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The subject/object relative clause asymmetry in Italian hearing-impaired children: evidence from a comprehension task

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We investigated the comprehension of subject and object relative clauses in hearing-impaired (HI) children using a cochlear implant compared to that of hearing children, by using an agent selection task. We show that HI children performed significantly poorer than their typically-developing peers. Despite their low performance, HI children show nonetheless a typical gradient of difficulty, with subject relatives (OS) easier to comprehend than object relatives with preverbal subject (OO) and these latter are easier than object relatives with postverbal subject (OOp). These asymmetries are explained in terms of some recent minimalist proposals on locality theory and on the fragility of Agreement occurring with postverbal subjects. A correlation between performance on OOp and digit span tasks was found only in the HI group.

1. Introduction

Relative clauses (RCs, henceforth) have been widely investigated in language acquisition and development, due to the complexity of their structure and to the presence of long-distance dependencies between sentence constituents. Much psycholinguistic research carried out on different populations across a number of head-first languages showed that subject RCs are usually easier to process and comprehend than object relatives. This response pattern was found in typically developing children (Guasti & Cardinaletti, 2003, Arosio et al., 2006, Utzeri, 2007, Adani, 2008); adults (De Vincenzi, 1990) for Italian; SLI children (Stavrakaki, 2001 for Greek, Friedmann & Novogrodzsky, 2004 for Hebrew; Adani 2008, for Italian); aphasic patients (Garraffa & Grillo, 2007, Grillo, 2008).

However, to the best of our knowledge, this phenomenon has not yet been investigated with Italian hearing-impaired (HI, henceforth) children. Since acquisition in contexts of auditory deprivation is atypical and delayed (Taeschner et al., 1988, De Villiers 1988, Volterra & Bates, 1989, De Villiers et al., 1994, Tuller & Jakubowicz, 2004, Chesi, 2006, Delage, 2008), we decided to extend the study of RCs to HI children using a cochlear implant, in order to test whether their comprehension of RCs patterns with that of hearing children and, if not, in what way it differs.

In our experiment, we tested right-branching subject and object restrictive RCs, i.e. those where the embedded clause follows the main clause. We assume a raising analysis of relative clauses, in which the head raises from a position internal to the CP, forming a chain with the gap in the VP internal position (Vergnaud, 1985, Kayne, 1994). Subject and object relative clauses differ with respect to the position from which the head moves: as for subject

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RCs, the head raises from embedded subject position (cf. 1) and in object RCs the head raises from embedded object position (cf. 2)[1]:

(1) …il cavallo [che <il cavallo> insegue i leoni] OS
'…the horse [that <the horse> chases the lions]'

(2) …il cavallo [che i leoni inseguono <il cavallo>] OO
'…the horse [that the lions chase <the horse>]'

In addition, we also tested the type of object relatives where the embedded subject surfaces in post-verbal position, which is also possible in Italian:

(3) …il cavallo [che *pro* inseguono i leoni <il cavallo>] OOp
'…the horse [that *pro* chase the lions <the horse>]'

In this typology, a null pronoun (*pro*) is postulated in embedded preverbal subject position.[2] This paper is organized as follows. Section 2 explains how hearing impairment affects language acquisition and development. Section 3 offers a literature review on studies investigating RCs on typical and atypical populations. In Sections 4 and 5 our experimental method and results are presented. In section 6, we discuss our results in the light of recent minimalist theories of locality and Agreement in order to account for the difficulties experienced with object relatives.

2. The effect of hearing impairment on language acquisition: existing studies

Hearing impairment strongly affects the acquisition and development of a language since it drastically reduces the quantity and quality of linguistic input available to HI individuals. In fact, the first months of life are crucial for a child to establish the basis for intact syntax development. If the input is absent or impoverished, syntactic skills cannot develop normally.

Cross-linguistic studies assessing speech production of deaf children and adults with different degrees of hearing loss revealed patterns of performance that were not observed in hearing individuals (Taeschner et al., 1988, De Villiers, 1988, De Villiers et al., 1994, Chesi, 2006).

