequency with which they used each language following a seven-point scale: 1- only Basque, 2- mostly Basque, 3- Basque the 75% of the time, 4- Basque and Spanish with the same frequency, 5- Spanish the 75% of the time, 6- mostly Spanish, and 7- only Spanish. According to this scale, when the experiment was carried out, participants in the Basque L1 group used mostly Basque in their everyday lives (mean: 2.1), whereas those in the Spanish L1 group used both languages with the same frequency (mean: 3.8).

² Note that only 6 out of 20 participants, all Basque L1, had the highest proficiency certificate in Basque.

3.2 Materials and procedure

SR and OR production in both languages was tested with a preference elicitation task developed in the COST-A33 project (Friedmann et al., in preparation) and adapted to Basque and Spanish by Ezeizabarrena. This task was already tested in Basque (Gutierrez-Mangado and Ezeizabarrena, 2012), and Spanish (Ezeizabarrena, 2012a), although some modifications in the materials were done in order to avoid the potential assimilation of the ergative marker *-k* with an immediately following consonant in ORs.

The objective of the task was to elicit 20 RCs: 10 SRs and 10 ORs. The experimenter presented two children in different situations (two boys for male participants and two girls for female participants³) and asked subjects to choose which child they would rather be. The task was designed in such a way that participants had to form RCs to show their preference. In half of the sentence pairs the child was the agent of a transitive predicate, thus prompting a SR (5a, 6a), and in the other half the patient, thereby eliciting an OR (5b, 6b).

(5) Experimenter eliciting RCs in Basque

(5a) SR context: *Bi ume daude. Ume batek ama entzuten du eta besteak ama oihukatzen du. Zein ume izan nahi zenuke?* ‘There are two children. One child listens to her mother and the other shouts at her. Which child would you rather be?’

Target answer:

[*Ama-Ø entzu-ten / oihuka-tzen du-en*] *ume-a-Ø*
mother-ABS listen-IPF/shout-IPF AUX-REL child-the-ABS
‘The child that listens to /shouts at her mother’

(5b) OR context: *Bi ume daude. Irratiak ume bat esnatzen du eta iratzargailuak bestea esnatzen du. Zein ume izan nahi zenuke?* ‘There are two children. The radio wakes a child and the alarm wakes the other child. Which child would you rather be?’

³ Note that this distinction was only done in Spanish, since although lexically the male and female counterparts of *child* exist in Basque, they do not carry any morphological effects. Therefore, the neutral version *ume* was used.

Target answer:

[Irrati-a-k / iratzargailu-a-k esna-tzen du-en] ume-a-Ø
radio-the-ERG / alarm-the-ERG wake-IPF AUX-REL child-the-ABS
'The child that the radio/alarm wakes'

(6) Experimenter eliciting RC in Spanish

(6a) SR context: *Hay dos niñas. Una niña escuchó a su madre y la otra gritó a su madre. ¿Qué niña te gustaría ser?* 'There are two children. One child listened to her mother and the other shouted at her. Which child would you rather be?'

Target answer:

La niñ-a [que escuch-ó/ grit-ó a su madre]
the.fem child-fem that listen-3sg.past/shout-3sg.past to her mother
'The girl that listened to/ shouted at her mother'

(6b) OR context: *Hay dos niños. La radio despertó a un niño y el despertador despertó al otro. ¿Qué niño te gustaría ser?* 'There are two children. The radio woke a child, and the alarm woke the other child. Which child would you rather be?'

Target answer (i. or ii.):

i. El niñ-o [que despert-ó la radio / el despertador]
the.masc child-masc that wake-3sg.past the.fem radio/the.masc alarm
'The boy that the radio/alarm woke up'

ii. El niñ-o [que la radio/ el despertador despert-ó]
the.masc child-masc that the.fem radio/the.masc alarm wake-3sg.past
'The boy that the radio/alarm woke'

Most of the sentences in the test (12 out of 20) were semantically reversible (5a, 6a) and the majority of the predicates included an animate character as second argument (14 animate (5a, 6a) and 6 inanimate (5b, 6b)). Furthermore, the two situations described could contrast either in the verb (5a, 6a) or in the second character (5b, 6b). Taking all these conditions into account, the sentences were presented in a pseudo-randomized order so that no more than two identical items appeared consecutively.

Data were collected in two different sessions, one for each language. All participants took the Basque version of the test in the first session and the Spanish one in the second, with a minimum interval of a week between them. Prior to both experiments, subjects were familiarized with the task with two training examples. There was no time limit and items were repeated as many times as requested. Each participant was tested individually and all responses were audio-recorded and transcribed for later codification. As for this last part, following Ezeizabarrena (2012a), a maximum of two responses was considered per item, and only the most target-like one was analysed. In addition, two taxonomies were used to codify the extracted data: the one in Gutierrez-Mangado and Ezeizabarrena (2012) for Basque, and the taxonomy in Ezeizabarrena (2012a) for Spanish.

4. Results

As data were collected in two different languages, the results of each language are presented separately. Section 4.1 deals with the results in Basque, while section 4.2 summarizes the major findings in Spanish.

4.1 Basque

From the total amount of responses produced in this language, 99% were RCs in the Basque L1 group and 100% in the Spanish L1 group. Among the non-RCs, the only errors produced were the identification of the subject with the second character rather than with the child (7a), and the use of the possessive form instead of a RC (7b).

- (7) a. *Lagun-a-∅ izan nahiko nuke*
 friend-the-ABS be want AUX
 ‘I would rather be the friend’
- b. *Helatu-a-n-a-∅*
 ice.cream-the-GEN-the-ABS
 ‘The one of the ice-cream’

Furthermore, as illustrated in Table 1, there were no remarkable differences in the distribution of RCs across groups.

Table 1. Distribution of RC across groups.

