A DEVELOPMENTAL STUDY OF SUBJECT AND OBJECT RELATIVE CLAUSES IN ITALIAN

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Abstract. In this paper, we aim at exploring the subject/object asymmetry by comparing the production of relative clauses by two groups of Italian children aged 5 and 9 years respectively. By focusing on quite different ages, we aim at providing some additional information about the development of object relative clauses. We will do so by using a different experimental set up than the one used in Belletti and Contemori (2010) and this might be the source of different outcomes and be revealing of some additional factor promoting the production of object relative clauses endowed with peculiar features. In most studies, subject and object relatives include reversible verbs with two animate arguments. Animacy has been claimed to play a role in the comprehension of object relative clauses by children (Arosio *et al.* 2011). In this study, we examine whether it also plays a role in production.

Keywords: animacy, subject/object asymmetry, development, passive, reduced head relative clause.

1. INTRODUCTION

Children's acquisition of relative clauses (RC) has always stirred the interest of language acquisition researchers and linguists. However, the recently growing cross-linguistic literature on the argument has greatly contributed to our understanding of the developmental stages governing their acquisition as well as to testing the consistency of syntactic mechanisms such as Relativized Minimality (Rizzi 1990, 2004) and interference effects and to exploring the possibilities made available to children by UG. A uniform and robust result exhibited by all investigations in this domain is the marked asymmetry observed at all ages in comprehension and production of subject (1) and object RCs (2), with object RCs representing a major challenge and posing greater difficulties such that even adults have been reported to avoid using them in favour of alternative structures (see Brown 1972, de Villiers *et al.* 1994, Adams 1990, for observations from classical

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literature; Guasti and Cardinaletti 2003, Gordon *et al.* 2004, Arosio *et al.* 2009, Utzeri 2007, Belletti and Contemori 2010, Contemori and Garaffa 2010, for some recent literature on the argument).

(1) The woman that raised the child
(2) The child that the woman raised

Under De Vincenzi's (1991) Minimal Chain Principle (MCP), such asymmetry stems from the more complex relation, which is at the basis of an object RC compared to a subject RC. Specifically, the movement of the relative head realized in both constructions would be shorter and more local in subject (3) than in object RCs (4), thus requiring a more costly computation.

(3) The woman [that <the woman> raised the child]
(4) The child [that the woman raised <the child>]

Much subsequent research work (Guasti and Cardinaletti 2003, Utzeri 2007, Friedmann *et al.* 2009, Belletti forthcoming, Arosio *et al.* 2009, Belletti and Contemori 2010, Belletti and Rizzi forthcoming, Contemori and Garaffa 2010, Volpato 2010, Belletti and Chesi 2011) has been carried out providing different theoretical explanations able to account for the cross-linguistic phenomenon thus contributing to a lively debate on the topic.

In this paper, we aim at further exploring the subject/object asymmetry by comparing the production of RCs by two groups of children aged 5 and 9 years respectively. By focusing on quite different ages, we aim at providing some additional information about the development of object RCs. We will do so by using a different experimental set up than the one used, for example, in Belletti and Contemori (2010)[2]. This might be the source of different outcomes and might be revealing of some additional factor promoting the production of object RCs endowed with peculiar features. In most studies, subject and object relatives include reversible verbs with two animate arguments. Animacy has been claimed to play a role in the comprehension of object RCs by children (Arosio *et al.* 2011). In this study, we examine whether it also plays a role in production.

2. THE STUDY

2.1. Participants

One group of 10 5-year-old children (age range from 60 to 71 months, M=65.6, SD=3.8) and one group of 19 9-year-old children (age range from 109 to

[2] See section 4 for more details on the research work carried out by Belletti and Contemori (2010).

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117 months, M=113, SD=2.94) participated in the experiment. Children were tested in their school and parent informed consent was previously obtained. The study was approved by the Ethics committee of the University of Milano-Bicocca according to the standards of the Helsinki Declaration (1964). Parents and educators have been informed of the results of the study during assemblies. Testing was performed by a trained researcher.

2.2. Materials and method

Data were collected through an elicitation task modeled after Hamburger and Crain (1982) and Crain and Thornton (1998). Stories were video-recorded and presented through a portable computer. The task was administered by a researcher who manipulated a blindfolded puppet. Each video-clip had one person acting out a story using two identical characters or objects. These were distinguished by an action they carried out as agents or in which they were participating as patients. At the end of the video-story, the assistant pointed to one of the two characters or objects and asked the child what s/he would say if s/he wanted the puppet to touch one of the two characters or objects. If the child avoided the use of a RC and, for example, said *Touch this one,* the puppet manipulated by the experimenter asked for clearer instructions. In (5), we have a protocol for eliciting a subject RC.