In a recent study, Chesi (2006) explored linguistic abilities of 13 Italian hearing-impaired children (age range: 6-17 years). As the following speech sample shows, their elicited productions were often problematic and, crucially, they produced sentences that are not produced by hearing individuals at any stage of development:

(4) Ma c'è la professore ø c'è segni anche parlano (T3.37s – Chesi, 2006:92)
'but there is the.FEM.SG professor.MAS.SG ø there is signs also speak.3.PL'
TARGET: Ma ci sono professori che parlano anche con i segni
'but there are professors who speak also with the signs'
'but there are professors who also use signs'

[1] In examples (1)-(3), the constituents in <> specifies the phonologically null original position of the RC head.

[2] In the three examples, the first letter ('O') refers to the fact that the RC head is the object of the main clause, whereas the second letter indicates its grammatical role within the embedded clause (either subject 'S' or object 'O'). The final 'p' indicates when the subject of the embedded clause is in post-verbal position.

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Similar findings were reported by De Villiers (1988) for English-speaking HI individuals aged 11 through 19. By eliciting their spoken production, she found out that they also produced non-standard structures, such as two separate simple sentences instead of conjoined or subordinate constructions. In a subsequent study, De Villiers et al. (1994) investigated the use of medial wh-questions in 52 orally-trained deaf students ranging in age from 11 to 19 years. Apart from difficulties deriving from the presence of long-distance movement in questions, HI children produced, in their answers, errors not occurring in hearing subjects of any age:

(5) a. The girl decided to wear what by looking in a magazine.
b. Ask father that which of two decision is better.

Comprehension of RCs in Hebrew HI children (age range: 7;7-11;3) has been recently investigated by Friedmann & Szterman (2006). They tested the comprehension of subject and object RCs and found that overall HI children performed significantly poorer than TD peers (68% vs. 86%). However, whereas their performance on subject relatives was quite intact (117 correct responses out of 130), their performance on object relatives was significantly poorer. This difficulty seems to be related to the several operations necessary to interpret long distance dependencies, namely the formation of a trace, the assignment of a thematic role to the trace and the linking of the trace to the moved constituent via a chain. Furthermore, Friedmann & Sztermann (2006) also found a strong correlation between linguistic performance and age of first intervention: children wearing hearing aids before the age of eight months performed significantly better than the other children.
The aim of the current study is to extend the investigation of movement derived sentences (such as RC) to Italian-speaking HI children. Considering that in production tasks, their performance may differ from that of hearing children, we want to investigate whether such atypical behaviour also appears in comprehension tasks or HI children follow the same pattern as their hearing peers.

3. Typical and atypical acquisition and development of relative clauses

RCs have been widely investigated in a variety of languages since the late 70's (see Guasti (2002) for a review). A common finding across these studies is that subject relatives are generally easier to produce and comprehend than object relatives. For the purposes of this paper, we will focus our discussion on the Italian data.
Guasti & Cardinaletti (2003) investigated the production of RCs by a group of 30 Italian-speaking children (age-range 5;1- 10;0). They found that subject relatives show a high rate of accuracy, while object relatives are more problematic and are, in most cases, turned into subject relatives, by adopting different relativization strategies.
Arosio et al. (2006) investigated the comprehension of subject relatives (cf. 1) and of two types of object relatives (with preverbal (cf. 2) and post-verbal embedded subject (cf. 3)) in 5- to 11-year-old typically developing children. Most difficulties were experienced on OOp. In 5-year-old children, the comprehension of OO is above chance (70%) and that of OOp is below chance (25%). Only by the age 11, the comprehension of RCs with post-verbal subject is comparable to adult performance. By using a different methodology, but the same sentence typologies, Adani (2008) tested 3 to 7 year old Italian children and replicated the gradient of accuracy (OS > OO> OOp) found by Arosio et al. (2006). However, children were more accurate in this task: whereas subject relatives are at ceiling from age 3, OO are 83% correct at age 4 and OOp are 70% correct at age 7.