	<i>L1 Basque</i>	<i>L1 Spanish</i>
SR context	99% (99/100)	100% (100/100)
OR context	99% (99/100)	100% (100/100)
Total	99% (198/200)	100% (200/200)

4.1.1 Ambiguous RCs

Following Gutierrez-Mangado and Ezeizabarrena (2012), ambiguously interpretable sentences were eliminated from the analysis to better account for the potential asymmetries in the production of SRs and ORs. Even though the mentioned authors observed that ambiguous sentences in their experiment belonged to three categories, namely (i) RCs without internal overt arguments, (ii) ‘ari’ type RCs, and (iii) RCs with atypical word order, no instances of the last two were attested in this study. Therefore, only the first kind of sentences will be addressed.

The lack of overt arguments inside RCs leads to the possibility of coindexing the head of the RC with the subject and the object of the embedded predicate. Hence, the sentence can be interpreted as a SR or an OR. Note that this occurs regardless of the head being lexical (8a) or null (8b) (Gutierrez-Mangado & Ezeizabarrena, 2012).

- (8) a. SR/OR: [$______i$ $______j$ *aurki-tzen du-n*] *ume-a-Ø_{ij}*
 find-IPF AUX-REL girl-the-ABS
 ‘the child that finds/ the child that somebody finds’
- b. SR/OR: [$______i$ $______j$ *aurki-tzen du-n*]-a- *Ø_{ij}*
 find-IPF AUX-REL-the-ABS
 ‘the one that finds/ the one that somebody finds’

Although it may seem obvious that ambiguous interpretations can only arise in semantically reversible predicates (8), in the case of two irreversible sentences interpretation difficulties arose. In the first item (9), ambiguity was related to the animacy of the second character, *the elephant*. As this is an animate argument, the interpretation of the child smelling/lifting the elephant, albeit unlikely, is not impossible, especially when the predicate used is *smell*. In fact, other studies analysing the performance of

children with similar materials, have attested cases of thematic role reversal in this item (Ezeizabarrena, personal communication). Consequently, it was decided to codify answers like (9) as ambiguous, unless the instrumental *tronparekin* ‘with the trunk’ was explicitly mentioned.

(9) *Bi ume daude. Elefanteak ume bat tronparekin usaitzen du eta elefanteak bestea tronparekin altxatzen du. Zein ume izan nahi zenuke?* ‘There are two children. The elephant smells one child with the trunk, and the elephant lifts the other with the trunk. Which child would you rather be?’

(?) SR/OR: [_i _j *usain-tzen/altxa-tzen du-en*]-a-Ø_{ij}

smell-IPF/ find-IPF AUX-REL-the-ABS

‘the one that smells/lifts/ the one that (the elephant) smells/lifts’

Target OR: *Elefanteak usaintzen/ altxatzen duena*

‘The one that the elephant smells/lifts’

However, animacy was not the only factor playing a role in the ambiguity of irreversible sentences, as illustrated in (10). In this case, it was the predicate *hoztu* ‘to cool’ the one which made an ambiguous interpretation possible, despite the second argument *dutxa* ‘the shower’ being inanimate. Ezeizabarrena (2012a: 166) points out this possible double interpretation for the Spanish version of the item, as well. Nevertheless, note that in Basque the election of the children in the counterpart situation did not make sentences ambiguous, since the predicate *erre* ‘to burn’ can only refer to the sensation of the child.

(10) *Bi ume daude. Dutzak ume bat hozten du eta dutzak bestea erretzen du. Zein ume izan nahi zenuke?* ‘There are two children. The shower cools one child and the shower warms the other. Which child would you rather be?’

SR/OR: [_i _j *hozt-en du-en*]-a-Ø_{ij}

cool-IPF AUX-REL-the-ABS

‘the one that cools (the water of the shower)/ the one that (the shower) cools’

Target OR: Dutzak hozten duena

‘The one that the shower cools’

The rates of the excluded ambiguous RCs are presented in Table 2.

Table 2. Ambiguous responses across groups.

	<i>L1 Basque</i>	<i>L1 Spanish</i>
SR context	8.1% (8/99)	9% (9/100)
OR context	28.3% (28/99)	22% (22/100)
Total	18.8% (36/198)	15.5% (31/200)

Table 2 reveals that even if there were no big between-group differences in the production of ambiguous SRs, the number of ambiguous ORs was higher among Basque L1 speakers. The most noticeable result this table illustrates is the difference between the production of ambiguous SRs and ORs in both groups, the percentage of the latter being always higher. This result could suggest that the production of ambiguous responses is a strategy to avoid ORs. Nonetheless, a deeper analysis of the contexts in which participants produced ambiguous answers does not seem to support this idea, since all participants left the internal argument of the RC covert in the exact same items. The characteristic of these items is that all of them describe two situations in which the second argument of the predicate remains unchanged (9, 10), hence, there is no need for making it explicit. This point will be further discussed in section 5.

To sum up, Table 3 shows the number of unambiguous RCs considered for analysis, namely all RCs except for those which lacked an internal argument.

Table 3. Unambiguous RCs across groups.

	<i>L1 Basque</i>	<i>L1 Spanish</i>
SR context	91.9% (91/99)	91% (91/100)
OR context	71.8% (71/99)	78% (78/100)
Total	81.8% (162/198)	84.5% (169/200)

4.1.2 Unambiguous RCs

Concerning unambiguous target-like responses, a slight asymmetry was observed in the production of SRs and ORs, being the rate of the former about 5% higher in both groups (Figure 1).