(5) There are two pigs, two sheep and two lions. One pig plays with the lions, the other one wants to play a trick and hides the two sheep. What would you say to the puppet if you wanted it to touch this pig?
Expected production: Touch the pig that hides the sheep.

We elicited 6 subject and 6 object RCs with two animate NPs and 6 subject and 6 object RCs with an animate subject and an inanimate object for a total of 24 RCs. The two animate NPs had different number features, so that only one agreed with the verb and the sentence was not ambiguous. Number on the NPs was counterbalanced across condition. For RCs with an inanimate NP object, this manipulation was not necessary, as the pragmatics was enough to produce non-ambiguous RCs. Responses were transcribed on site on a score sheet and recorded for further check.

2.3. Scoring and error coding

The material was scored by one experimenter and checked by a second one, with disagreement being resolved through discussion. Two main types of correct RCs were found, i.e., of sentences in which the thematic structure was respected. One type consisted in the production of a RC featuring embedding and a second

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type was a reduced RC with no embedding. Among the first type of RCs various modifications were observed, however. Given the object RC in (6), we categorized our responses as in (7).

(6) Il cane che i gatti lavano
The dog that the cats wash

(7)

a. *Target response*: the response in (6).

b. *Reduced head response*: the relative head is reduced and expressed by a demonstrative pronoun ("quello che i gatti lavano", the one that the cats wash). This response is pragmatically adequate and was employed to express both subject and object RCs.

a. *Passive response*: the verb in the RC is passivized and the object RC is turned into a subject RC. This structure was only used when an object RC was elicited (e.g., The dog that is washed by the cats).

b. *Reduced RC response*: the thematic structure is respected, but there is no embedding. This structure was observed only with object RCs ("il cane lavato (dai gatti)", the dog washed (by the cats)).
Target responses also include few sentences in which the object is expressed by a resumptive pronoun in the embedded clause, as in (8), or by repetition of the full relative head, as in (9).

(8) L'asino che i cani lo lavano
the donkey that the dogs wash him

(9) L'asino che i cani lavano l'asino
the donkey that the dogs wash the donkey

Sentence (8) is not grammatical in standard Italian, but is found in substandard varieties and colloquial language, while sentence (9) is not grammatical. We included these two types of resumptive RCs in the target category, as the thematic structure is respected and they display embedding.

Errors also took different shapes, listed below and exemplified with respect to the target structure in (6):

a. *Reverse role response*: the thematic roles are reversed ("il cane che lava i gatti", the dog that washes the cats).

b. *Reverse head response*: the thematic structure is respected, but the head of the RC is not the target one. In this sentence, the restrictive function of the RC is disregarded ("I gatti che lavano il cane", the cats that wash the dog)

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c. *Headless response*: the RC does not have a head and only the embedded clause is produced ("che i gatti lavano", that the cats wash).
d. *Declarative response*: the thematic structure is respected but a declarative sentence is produced.
e. *Other response*: utterances of various types (production of the RC head alone, attempts to produce a RC, fragments, ambiguous RCs) conflated together because they were too few.

2. RESULTS

We obtained 696 responses, of which 562 were correct RCs featuring embedding, 32 were reduced RCs and the remaining 102 were errors. Percentages of correct RCs with embedding, of reduced RCs and errors are reported in Figure 1. We distinguished between subject and object RCs with animate and inanimate objects.