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Further evidence of the difficulties experienced in the interpretation of object relatives as opposed to subject relatives is offered by Garraffa & Grillo (2007) and Grillo (2008), who tested long-distance dependencies in agrammatic patients and found out a high level of accuracy on subject relatives and chance levels on object relatives.
The asymmetry between subject and object relatives (tested both in production and comprehension) was also found in Hebrew and Greek SLI children (Friedmann & Novogrodzsky 2004, Stavrakaki 2001).

4. Experimental study: Method

4.1. Participants

Thirty-two Italian monolingual children participated in this study. They were distinguished between a group of HI children using a cochlear implant (N=8, age range: 6;9-9;3; mean age: 7;9) and three groups of typically-developing controls. The first control group (GC: N=8, age range: 3;6-5;11; mean age: 4;10) was matched to the HI group on the basis of morpho-syntactic abilities (p=0.86), a second group (VC: N=8; age range: 5;4-7;0; mean age: 6;5) was matched on the basis of receptive vocabulary (p=0.70) and a third group (AC: N=8; age range: 7;1-7;8; mean age: 7;5) was matched to the HI group on the basis of chronological age (p=0.48).
As for the HI group, all our participants are hearing impaired since birth, born to hearing parents. Only one participant has parents with hearing loss. None of them has ever used the Italian Sign Language. They have been exclusively exposed to the oral language. Age of hearing loss detection varied from birth to 1;6. They were fitted with hearing aids (HA) within the second year of life. Age of cochlear implantation (CI) varied between 2;1 to 4;4. All children have been trained orally and all of them receive speech-language therapy from two to three times per week. They do not show any other associated disabilities. At the time of testing, they were attending primary schools in hearing classes. A summary of each child's clinical history is reported in the following table:

Table 1: Clinical data of HI participants.

ID	Age (Y:M)	Age of HL Diagnosis	Age of HA	Age of CI	CI Use Duration	HL	HL with CI (dB)	Sign language
101	6;10	1;2	1;3	2;5	4;5	>90	25	no
102	7;11	1;0	1;1	2;1	5;10	>90	30	no
103	7;4	1;6	1;7	2;10	4;6	>90	30	no
104	6;11	0;4	0;6	3;4	3;7	>90	25	no
105	7;4	0;0	0;3	4;4	3;0	>90	30	no
106	9;3	0;7	0;9	2;7	6;8	>90	30	no
107	8;7	1;5	1;5	3;2	5;5	>90	30	no
109	7;1	0;9	0;10	3;2	3;11	>90	25	no

HL: Hearing loss; HA: Hearing aids; CI: cochlear implantation.

4.2. Material

The types of structure under investigation are those shown in (1), (2) and (3). Each trial began with 'Indica' (point to). Only animate nouns and transitive verbs were used. The verbs used in the experimental task are: *rincorrere* (to run after), *tirare* (to pull), *inseguire* (to chase), *beccare* (to peck), *seguire* (to follow), *lavare* (to wash), *guardare* (to look at), *mordere* (to bite), *spingere* (to push).
Given that (1) and (3) in Italian are potentially ambiguous between a subject or object reading when the two DPs display the same number, each experimental trial was

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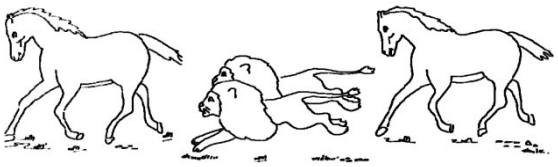
disambiguated through number agreement between the subject and auxiliary verb. The relative head was always singular whereas the embedded noun was always plural. The verb could either agree with the relative head (as in 1) or with the embedded noun (as in 2 and 3). The test was composed of picture/sentence pairs. The pictures were selected from those used by De Vincenzi (1996) to test subject/object wh-questions in Italian and were partially modified in order to make the image clearer. The pictures always had the same structure: animal X on the left, a pair of animals Y in the middle and animal X on the right. For example, a horse that is chasing two lions and these two lions are chasing another horse (Figure 1) was paired with one of the structures in (1), (2) and (3):

