Disentangling the mastery of object relatives in children and adults. Evidence from Italian

CARLA CONTEMORI & ADRIANA BELLETTI
Università di Siena – CISCL
contemori7@unisi.it, belletti@unisi.it

We investigate the production of subject (SR) and object (OR) relative clauses in Italian typically developing children and adults. We confirm the well known asymmetry between SR and OR for children, with the former more accurately produced than the latter. Moreover, we attest the production of resumptives and relatives with passive to avoid OR with gap.
For adults we observe a clear preference for relative clauses with passive as a strategy to avoid ORs.
With a picture selection task, we also test the comprehension of OR with gap, ORs with resumptive clitic pronouns and relative clauses with (different types) of passive. We show that the comprehension of relatives with passive is significantly better than that of ORs (with either gap or resumptive clitics) in children aged 6:5-8:10. Furthermore, while comprehension of relatives with passive increases with age, no age effect is detected in the comprehension of ORs with gap or resumptive clitics.
We explain the persistent difficulty that children experience with ORs both in production and comprehension as a result of intervention effects, as proposed by Friedmann et al (2009). Furthermore, we adopt Belletti (2009)'s approach to passive derivation to account for the increasing use and more accurate comprehension of relatives with passive over ORs in children.

1. Introduction

We report here the results from a number of production and comprehension experiments, which we run with both children and adults in Italian. The experiments tested a notoriously difficult domain in syntax: the domain of Object relatives, in comparison with Subject relatives.

It is a well known and widely described fact that ORs are harder than SRs, in various respects, for both children and adults. For children, ORs are both difficult to comprehend and to produce (Adani, 2010; Adani et al., 2010; Arosio et al., 2006, 2009; Belletti 2009, Belletti & Contemori 2010; Contemori & Garraffa 2010, for recent contributions on Italian; Brown 1972; Correa, 1995; de Villiers et al., 1994; Friedmann et al. 2009; Friedmann & Novogrodsky, 2004; Gordon et al., 2004; Håkansson and Hansson, 2000; McKee et al., 1998; Tavakolian, 1981, for some items of a rich and long lasting literature); for adults, ORs are harder, slower to parse (e.g. De Vincenzi 1991, Warren & Gibson 2002, a.o). We report results from children aged 3:4-8:10. Our main aim

in this paper is of a documentary nature: we want to contribute a rich array of newly collected data from Italian in the domain of (headed) ORs, so that the difficulty of the complex syntactic structure can be disentangled in (most of) its various, often interacting, components.

Two main aspects of our results are particularly significant and should be mentioned at the outset. First, the production of (headed) ORs is typically avoided by both adults and children in Italian, in the different experimental conditions utilized; the kinds of ORs which are most avoided are the standard ones, with a gap in the merge position of the relative head and a lexical subject in the preverbal position. ORs with a gap are often replaced by (clitic) resumptive ORs, thus confirming previous findings from spontaneous production (Guasti & Cardinaletti 2003). However, the privileged way to avoid the production of an OR which has emerged, is by replacing it with a different structure, that we will refer to as a Passive Object Relative (Belletti 2009, 2010); both adults and children tend to transform the elicited (active) object relative into a subject relative in the passive: this strategy is adopted overwhelmingly by adults, and children tend to approach the adults' level of production as they grow older. This result confirms the one from a first pilot study (Utzeri 2007) which used similar elicitation designs, adapted from Novogrodsky and Friedmann (2006). The second significant aspect of our results is a new finding on the comprehension of ORs: the comprehension of Passive Object Relatives of various kinds has been tested for the first time and it has been compared to the comprehension of (active) ORs, both with a gap and with a resumptive (clitic) pronoun. Interestingly, all kinds of Passive Object Relatives tested have been better comprehended than (active) ORs, both with gap and with resumption, by children in the ages (6-8:11), the ages in which they are known to be mature enough to master different passive structures.

2. Study I: Production

The first study in based on data gathered in one experiment carried out in Italian, eliciting subject and object relative clauses.

2.1. Participants

100 Italian-speaking children Italian-speaking children aged 3:4-8:10 participated in the elicited production study. The children came from a public school in Siena and Chianciano Terme, Italy. Children were divided into four age groups. Table 1 shows the number and the age mean of each age group.

28 adults aged 20-30 years old were selected as control participants. The adult group is composed by students randomly selected from the University of Siena.

Table 1. Description of the participants

Age groups	N of participants	Age mean	SD
3:4-3:11	12	3:6	0:3
4-4.11	14	4:5	0:3
5-5:11	17	5:5	0:4
6-6:11	23	6:3	0:3
7-7:11	12	7:5	0:4
8-8:10	22	8:5	0:3

2.2. Material

Relative clause production was tested using two Preference production tasks, adapted from Novogrodsky and Friedmann (2006). The two tasks are described in sections 2.2.1, 2.2.2 and 2.2.3.