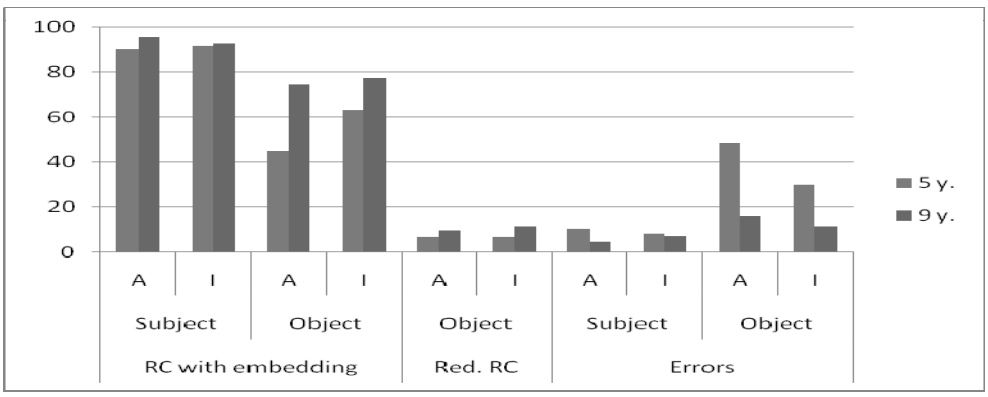


Fig. 1. Percentages of correct RCs and of errors as a function of sentence type and animacy of the object in the two age groups of children.

Consider RCs featuring embedding. Subject RCs are almost at ceiling in both groups, while for object RCs there is an improvement from 5 to 9 years, especially for those with an animate object. Reduced RCs were only produced in the case of object RCs, as they are a form of passive RCs and they are used a bit more by older children. Errors are more frequent with object RCs, especially among younger children. Among embedded RCs, different structures and modification of the target were found, especially with object RCs. Figure 2 reports the percentages of correct RCs divided by type of response for each age group.

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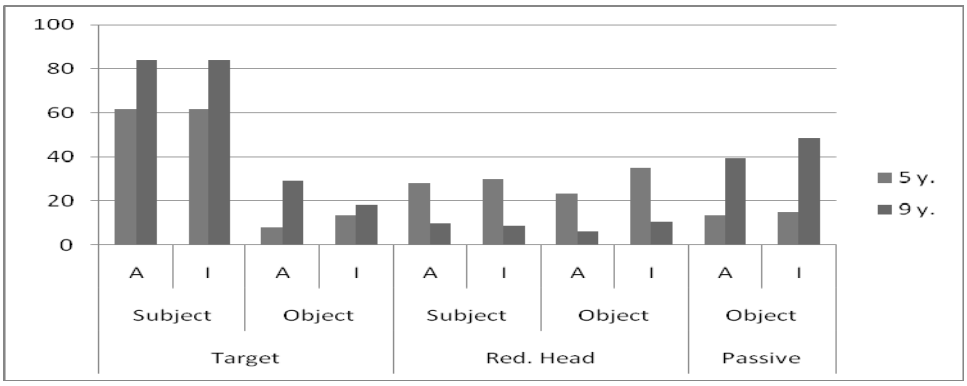


Fig. 2. Percentages of the various structures employed by the children for subject and object RCs, with animate and inanimate objects.

The data in this figure show that children do not produce many target responses or headed RCs in the case of object RCs and this is so for both groups. For subject RCs, target structures are no longer at ceiling, but they are more frequent in 9 than in 5-year-olds. Reduced head RCs are produced more by younger than by older children, both in case of subject and object RCs. Finally, passivization was only used in the case of object RCs, more by older than by younger children. These data suggest that rather than producing the target structure for object RCs, the 5-year-olds produce the reduced head structure and the 9-year-olds the passive structure.

These observations are corroborated by the statistical analyses. Because our dependent variable (correct response) is categorical, we submitted our data to a repeated mixed logit model with group, sentence and animacy, as fixed factors (e.g., Dixon 2008), using the SAS program. Concerning RCs with embedding, we found an effect of sentence ($\chi^2(1)=9.68$, $p<0.01$), with subject RCs being easier than object RCs (Contrast estimate: 0.14 $p<0.01$) and an interaction between sentence and animacy ($\chi^2(1)=4.18$, $p=0.04$). By unpacking this interaction, we found that animacy does not matter in the case of subject RCs, as is apparent in figure 1. Instead, it does in the case of object RCs, but mainly due to the younger group of children. In fact, a difference between object RCs with animate and inanimate head is found only in this group ($\chi^2(1)=4.09$, $p=0.04$), with the former being less accurate than the latter (Contrast estimate: 2.11, $p=0.4$). In the case of reduced RCs no effect was found. Thus, our results confirm the existence of a subject/object asymmetry both at 5 and at 9 years and a modulation by the animacy feature in object RCs. They also show that children of different ages respond differently: animacy plays a role at 5, but no longer at 9 years.