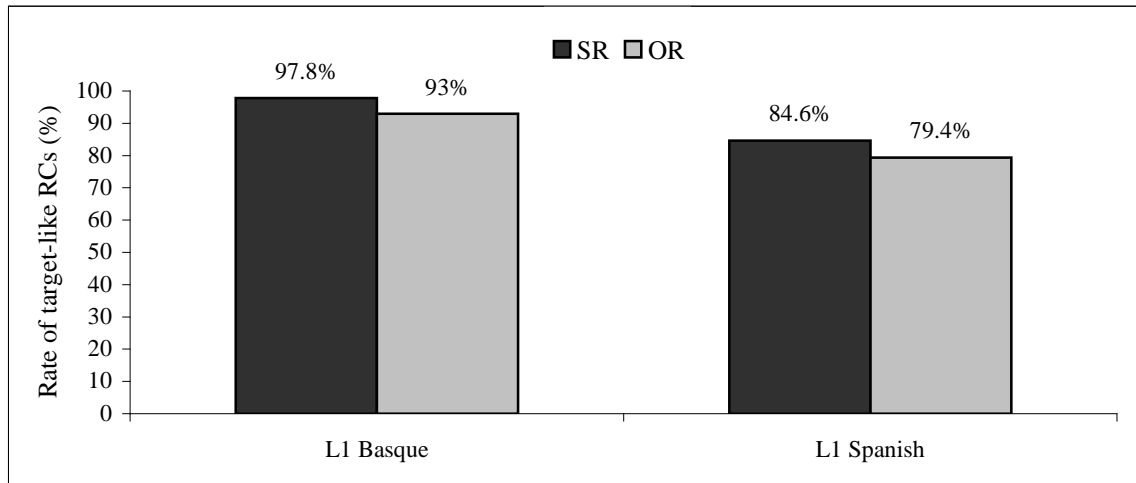


Figure 1. Production of target-like SRs and ORs in Basque across groups.

Four instances of uninflected ORs (11) were found among target-like answers, all of them produced by the same Basque L1 participant. Similarly, three cases of the anti-passive construction (two by the same subject) were attested (12)⁴.

- (11) *Izeb(a)-a-k agurtu-tako ume-a izan nahiko nuke*
 aunt-the-ERG wave-REL child-the be want AUX
 ‘I would rather be the child that the aunt waved at’

- (12) *Atton(a)-a-k marraztu-a izan d-en umi-a-Ø*
 grandfather-the-ERG draw-PF be AUX-REL child-the-ABS
 ‘The child that is drawn by his grandfather’

⁴ A Basque L1 participant produced an instance of a construction where he identified with the child by using the 1st person singular pronoun *ni* instead of the phrase ‘I would rather be’ (i). The response was codified as target-like.

(i) *Am(a)-a-k entzu-ten du-en-a-Ø, ni-Ø*
 Mother-the-ERG listen-IPF aux-REL-the-ABS I-ABS
 ‘I, the one that the mother listens to’

Regarding between-group differences, the almost at ceiling performance of Basque native speakers contrasts with the lower rates scored in the Spanish L1 group. Nevertheless, a further analysis of each group's performance reveals that this variation could have been caused by within group differences among Spanish L1 speakers. Here, four subjects performed almost at chance level either in SR contexts (one subject), in OR contexts (two subjects), or in both of them (one subject)⁵. If these subjects were excluded, the rate of target-like responses in the Spanish L1 group would raise to 92.9% in SRs and 85.5% in ORs. Note that these values are still lower than those of the Basque L1 group. To delve into these differences, the remaining part of the section will deal with the errors recorded in the corpora.

Five types of deviances were distinguished following the error taxonomy by Gutierrez-Mangado and Ezeizabarrena (2012): (i) case errors, (ii) agreement errors, (iii) resumptive DP and pronouns, (iv) changes in the transitivity of the predicate, and (v) theta-role reversals. However, in our study no agreement errors were attested and, indeed, the category *other errors* had to be added (Figure 2). This category comprised lexical deviances and errors which did not fit with the original classification.

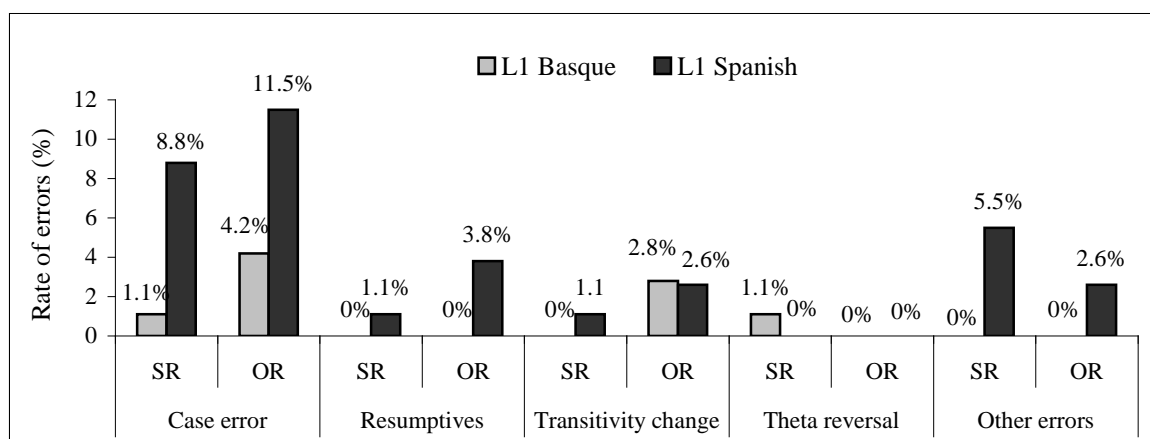


Figure 2. Types of errors in SR and OR in Basque across groups.

Case error was the most common deviance in both groups, particularly in ORs contexts (Figure 2). This error involves an incorrect case marking of the internal argument. That is to say, in SRs internal arguments are marked with the ergative case instead of with the absolutive (13) and just the opposite happens in ORs (14). Consequently, what should have been a SR appears as an OR (13), and vice versa (14).

⁵ Interestingly, there were no within group differences between the subject who started acquiring Basque at the age of 10 and those who started acquiring it when they were 3.

Moreover, it is essential to highlight the difference in the total percentage of case errors made by the Basque (2.5%) and Spanish L1 groups (10%).