Figure 1: Sample of experimental picture



Hence, correct answers were always on one of the peripheries of each picture. Each structure (OS, OO or OOp) occurred 8 times in the list. In addition to the 24 experimental trials, 12 fillers sentences were introduced, yielding a list of 36 items in total. Filler sentences were used in order to introduce some correct responses corresponding to the character in the central position. We used sentences with either intransitive verbs or transitive verbs with inanimate objects (which are not reversible and therefore easier for children). The same picture appears only once in the experimental list and each picture was paired with only one sentence. The direction of the action in the experimental trial pictures was towards the left in 14 pictures and towards the right in 12 pictures. The position of the target was on the left 14 times, on the right 12 times and in the center 10 times. To control for potential order effects on trials, we created two lists (List1 and List2), in which the presentational order of trials was reversed and each list was presented to half of the participants.

4.3. Procedure

Typically-developing children were tested at their school or kindergarten. A preliminary meeting in the classroom preceded the actual individual testing session. During this familiarization time, we introduced ourselves and our puppet Camilla to the children. Camilla was a little snail who wanted to learn Italian and children were very happy to help her in this purpose. After this preliminary session, hearing children were tested individually in a quiet room. HI children were tested by the speech therapist and the first author during their individual speech therapy sessions.

Each participant was presented with some pictures and was asked to point to the right character after listening to the test sentence. All sentences were recorded by a female voice and to hearing children, they were administered using speakers connected to a laptop. For HI children, the sentences were instead uttered by the experimenter.

The session started with a verb comprehension pre-test, in order to make sure that all children (especially the 3-year-olds) were familiar with the lexical verbs used in the test. Furthermore, in order to make sure that participants knew all the characters, we began each trial by naming them aloud (or encouraging the child to do so). This was done in order to make sure that the child scanned the whole experimental setting, minimize lexical access just before the experimental sentence was uttered and make both RC head candidates salient in the reference context. For example, for sentence (1), the preamble was: *Look, here there's*

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a horse, here there are two lions and here there's another horse. Now, we will listen to a voice saying something and you will show Camilla which is the right character". We began with three practice sentences and then moved to the experimental trials.
Children's responses were annotated on the response form by the experimenter. One point was attributed for each correct response.

5. Results and Data Analysis

Correct response percentages are summarized in the following table:

Table 2: Correct response % for each condition in each group.

	HI	GC	VC	AC	Sentence type Mean
OS	89	100	97	97	96
OO	55	81	83	92	78
OOp	22	45	53	67	47
Group Mean	55	76	78	85	

The main results of the correct response analysis confirm that subject relatives are significantly more accurate than object relatives. As for the two object relatives, OO are significantly more accurate than OOp. As for groups, children with CI are significantly less accurate than each control group whereas no significant difference yields among typically-developing children.
Given the categorical nature of our data, a repeated-measure logistic regression analysis was conducted in order to explore the variation of errors (Non-Target) and correct (Target) responses.
We found significant main effects of Group [$\chi^2(3)= 8.59$, $p=0.035$] and Sentence [$\chi^2(2)= 24.02$, $p<0.001$]. Contrast estimate results show that, from HI to GC, the odd Non-target/Target significantly decreases at a 0.28 rate ($p= 0.01$); this means that errors (rather than correct responses) are 3.6 times more frequent in HI (mean accuracy: 55%) than GC (mean accuracy: 76%). From HI to VC, the odd Non-target/target significantly decreases at a 0.23 rate ($p= 0.007$); this means that errors (rather than correct responses) are 4 times more frequent in HI (mean accuracy: 55%) than VC (mean accuracy: 78%). From HI to AC, the odd Non-target/Target significantly decreases at a 0.12 rate ($p<0.001$); this means that errors (rather than correct responses) are 7 times more frequent in HI (mean accuracy: 55%) than AC (mean accuracy: 85%). No other significant differences were attested among control groups.
As for the main effect of Sentence, contrast estimate results show that from OS to OO, the odd Non-target/Target significantly increases at a 7.3 rate ($p<0.001$); this means that errors (rather than correct responses) are 7 times more frequent in OO (mean accuracy: 78%) than in OS (mean accuracy: 96%). From OS to OOp, the odd Non-target/Target significantly increases at a 34.58 rate ($p<0.001$); this means that errors (rather than correct responses) are 35 times more frequent in OOp (mean accuracy: 47%) than OS (mean accuracy: 96%). From OO to OOp, the odd Non-target/Target significantly increases at a 4.73 rate ($p<0.001$); this means that errors (rather than correct responses) are almost 5 times more frequent in OOp (mean accuracy: 47%) than in OO (mean accuracy: 78%).
In order to assess whether individual pattern of responses to different conditions mirrors our group results, data from each child in the four groups were calculated to derive a pass/fail score. Children were credited to succeed in a particular condition if they produced at least 5 (out of 8) correct responses (Binomial distribution for n=8, setting the chance level at 0.33 ,