Then, we analyzed the various structures produced by children. For the target structure, we found an effect of sentence ($\chi^2(1)=10.22$, $p<0.01$), with accuracy decreasing from subject to object RCs (Contrast estimate: 0.09, $p<0.01$). For the

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reduced head RCs, we found an effect of group ($\chi^2(1)=3.74$, $p=0.05$), with a decrease in the use of this structure from the younger to the older group (Contrast estimate: 0.16, p=0.01). We also found an effect of sentence ($\chi^2(1)=3.65$, $p=0.05$) with an increase in the use of the structure from subject to object (Contrast estimate: 1.45, p=0.03). Finally, for the passive object RCs, we found en effect of group ($\chi^2(1)$= 18-50, $p<0.001$), with an increase in the use of this structure in older children than in younger children (Contrast estimate 3.78, $p<0.001$). In sum, the major changes from 5 to 9 years reside in the type of structure children use to express object RCs: reduced head at 5 and passive at 9 years. It is interesting to observe that the reduced head structure, although employed also for subject RCs, is significantly more exploited for object RCs.

The 102 errors were distributed across various categories. Most of them consisted in reversing the head (49 examples 4 of which were reverse role, which were conflated in the same category) or in producing declarative clauses (27 examples). Then, we have 18 examples of headless RCs, and 9 errors of other types. Figure 3 reports the distribution of errors across three categories.

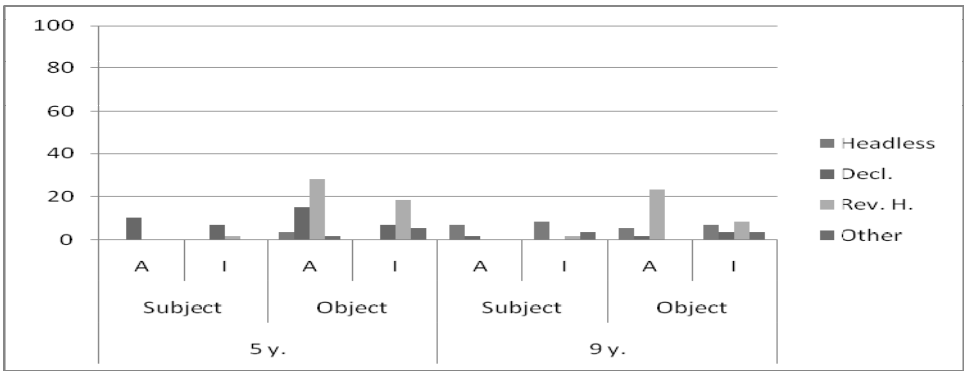


Fig. 3. Percentages of the various types of errors as a function of sentence type and animacy.

As is apparent from Figure 3, the reverse head error is common in both groups, with a dominance when the object RC is targeted. The declarative structure is mostly used by younger children and the headless RC is mostly found in older children. Statistical analysis using the repeated mixed logit model with group, sentence and animacy (of the object) factors confirm that the declarative structure is used more by the 5-year-olds than by the 9-year-olds ($\chi^2(1)=13.18$, $p<0.0015$) with a decrease from 5 to 9 in the use of it (Contrast estimate: 0.15, $p<0.001$). An effect of group is also found in the case of the headless RC ($\chi^2(1)=19.98$, $p<0.001$) with an increase in the use of the structure from 5 to 9 years old (Contrast estimate: 16.0, $p<0.01$). Neither for reverse head RCs nor for other structures any effect was found.

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Finally, we looked at the distribution of the subject in object RCs. As is apparent from figure 4, children use both pre-verbal and post-verbal subjects with little difference between 5 and 9 year olds. No effect was found in the statistical analysis.

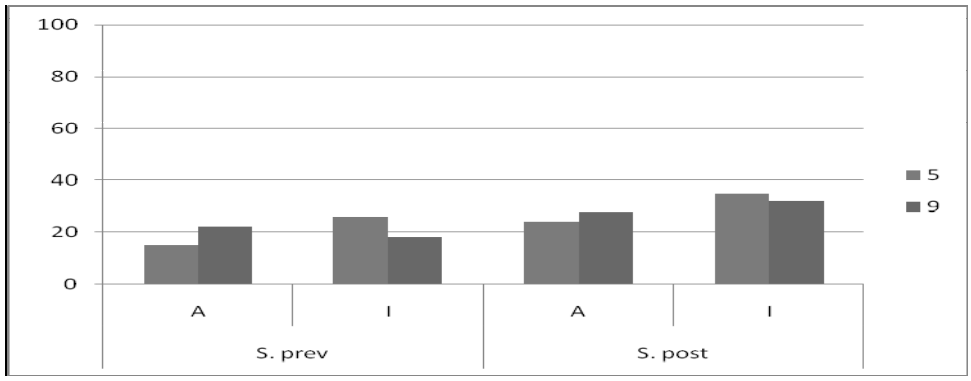


Fig. 4. Percentages of the distribution of subjects in object RCs.