OR instead of SR:

- (13) *Am(a)-a-k entzu-ten du-en-a-Ø*
mother-the-ERG listen-IPF AUX-REL-ABS
'The one that her mother listens to'
Target: *Ama entzuten duena*
'The one that listens to her mother'

SR instead of OR

- (14) *Despertadori-a-Ø esna-tzen du-en-a-Ø*
alarm-the-ABS wake-IPF AUX-REL-the-ABS
'The one that wakes up the alarm'
Target: *Despertadoreak esnatzen duena*
'The one that the alarm wakes up'

Another type of error, though not as common as the previous one, was the use of resumptives (15). All the instances of this kind featured a full DP rather than a pronoun.

- (15) **Elefante-a-k altxa-tzen du-en-a-Ø ume-a-Ø*
elephant-the-ERG lift-IPF AUX-REL-the-ABS child-the-ABS
'The one that the elephant lifts the child'
Target: *Elefanteak altxatzen duena*
'The one that the elephant lifts'

The third category of errors includes sentences where participants turned transitive predicates into intransitives. These errors were mainly attested in OR contexts (16).

- (16) *Ezkuta-tzen de-n-a-Ø*
hide-IPF AUX-REL-the-ABS
'The one that hides'
Target: *Aitonak ezkututzen duena*

‘The one that the grandfather hides’

As far as role reversals are concerned, only one instance was attested (17).

- (17) Umi-a- \emptyset agur-tzen du-n lagun-a- \emptyset
child-the-ABS wave-IPF AUX-REL friend-the-ABS
‘The friend that waves at the child’
Target: Laguna agurtzen duen umea
‘The child that waves at his friend’

Finally, two types of deviances were included in the category *other errors*: lexical substitutions and errors which did not fit in any of the mentioned categories. In the first type, a single case was found, where a subject used the construction *lo iteko jarri* ‘make somebody sleep’ instead of *oheratu* ‘to take to bed’. The second type includes sentences which featured a /k/ phoneme at the end of the head of the RC. Note that a single participant (L1 Spanish) was responsible for the 6 examples which occurred in 5 SRs (18a) and 1 OR (18b).

- (18) a.*Am(a)-a- \emptyset entzu-ten du-n-a-k
mother-the-ABS listen-IPF AUX-REL-the-ERG(?)
‘The one that listens to her mother’
Target: Ama entzuten duena
‘The one that listens to her mother’
- b.*Izeb(a)-a-k agur-tzen du-n-a-k
aunt-the-ERG wave-IPF AUX-REL-the-ERG(?)
‘The one that the aunt waves at’
Target: Izebak agurtzen duena
‘The one that the aunt waves at’

At first glance, it seems that this deviance is simply an instance of case error for two reasons. First, *-k* can be the morpheme of the ergative case marker. Second, the error is mainly attested in SR contexts, and as indicated in section 2, SRs in Basque show a case mismatch between the head, which bears absolutive, and the gap, which

bears ergative. As a consequence, the participant could add the ergative marker *-k* to the head of the RC to resolve the mismatch. Despite the fact that this reasoning may explain cases such as (18a) above (i.e. erroneous SRs), it seems less appropriate for the OR example (18b). Here, the subject correctly marks the internal argument with the ergative case and, in addition, attaches the sound /k/ to the head. According to this interpretation, if /k/ represented the ergative case, the subject would have produced a transitive sentence with two agents and no patient, which does not seem to be very likely. Since there is only a single case of OR with this deviance, we could assume that the error was made by analogy and that, indeed, it is a case error. Nevertheless, in the light of these controversies and considering that all errors were made by the same participant, it was decided to classify this deviance in the category *other errors* so as to be cautious.

To sum up, Basque data has revealed that both groups of participants produced RCs with high accuracy, showing a slight preference for SRs. The between group comparison indicated that the accuracy was higher in the L1 Basque group than in the L1 Spanish group. Regarding target-deviant RCs, most of them were instances of case errors, especially in the Spanish L1 group.

4.2 Spanish

From the total amount of answers produced by the Basque L1 group 99.5% (199/200) were RCs, while in the Spanish L1 group the percentage raised up to 100% (200/200). The only non-RC response was a case of possessive construction (19), similar to a non-RC example attested in Basque (7b).

- (19) El del despertador
 the.masc GEN.the.masc alarm.clock
 ‘The one of the alarm clock’

No differences were found in the production of RCs in SR and OR contexts, as shown in Table 4.

Table 4. Distribution of RCs across groups.

	<i>L1 Basque</i>	<i>L1 Spanish</i>
SR context	100% (100/100)	100% (100/100)
OR context	99% (99/100)	100% (100/100)
Total	99.5% (199/200)	100% (200/200)

4.2.1 Ambiguous RCs

Following the methodological decisions made for Basque, RCs which could be interpreted both as SRs and ORs were eliminated from the analysis. These mostly comprised sentences which lacked an overt argument in the embedded clause (20). Importantly, in these sentences ambiguity arose regardless of there being a clitic (20b), since third person singular clitics may refer either to the object of the SR or the head of the OR (Ezeizabarrena, 2012a: 165)

- (20) a. SR/OR: *El_{ij} [que ______i escondi-ó ______j]*
the.masc that hide-3rdsg.past
‘The one that hides/ the one that somebody hides’

- b. SR/OR: *La_{ij} [que ______i le_j salud-a ______j]*
the.fem that her/him wave-3rdsg.pres
‘The girl that waved at him/her/ The girl that (s)he waved at’

However, not all answers which lacked an overt argument in the embedded clause were ambiguous. For instance, sentences where the preposition *a* ‘to’ appeared pied-piped (21a) or irreversible predicates (21b) could only be interpreted as either SRs or ORs. Yet, as has been explained for the Basque data, in the case of two particular irreversible sentences, a double interpretation was possible, whenever the argument of the embedded clause was not made explicit (21c,d, cf. examples (9), (10)).