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p= .046). The number of subjects in each group who were performing at above chance level is reported in the following table:

Table 3: Number of children performing above chance for each group.

	HI	GC	VC	AC
OS	8	8	8	8
OO	3	6	8	7
OOp	1	4	3	4

Only one HI child scored above chance on OOp whereas 3 children out to 8 scored above chance on OO. It is important to notice that the low performance of HI children is particularly striking if compared to the one of the youngest language control group (GC), whose age ranges from 3;6 and 5;11.
Furthermore, we have checked whether language performance in HI children showed a significant correlation with some of the following factors: (a) age of HA; (b) age of CI; (c) age at the time of testing; (d) duration of CI use; (e) memory span (back and forward). We found a significant positive correlation only between performance on OOp sentences and memory span. Specifically, both correlations between performance on OOp and forward span (r_s = .941, N=8, p<.001) and performance on OOp and backward span (r_s = .9, N=8, p<.004) were significant.

6. Discussion

The performance of the HI children in the comprehension task show a typical gradient of difficulty, namely OS are easier to interpret than OO and OO are easier than OOp.
The asymmetry between subject and object relatives is captured by the Relativized Minimality principle (Rizzi, 1990, 2000, 2004a, Starke, 2001), accounting for the intervention effects involved in sentences containing long-distance dependencies[3]. RM is a principle of locality, occurring in configurations like (6):

(6) …X…Z…Y…

This principle states that a relation between X and Y cannot be established when an intervener, Z, potentially represents a candidate for the local relation.
The RM principle predicts the high percentage of correct responses in subject relative clauses in all groups. In this type of sentences, no Z-type element occurs between the relative head and the gap in embedded subject position:

(7) Indica il cavallo [che < il cavallo > sta inseguendo i leoni]

To account for the asymmetry between subject relatives (OS) and object relatives with preverbal subject (OO) by using RM some further remarks are necessary. RM effects in object relatives with preverbal subject are due to an intervening element occurring between the moved object, namely the RC head, and its gap in the embedded clause.
The requirement for the intervening element to be a potential candidate is specified in terms of "feature identity/sameness", i.e. Z and X have to belong to the same structural type (Rizzi 2000). Recent Cartographic studies, drawing detailed maps of syntactic configuration

[3] We assume Chomsky's (1995) Copy Theory of Traces, on the basis of which traces are full (unpronounced) copies of their antecedents.