Summarizing, our study has confirmed the higher difficulty faced by children both at 5 and 9 in producing object RCs with respect to subject RCs. From 5 to 9 years, we do not observe a statistically significant improvement in the use of the target structure, but we do observe a change in the structures employed to overcome the challenge posed by object RCs. At 5 years, children reduce the head of the RCs, while at 9 years they use passive object RCs, as do older children in Belletti and Contemori (2010). Animacy plays a role, but only at 5 years, with object RCs with an inanimate head being easier than those with an animate head. The kind of errors also changes from 5 to 9. Children opt more for a declarative sentence at 5 years, while they produced a headless RC at 9 years, i.e., still a RC displaying embedding, but lacking its head.

3. DISCUSSION

The results of this study confirm, in line with the literature, the subject-object asymmetry in the acquisition of RCs. Although children improve in their production of correct object RCs, the asymmetry between subject and object RCs persists as children grow older. An interesting result is the enhancing role played by animacy in the production of object RCs , but only in the younger group. The percentage of correct and target object RCs in 5-year-old children is higher when the subject and the object do not share the +animate feature (and the object is inanimate). Younger children, whose grammatical system is not yet mature, take advantage of the mismatch in animacy feature of the two arguments of the RC in

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the production of the syntactic structure posing more difficulties, namely object RCs. Hence, the greatest improvement in the production of correct and target object RCs concerns the condition in which both arguments of the RC are marked with the +animate feature. As children grow older, they are able to produce more correct object relatives independently of the animacy feature of their arguments. In other words, animacy seems to play a role only at an earlier age in production. This is different from what is found in comprehension. Arosio *et al.* (2011) found that 9-year-old Italian-speaking children are better at comprehending object RCs with an inanimate head than with an animate head. Interestingly, they tested object RCs with a post-verbal subject, i.e. displaying the order VS, which according to Arosio *et al.* (2009) are more difficult to comprehend than object RCs with a pre-verbal subject, i.e. displaying the SV order. The greater difficulties encountered by children facing object RCs with a VS configuration is explained by assuming Guasti and Rizzi's (2002) proposal that local agreement performed under Agree + Move, namely under the Spec-head relation (and resulting in a SV order) is stronger than agreement established only under the Agree relation and resulting in a VS configuration.

In their study on comprehension, Arosio *et al.* (2011) administered headed object RCs to children, but not any simplified structure that children would have produced at their age (as resulting from the present study). The discrepancy between comprehension and production may, therefore, be due to the different demand posed by the two tasks. While in production children are free to decide what strategy to adopt in order to produce a correct RC, comprehension does not allow them to freely operate on the task. Children are usually presented with a standard headed relative construction. Very likely, animacy may play a role both in production (as we found) and in comprehension at the age of 5 (something that has to be tested), however, as production is under children's control, who can decide how to simplify difficult object RCs, animacy does no longer play a role in production at the age of 9, as children are skilled enough to use various and more effective ways to simplify object RCs, regardless of the animacy of the object. On the other hand, animacy still plays a role at the age of 9 in comprehension: as children do not have any control over the structure of the proposed RC, they take advantage of any clue that might help them interpreting correctly the complex structure, especially when the relevant structure is an object RC with a post-verbal subject.

While both age groups resort to target RCs as their preferred answering strategy when a subject RC is targeted, children differ in the strategy adopted when an object RC is targeted: while 5-year-old children mainly produce reduced head RCs, 9-year-old children mainly opt for passive relatives. Following Belletti (forthcoming), we interpret children's difficulty to produce object RCs in terms of interference effects of the subject in the local relation between the relative head position in the CP and the object in its internal-vP merge position, an effect due to the locality priciple known as Relativized Minimality (Rizzi 1990, 2004).

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In a nutshell, the principle states that a local relation between X and Y cannot be established if Z, intervening between the two, shares the same feature as Y, thus acting as a closer candidate for the same relation.