- (21) a. *A la que calent-ó*
to the.fem that warm-3rdsg.past
‘The girl that it warmed’

b. *El que compr-ó*
 the.masc that buy-3rdsg.past
 ‘The one that bought it’

c. SR/OR: *El que enfrió*

SR: (i) *El que enfrió (la ducha)*
 the.masc that cool-3rdsg.past (the.fem shower)
 ‘The one that cooled (the shower)’

OR: (ii) *El que (la ducha) enfrió*
 the.masc that (the.fem shower) cool-3rdsg.past
 ‘The one that (the shower) cooled’

d. SR/OR: *El que levantó*

SR: (i) *El que levant-ó (el elefante)*
 the.masc that lift-3rdsg.past (the.masc elephant)
 ‘The one that lifted (the elephant)’

OR: (ii) *El que (el elefante) levant-ó*
 the.masc that (the.masc elephant) lift-3rdsg.past
 ‘The one that (the elephant) lifted’

Nonetheless, not all cases of ambiguity arose due to the lack of overt internal arguments. As (22) illustrates, occasionally responses with overt lexical arguments could not be disambiguated without the presence of the preposition *a*. This ambiguity was mainly attested with the predicate ‘draw’. Moreover, the possible assimilation of the preposition *a* with the final /a/ vowel of the preceding verb also led to ambiguous interpretations in some cases (23).

(22) SR/OR: *El que dibuj-ó un bailarín*
 the.masc that draw-3rdsg.past a.masc dancer
 ‘The one that draw a dancer/ the one that a dancer draw’

(23) SR/OR: La niña que le pein-a a(?) la madre
the.fem girl that her comb-3rdsg.present to(?) the.fem mother
‘The one that combs her mother/ The one that her mother combs’

On the basis of these decisions, the percentage of excluded answers hovered around 12% (Table 5). Although the number of ambiguous SRs produced by both groups is similar, differences are observed in ORs, the Basque L1 group producing almost three times more ambiguous ORs than their Spanish counterparts. Furthermore, no major differences were found when comparing the performance in SRs and ORs within each group.

Table 5. Ambiguous responses across groups.

	<i>L1 Basque</i>	<i>L1 Spanish</i>
SR context	14% (14/100)	11% (11/100)
OR context	17.2% (17/99)	6% (6/100)
Total	15.6% (31/199)	8.5% (17/200)

4.2.2 Unambiguous RCs

Regarding unambiguous RCs, both groups performed almost at ceiling in SRs (Figure 3). However, in ORs, the rate of target-like responses dropped almost 10% in the Basque L1 group and around 15% in the Spanish L1 group. Although no remarkable differences were observed between groups, individual differences were found within groups. One Basque L1 participant performed at chance level in ORs, while in SRs all his answers were target-like. If this participant was excluded the rate of target-like ORs would rise up to 91.8% in the Basque L1 group. Regarding the L1 Spanish group, two participants scored considerably lower in OR contexts than the rest of their peers: one scored 50% and the other 60%, whereas the mean percentage of target-like answers for the other participants in the group was 90%⁶.

⁶ Interestingly, these last two subjects’ performance was also poorer than their peers’ in Basque. However, while one performs at chance level in ORs and at ceiling in SRs in both languages, the other, performs lower than the average in Basque SRs and in Spanish ORs.

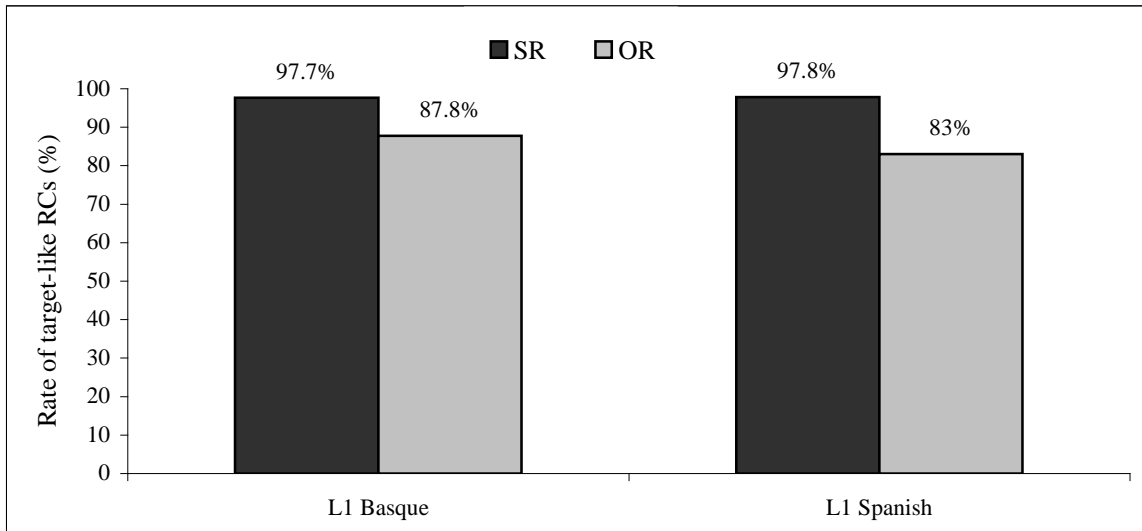


Figure 3. Production of target-like SRs and ORs in Spanish across groups.

Target-deviant answers were classified in five kinds of errors following Ezeizabarrena (2012a): (i) role reversals, (ii) lexical substitutions (iii) resumptives, (iv) incorrect person references, and (v) erroneous verb agreements. No cases of resumptives, incorrect person references, or verb agreement errors were attested in the corpora. However, two other types of deviances were found: case errors, and other agreement errors (Figure 4).