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(Cinque 1999, 2002, Rizzi 2004b), help clarify the concept of "feature identity/ sameness". Indeed, each position in clause structure is associated to a set of morphosyntactic features, as (8) shows:

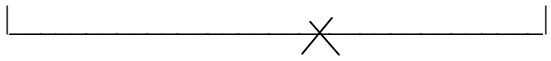
(8) a. *Argumental:* person, gender, number, case
b. *Quantificational: wh-*, Neg, measure, focus, R[4]
c. *Modifiers:* evaluative, epistemic, Neg, frequentative, celerative, manner..
d. *Topic*

In relative clauses, the DP head (and consequently its trace) belongs to the Quantificational class (R), while the embedded DP belongs to the Argumental class (A). A mature system is able to operate a distinction between the two classes and to attribute the correct set of morphosyntactic features to the two DPs. In this case, the chain between the moved DP and its trace is correctly formed:

(9) +R +A +R
Indica il cavallo [che i leoni stanno inseguendo < il cavallo >]

In immature systems, scope-related features and features checked against positions in the periphery of the clause, namely wh/R features, are more likely to get compromised and to remain underspecified due to limited processing capacities (Garraffa & Grillo 2007, Adani 2008, Grillo 2008). Hence, the distinction between Quantificational and Argumental classes is no longer available:

(10) +A +A +A
Indica il cavallo [che i leoni stanno inseguendo < il cavallo >]



The presence of the intervening element and the decay of the R-feature lead to RM blocking chain formation[5].
Although Relativized Minimality suitably explains children's performance OO, it does not immediately capture the low accuracy on OOp. Let us consider the example of an OOp:

(11) Indica il cavallo [che *pro* **stanno** inseguendo **i leoni** <il cavallo>]
Point to the horse that ARE chasing the lions
'Point to the horse that the lions are chasing'

This sentence involves a long chain between the expletive *pro* and the post-verbal DP (Rizzi 1982, 1986). Preverbal *pro* intervenes between the relative head and the post-verbal NP. Hence, on the basis of RM predictions, we would expect the same intervention effects as those provoked by the preverbal embedded subject in OO. The performance on the two types of object relatives would be expected to be similar. On the contrary all groups (especially the HI group) achieved lower scores on OOp than on OO.
The role of different intervening elements in sentences containing long-distance dependencies in Hebrew was investigated by Friedmann et al. (2008), who found out that the presence of arbitrary *pro* does not cause any intervention effect and the sentence is

[4] In this analysis, following Adani (2008), we assume that the relative feature R is also included in the Quantificational class.
[5] Another approach in terms of RM has been proposed by Friedmann et al. (2008) for Hebrew-speaking typically developing children, where the source of intervention is the lexical restriction (+NP).

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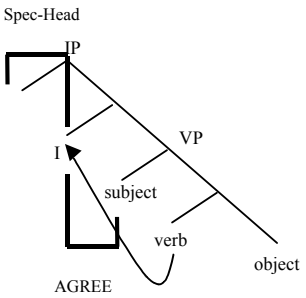
correctly interpreted. It is worth clarifying that *pro* (arbitrary) in Friedmann et al. (2008) and *pro* (expletive) in our experiment are different. Nonetheless, in the same way as arbitrary *pro*, we claim that expletive *pro* in our experimental trials is not problematic per se. Low performance scores might be attributed instead to the presence of a post-verbal subject in the low area of clause structure and to the way agreement between the subject and the verb takes place.

In order to account for this phenomenon, we adopt the minimalist theory of Agreement (Chomsky 1995, 2000, 2001) and following Guasti & Rizzi (2002) and Franck et al. (2006), we assume that agreement is a two-step process, composed of two distinct components, AGREE and Spec-Head checking, subsequent to the movement of the subject (MOVE) from its original position. AGREE is the relationship established between the subject within VP and the relevant functional projection in the upper area of the syntactic tree (IP)[6]. Through this agreement process, the number and person features of the subject are copied onto IP. A second agreement step takes place when the subject moves to the specifier of IP, thus entering a Spec-head configuration with the verb in I and allowing local checking:

(12)



Subject-verb agreement is robust in syntactic configurations in which derivation involves both AGREE and Spec-head checking, because agreement is double-checked. Agreement is instead more fragile in Verb-Subject configurations, in which this relation is established exclusively under AGREE and no local checking in Spec-head takes place.