(10) X … Z … Y

By applying the principle to the derivation of object RCs under a raising analysis, the relevant local relation to be established is the one between the relative head position within the CP assumed to be endowed with the +R, +NP features (R expressing the relative feature and NP the DP lexical restriction feature), and the object in its merged position within the vP, a DP with a lexical-NP restriction [DP_{obj}]. The intervener causing the relation to fail is a candidate of the same type as the object, i.e., the intervening subject [DP_{subj}], which like the object, has the feature +NP. Thus, an intervention effect of the subject over the local relation between the relative head position and the object is at play, as represented in the schematic structure in (11).

(11) [$_{CP}$ …[+R, +NP] … [$_{TP}$ [$_{DPsubj}$ D NP] [$_{vP}$ … V [$_{DPobj}$ D NP]]]

The theory therefore predicts that the more structurally dissimilar the subject and the object are, the least intervention effects arise.

Belletti (forthcoming), Belletti and Contemori (2010), Belletti and Rizzi (forthcoming), Belletti and Chesi (2011) extend to production the account in terms of intervention effects and RM formulated for comprehension by Friedmann *et al.* (2009). The central proposal advanced is that locality problems are at play also in the production of object RCs and that passive RCs represent the preferred strategy available to (older) children and to adults to overcome such problems. By applying Collins' (2005) *smuggling* operation to the derivation of passive RCs, Belletti (forthcoming) shows that RM is avoided due to the preliminary movement of the VP chunk containing the verb and the object to a higher position across the subject (so-called *smuggling*). From this position, the object can move toward the relative CP position thus avoiding intervention effects of the subject and violation of RM, as shown in (12).

(12) [CP.. [+R, +NP] … [TP *pro* … [V DP_{obj}] *by*.. [vP… DP_{subj} <[V DP_{obj}]>]

Depending on their age and on the syntactic resources they are endowed with, children solve interference effects differently. Following Collins' (2005) derivation of passives, at the age of 5 the operation of *smuggling* is not acquired yet and children mainly resort to the simplification strategy of reducing the NP-lexical restriction of the object head to avoid a violation of Relativized Minimality and interference effects of the intervening subject.

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At the age of 9 the syntactic operation of *smuggling* is acquired and a more efficient strategy is adopted, namely, the passive relative construction representing the most effective and economic solution to object RC production as: (i) it involves more local steps in the derivation than the single long movement involved in object RCs; (ii) it gets rid of the intervention effects of the pre-verbal lexical subject in the agreement relation between the relative head position and the object through *smuggling* of the VP chunk, although retaining the intended meaning of the sentence, i.e. maintaining the thematic roles of the arguments unmodified; (iii) it involves production of a subject RC instead of an object RC. For all these reasons, once passive constructions are available to their grammar (after the age of 5), children and adults employ them extensively instead of object RCs.

We did not replicate the finding of a preference for object RCs with post-verbal subjects from age 5. Likely, this is due to the method used in this study, which is different from the one employed in Belletti and Contemori (2010). In our study, children had to single out an object from a set. In Belletti and Contemori, they had to choose which child they would have liked to be. The information structure of the sentences elicited with these two methods may differ and the one used by Belletti and Contemori may invite a higher production of object RCs with post-verbal subjects. In turn, this difference suggests that children start to be sensitive to the different pragmatic demands and to use them in production from the age of 5.

Number feature on the verb and the mismatch in number feature between the subject and the object of the object RC (corresponding to the +animate condition of both arguments) does not seem to help children who produce different errors, mainly reverse head errors. By committing this error, children simplify the structure, as they produce a subject RC, but miss the function of the restrictive RC, which consists in restricting the set of objects one wants to focus on. We interpret the error in the production of reverse head relatives as an attempt to avoid interference effects, by respecting the argument structure of the verb at the cost of missing the function of the RC.

Different errors are also produced by the two age groups: declaratives at 5 years and headless RCs at 9 years. This difference indicates that, as children grow older, they use embedding more frequently, i.e., they use more complex structures.

In conclusion, our results are in line with previous findings in showing that headed object RCs are difficult for children to produce, both at 5 and 9 years old. However, the two groups respond differently to challenges posed by object RCs, both in terms of the correct alternative structures produced and in terms of the errors they make, showing a development. When we put our results into a broader perspective, we notice some asymmetry between comprehension and production with regard to the use of the animacy feature; we also fail to observe any preference for locating the subject of the RC in the production of object RCs, likely due to the experimental method adopted in this study.

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