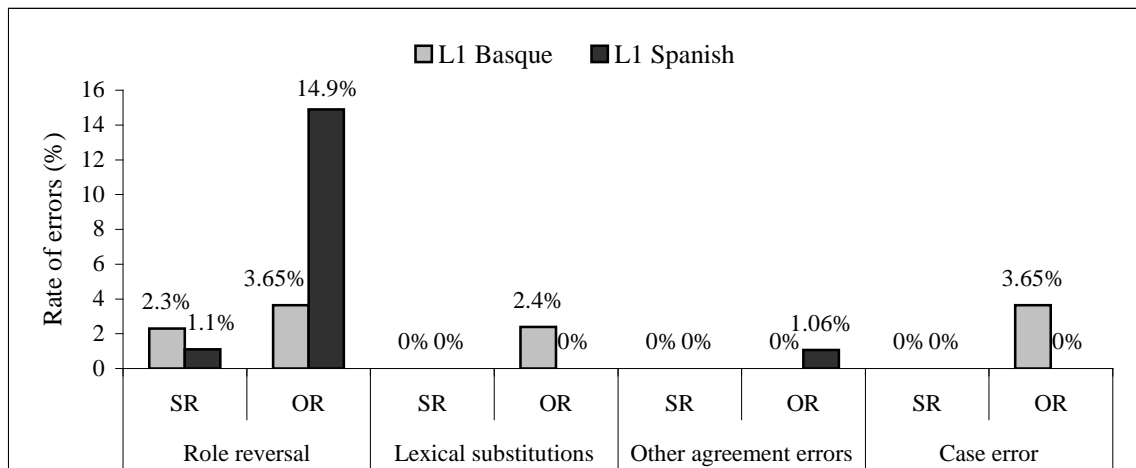


Figure 4. Types of errors in SRs and ORs in Spanish across groups.

The most common error in both groups was role reversal, being particularly prevalent among Spanish L1 speakers in OR contexts (24). Crucially, role reversals lead to the production of RCs opposite in nature to the target in most cases. That is, this type

of deviance generally turns ORs into SRs and vice versa. Therefore, the fact that 85% of the total reversals occurred in OR contexts seems to be relevant.

- (24) *La madre que escuch-ó al otr-o niñ-o*
 the.fem mother that listen-3rdsg.past to.the other-masc child-masc
 ‘The mother that listened to the other child’
 Target: *El niño que la madre escuchó*
 ‘The child that the mother listened to’

As regards lexical errors, two types of replacements were found among Basque L1 participants in ORs: the substitution of transitive predicates with the intransitive *se-medial* (25a), and the use of *receive+DP* to substantivize the predicate of the embedded clause (25b). These two lexical errors also seem to be strategies to avoid producing ORs, since both result in grammatical SRs.

- (25) a. *La que se enfr-ía con la ducha*
 the.fem that medial cool-3rdsg.present with the.fem shower
 ‘The one that gets cold with the shower’
 Target: *La niña que la ducha enfría*
 ‘The one that the shower cools’
- b. *El que recib-e el saludo de la tía*
 the.masc that receive-3rdsg.present the.masc wave of the.fem aunt
 ‘The one that receives the aunt’s wave’
 Target: *El que la tía le saluda*
 ‘The one that the aunt waves at’

Concerning agreement errors, a single case was attested between the head of an OR and the clitic coindexed with it (26).

- (26) **El_i que el abuelo la_i dibuj-ó*
 the.masc that the.masc grandfather the.fem draw-3rdsg.past
 ‘The boy that the grandfather drew her’
 Target: *El que el abuelo le dibujó*

‘The boy that the grandfather drew’

Finally, three instances of case error were produced by three different subjects, all involving the marking of the head of the OR with the accusative rather than with the nominative (27). Interestingly, the accusative is the case that the gap of the OR bears.

- (27) *A *la niña que le calent-ó la ducha*
to the.fem girl that her warm-3rdsg.past the.fem shower
‘To the girl that the shower warmed her’
Target: *La niña a la que le calentó la ducha*
‘The girl that the shower warmed’

Before concluding this section and turning to the discussion of the results, some other aspects on unambiguous RCs will be presented following Ezeizabarrena (2012a). Firstly, all unambiguous RCs in the corpora were headed. In spite of the fact that both alternatives, lexical heads (*la niña/el niño (que)* ‘the girl/the boy (that)’) and noun-less DP (*la/el (que)* ‘the.fem/masc (that)’), were produced by the two groups, the frequencies of each option differed. Whereas in the Basque L1 group the lexical head was slightly more common (51.8%), particularly in OR contexts, in the Spanish L1 group the null DP was attested more often (61.2%), both in SRs and ORs.

Secondly, with respect to lexical arguments, a slight difference was observed between SRs and ORs: while all unambiguous SRs in the corpora contained a lexical object, the presence of lexical subjects was, albeit high, not so consistent in ORs (97% Basque L1 and 90% Spanish L1). Furthermore, the use of single clitics in unambiguous RCs was not attested in any group. In contrast, double clitics were produced by participants in both groups, especially in ORs. In fact, no more than two instances of doubling were found in SR contexts in the corpora (2.2%), and both were produced by the same subject (Spanish L1) (28a). In conclusion, as summarised in Figure 5, the most common option in unambiguous RCs was the presence of single lexical embedded arguments, in both groups (particularly in SRs).

- (28) a. *La que le escuch-ó a su madre*
the.fem that her listen-3rdsg.past to her mother
‘The one that listened to her mother’

b. *La niña a la que le escuch-a la amiga*
 the.fem girl to the.fem that her listen-3rdsg.present the.fem friend
 ‘The girl that her friend listened to’