We found that OO are performed significantly better than OOp (see section 5). In the case of OO, agreement checking occurs both under AGREE and in the Spec-Head configuration (13a). In the case of OOp, there is uniquely long-distance AGREE between the verb in I and the subject in the low portion of the clause structure. This agreement is then not confirmed by Spec/Head checking (13b):

[6] In this paper, we used a simplified representation of clause structure only containing the nodes CP-IP-VP.

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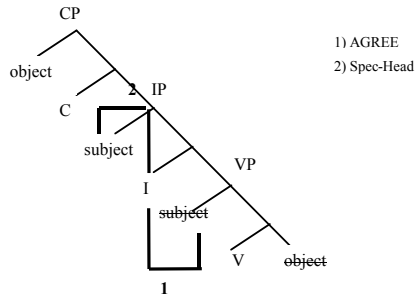
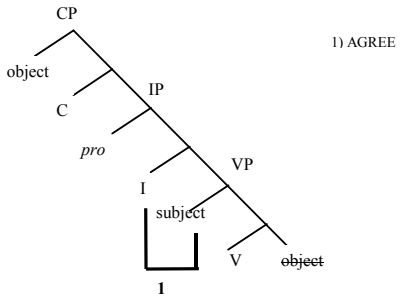
(13) a. OO



b. OOp



Hence, we suggest that difficulties in the interpretation of OOp are related to the fragility of agreement between verbs and post-verbal subjects, based on AGREE only (Guasti and Rizzi, 2002, Frank et al., 2006). We claim that this phenomenon is easily found in all groups in the course of linguistic development, but it has even stronger consequences in presence of immature systems and especially in HI children.

The difficulties of HI children with OOp may be justified by the heavy processing load needed to interpret these structures, since memory is forced to keep plural morphology on the verb in stand by, until the post-verbal subject is encountered. Since the plural morphology on the verb needs to be checked against the subject in post-verbal position, the human parser presumably forces the syntactic reanalysis of OOp, which are interpreted as OS. Interestingly, we found a significant correlation between performance on OOp and both forward and backward digit spans in HI children.

Our results are corroborated by some studies investigating the relationship between sentence comprehension and memory. Typical and atypical acquisition seems to be affected by some developmental constraints. Papagno et al. (2007) found that sentence comprehension depends on syntactic complexity and on the involvement degree of verbal short memory in processing syntactically complex sentences. Correlation between impaired acquisition and limited working memory is also predicted by the Derivational Complexity Metric (Jakubowicz 2005, Jakubowicz & Tuller, 2008), which accounts for the difficulties French-speaking SLI children experience in the computation of sentences containing long-distance dependencies, and for their tendency to avoid long-distance movement.

7. Conclusions

In this paper, we have analysed the performance of HI children in comparison with that of hearing children in the comprehension of subject and object relative clauses. A between-group analysis proved that HI children significantly distinguish from hearing children as far as the comprehension of these structures is concerned. The HI group showed lower accuracy than all control groups. It is evident that the role of accessible linguistic input is fundamental for a child to acquire and develop the grammar of his/her own language and the lack of natural and adequate exposure to a natural language (either oral or sign language) since birth has had strong consequences on these children's language development.

Despite the significant difference in performance between the HI group and the hearing controls, a within-group analysis has revealed that HI children pattern with hearing children as far as the relative clauses gradient of difficulty is concerned. OS are more accurate than OO, and OO are more accurate than OOp. We explained the extra difficulty attested with the two types of object relatives by using an approach that combines recent linguistic proposals in terms of locality and agreement. The analysis of results has demonstrated that

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OS are well mastered by all hearing populations and also for HI children these structures are not problematic. In OO, the increasing load brought in by the intervening element is responsible for the low performance in immature systems. Hence, the consequences of Relativized Minimality are even more evident in children with hearing loss. In OOp, the difficulty is not due to RM. We have claimed that it is due to fragile subject-verb agreement occurring with post-verbal subjects, which is only based on the AGREE relation. This contributes to overload working memory and makes the comprehension of these structures extremely problematic for children using cochlear implants.

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