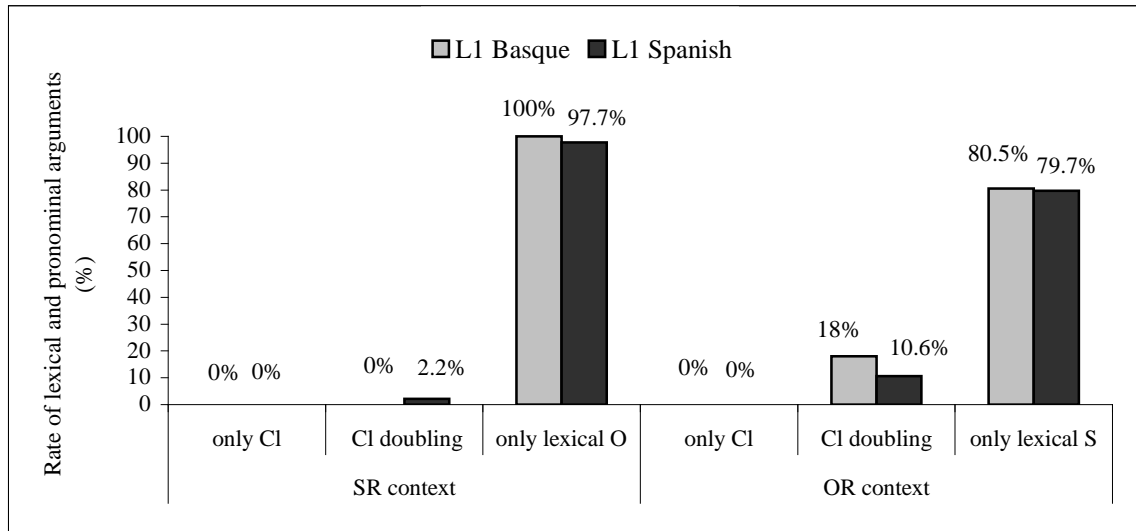


Figure 5. Distribution of lexical and pronominal arguments in Spanish across groups.

Thirdly, as far as word order is concerned, ORs showed more variability than SRs. Whereas in all unambiguous SRs the O followed the (cl-)V (29a), in ORs both orders were attested, (cl-)VS (29b) and S(cl-)V (29c). Nevertheless, the distribution of these alternatives was not balanced in any of the groups: S followed V in 86.6% of the sentences in the Basque L1 group, and in 88.3% of the answers in the Spanish L1 group. That is to say, both groups showed a preference for the (Cl-)VS order in ORs too.

(29) a. *El que atrap-ó a un amigo*
 the.masc that catch-3rdsg.past to a.masc friend
 ‘The one that caught his friend’

b. *El que pein-ó la madre*
 the.masc that comb-3rdsg.past the.fem mother
 ‘The one that the mother combed’

c. *La que el abuelo dibuj-ó*
 the.fem that the.masc grandfather draw-3rdsg.past
 ‘The one that the grandfather drew’

Finally, regarding voice, only active sentences were observed in SR contexts, with the exception of a passive OR produced in a SR context. In ORs, on the other hand, both alternatives were found, even though actives were considerably more frequent in both groups. Among the Basque L1 participants the percentage of passive ORs was 18.3% and among the Spanish ones 30.8%. It is essential to highlight, however, that in the former group more than half of the passive constructions were produced by the same participant and that in the latter three participants produced only passive ORs (30).

- (30) *El niño que fue curado por el doctor*
 the.masc boy that be.3rdsg.past cured by the.masc doctor
 ‘The boy that was cured by the doctor’

5. Discussion

In this study we analyzed the production of RCs in two groups of unimpaired bilingual adults. The main aim of the study was to test some materials for eliciting RCs which could later be used with Basque-Spanish bilinguals with aphasia. Thus, our results from unimpaired bilinguals would serve as a control group. In view of the results, we conclude that, in general terms, the elicitation task could be successfully fulfilled by non brain-damaged individuals, as the production of RCs was almost at ceiling in both control groups and in both languages. Nevertheless, a deeper examination of the findings may suggest that some aspects of the material should be modified.

To begin with, the rate of ambiguous responses was noteworthy in both languages (mean: 14.6%), especially in Basque ORs (25.1%). These values differ from those in Gutierrez-Mangado and Ezeizabarrena (2012), where only 8.6% of the answers were ambiguous, but converge with the 14% of ambiguous RCs attested in Ezeizabarrena (2012a). The high rates of ambiguity have two major consequences in this study: first, the number of items considered for analysis decreases. Second, due to the unequal distribution of ambiguous responses in SR and OR contexts, one might suggest that producing ambiguous RCs is a strategy to avoid ORs, particularly in Basque. However, the fact that all participants produced ambiguous answers in the

exact same sentences may rule out this interpretation. As described in section 3.2, in this study, the experimenter presented two situations which could contrast either in the verb (cf. 5a, 6a) or in the second character (cf. 5b, 6b) to elicit RCs. Interestingly, all ambiguous responses were produced in sentences where it was the verb which changed. Thus, as the focus of the preference was not the second argument, there seemed to be no need to make it explicit. Note that ambiguity was mainly caused by the lack of overt arguments in the embedded clause. Although both SR and OR contexts comprise the same number of verb-change items (which would not explain the asymmetry between SRs and ORs), the nature of these items is slightly different in each context. Among SRs, two out of five verb-change items are irreversible, which prevents an ambiguous interpretation. In contrast, among OR contexts, despite there being two irreversible verb-change items, as well, these are those which have been described in section 4 as cases of irreversible predicates compatible with an ambiguous interpretation. As a consequence, the number of 0-argument RCs which can be interpreted ambiguously is higher in ORs.

In the light of these conclusions, it is suggested that even if the material used was appropriate, remodelling some items to really balance factors such as reversibility or animacy could be beneficial to decrease the number of ambiguous responses and to avoid misinterpretations of SR/OR asymmetries.

With respect to participants' performance in SRs and ORs, it was found that SRs were produced more accurately in both groups and in both languages. In the case of Spanish, the results are in line with Ezeizabarrena (2012a), who reported that SRs are easier to produce in typically developing grammars. Nevertheless, note that the scholar did not find any asymmetry in adult participants, whose rate of target-like answers was only 3% higher in SRs. In the case of Basque, the results show the opposite preference found in the comprehension of RCs by unimpaired adults (Carreiras et al., 2010) and children (Gutierrez-Mangado, 2011) as well as aphasics (Munarriz et al., submitted), but converge with the asymmetries attested by Gutierrez-Mangado and Ezeizabarrena (2012) in RC production by children and adults, although in different proportions: while the difference between target-like SRs and ORs was of about 5% in the two groups of the present study, Gutierrez-Mangado and Ezeizabarrena (2012) observed that the rate of target like SRs was 10,8% higher than that of ORs. In view of these asymmetries, we could predict that in case difficulties surface, Basque-Spanish aphasic bilinguals would have more difficulties producing ORs than SRs in both of their languages. However,

note that inferential statistics of the data would be needed to evaluate the significance of our findings.

To account for the asymmetry between SRs and ORs the major causes of error were examined in both languages. In Spanish, role reversal in ORs was the most common deviance (Figure 4). Importantly, this error, together with the use of resumptives, predicate changes and, particularly, passive constructions, has been considered a strategy to avoid ORs (Belletti, 2009; Contemori & Garraffa, 2010). In fact, although resumptives and predicate changes were not common in the corpora, passive constructions reached rates of 18% and 30% among Basque and Spanish L1 speakers respectively. This result differs from Ezeizabarrena's (2012a) findings, but is in line with those of other languages, such as Italian and Portuguese, albeit in different proportions (Utzeri, 2007; Costa et. al, 2010).

In Basque, on the other hand, case marking in ORs was the aspect that posed the biggest problems to participants, especially to Spanish L1 speakers. Indeed, other errors as the use of resumptives, theta reversals and transitivity changes were rather infrequent. Similarly, very few cases of anti-passive RCs were attested, which confirms that depending on the characteristics of the language there may be crosslinguistic differences in the syntactic strategies used to avoid ORs. In general, our results of target-deviant answers resemble those reported by Gutierrez-Mangado and Ezeizabarrena (2012) in unimpaired adults.

Turning to between-group differences, we observed that although both groups scored similar rates of target-like RCs in Spanish, Basque L1 participants outperformed their Spanish peers both in SRs and ORs in Basque. This difference between groups in Basque, which should be corroborated by inferential statistical analyses, could be due to within group differences among Spanish L1 participants to a certain extent. Some subjects in this group performed noticeably under the average and so, they could have been removed from the analysis for being outliers. However, we decided not to do so to provide a full picture of the non-brain-damaged individuals. Taking into account that the study is thought to be later carried out with participants with language disorders, including only "ideal" control participants has a clear risk: if the behaviour of aphasic patients was poorer than that of the control group, this would directly be attached to their pathology, while it could just resemble the performance of some of the "non-ideal" unimpaired participants.

Interestingly, even if these “non-ideal” participants were excluded, Basque L1 participants would still surpass their Spanish counterparts in Basque ORs. Taking into consideration that half of the errors (62.5%) produced by L1 Spanish subjects were case errors, we propose that this between-group difference can be explained on the grounds of case-marking, a syntactic parameter which diverges in Basque and Spanish. This interpretation is in line with Gutierrez-Mangado and Ezeizabarrena (2012) who suggest that the ergative nature of Basque is the responsible for the asymmetry found in the comprehension and production of ORs and SRs.

As noted in section 2, Basque is an ergative-absolutive language and, thus, it marks the embedded argument of ORs with the ergative case *-k*. Spanish, in contrast, is a nominative-accusative language. According to Zawiszewski et al. (2011), it is in divergent syntactic parameters that native/non-native differences are observed. In fact, these scholars found that Spanish native speakers who started acquiring Basque with 3 years did not process the ergative marking of arguments in the same way as Basque native speakers. Moreover, Ezeizabarrena (2012b) also asserts that the ergative case is a linguistic feature bound to fossilize even in early L2 acquisition, as the scholar found that participants who started acquiring Basque at the age of 3 omitted the ergative mark the 75% of occasions. These results are in line with Weber-Fox and Neville (1996) who claim that delays in L2 exposure as short as 1-3 years may affect the grammaticality judgements for some syntactic rules. In the light of all these findings, we suggest that the lower target-like performance of Spanish L1 speakers in Basque ORs might be due to the difficulty of these participants to attach the ergative marker *-k* to the embedded argument. It is important to take this into consideration for L2 Basque bilinguals with aphasia, since a worse performance in Basque RCs in this population would not necessarily indicate that Basque was more affected than Spanish after the brain lesion.

Moreover, it is noteworthy that the Basque L1 group does not seem to have problems with the Spanish case system, as no more than three case errors were attested. Therefore, it would be interesting to explore whether this type of error is more common in developing grammars or whether it is the ergative case marking and not divergent case systems in general what really poses difficulties in L2 acquisition.

6. Conclusion

Asymmetries in the comprehension and production of SRs and ORs have been widely studied crosslinguistically both in impaired and unimpaired monolingual speakers. However, fewer works have focused on the performance of bilinguals. This paper has explored the production of RCs by bilingual adults in Spanish and Basque, two typologically distant languages. The main aim of the study was to test the validity of some RC elicitation material in two groups of unimpaired bilingual adults so that they could serve as control groups to be later compared to aphasic bilinguals. The paper has shown that the tested material was appropriate, though the modification of some items could improve it. Concerning the performance of the unimpaired Basque-Spanish bilinguals, the results have indicated a better performance of Basque and Spanish L1 speakers in SRs in both languages. These findings seem to converge with previous studies on the production of RCs in Spanish and Basque. Moreover, data pointed to an asymmetry between Basque and Spanish L1 participants in the production of Basque ORs, the former outperforming the latter. In view of the fact that the absence of the ergative marker was the most frequent error, particularly among Spanish L1 speakers, the paper has suggested that the ergative-absolutive case system of Basque may be the responsible for the mentioned between group differences. Finally, despite caution is needed to consider the implication of our findings in the absence of inferential statistical analyses, our study led us to predict a preference for SRs in the production of aphasic bilinguals in both Spanish and Basque. Besides, the differences between groups supporting the widely reported finding that age of acquisition may have an effect in the performance of certain syntactic structures need to be considered when assessing brain-damaged individuals with different bilingual profiles.

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