2.2.1 Singular head/subject singular. First task

In the first task, the experimenter presented two options and asked the participants to choose one. Ten items elicited SRs and ten elicited ORs. The head of the expected SR is singular and the verb (and object DP) of the relative clause is singular. Similarly, when an OR is elicited, the head of the relative is singular and the subject (and verb) of the relative clause is also singular.

Two conditions for SRs are included: an Object and a Verb change condition. In the Object change condition, the child has to choose the object of the action (1) and in the Verb change condition she has to choose the verb expressing the action (2).

(1) Elicitation of a SR: *Object change condition*

Ci sono due bambini, Un bambino mangia la cioccolata, l'altro bambino mangia il gelato. Quale bambino ti piacerebbe essere? Inizia con: “Vorrei essere il bambino...”

There are two children. One child is eating chocolate, the other child is eating ice cream. Which child would you rather be? Start with ‘‘I would rather be . . .’’

Target sentence: Vorrei essere il bambino che mangia la cioccolata/il gelato

‘‘(I would rather be) the child who is eating chocolate/ice cream’’

(2) Elicitation of a SR: *Verb change condition*

Ci sono due bambini. Un bambino trova una palla, l'altro bambino compra una palla. Quale bambino ti piacerebbe essere? Inizia con: “Vorrei essere il bambino...”

There are two children. One child is finding a ball, the other child is buying a ball. Which child would you rather be? Start with ‘‘I would rather be . . .’’

Target sentence: Vorrei essere il bambino che trova/compra una palla

‘‘(I would rather be) the child who is finding/buying a ball’’

Similarly, the elicitation of ORs includes a Subject and a Verb Change condition. In the first condition, the child has to choose one of the two characters performing an action and in the second condition, one of the two actions performed by the same character[28].

(3) Elicitation of an OR: *Subject change condition*
Ci sono due bambini, il dottore visita un bambino, l'infermiera visita l'altro bambino. Quale bambino ti piacerebbe essere? Inizia con: “Vorrei essere il bambino...”
There are two children. The doctor is examining one child, the nurse is examining the other child. Which child would you rather be? Start with ‘‘I would rather be . . .’’
Target sentence: Vorrei essere il bambino che il dottore/l'infermiera visita
‘‘(I would rather be) the child that the doctor/nurse is examining’’

(4) Elicitation of an OR: *Verb change condition*
Ci sono due bambini, l'elefante solleva un bambino e l'elefante bagna l'altro bambino. Quale bambino ti piacerebbe essere? Inizia con: “Vorrei essere il bambino...”
There are two children. The elephant is lifting one child, the elephant is spraying the other child. Which child would you rather be? Start with ‘‘I would rather be...”
Target sentence: Vorrei essere il bambino che l'elefante solleva/bagna
‘‘(I would rather be) the child that the elephant is lifting/spraying’’

2.2.2 The ambiguity issue: Singular head/subject and verb plural
In the first task, the match in number agreement feature between the relative head and the subject (and the agreeing verb) of the relative clause may lead to ambiguity in some cases, with the relative clause interpretable either as a SR or an OR. In Examples (5)-(7), we show the kind of ambiguous relatives produced by the children. In (5), the postverbal noun phrase can be interpreted as the direct object in the SR reading or as the postverbal subject in the OR interpretation. In (6) and (7), the lack of a DP may be interpreted either as a non overt object (SR, (6)) or as a null subject within the relative clause (OR, (7) with a lexical copy of the relative head (7)).

Target sentence: Vorrei essere il bambino che l'elefante solleva/bagna
‘‘(I would rather be) the child that the elephant is lifting/spraying’’
Sentence produced:
(5) Che bagna l'elefante

[28] The analysis of children's productions showed that there is no difference between SRs produced by children in the object change condition and those produced in the verb change condition. Similarly, no difference emerges between the subject and verb change condition for ORs. Therefore, in the results section, we will not analyze data classified per condition.

‘‘(The child) that is spraying the elephant’’ (M.F. 5:7)

(6) Quello che bagna

‘‘The one that is spraying’’ (A.M. 5:7)

(7) Vorrei essere il bambino che bagna il bambino

‘‘I would rather be the child that is spraying the child” (M.C. 4:9)

To avoid the issue of ambiguity arising from the match in number agreement feature, six additional items eliciting ORs were added to task 1. The aim of those items was to elicit *unambiguous* ORs with a plural subject and a plural verb within the relative clause. Three items belong to the Subject change condition (8) and three to the Verb change condition (9):

(8) Elicitation of an OR with singular head and subject (and verb) of the relative plural: *Subject change condition*

Ci sono due bambini, i vicini pettinano un bambino e i nonni pettinano l'altro bambino. Quale bambino ti piacerebbe essere? Inizia con: “Vorrei essere il bambino...”

There are two children. The neighbors are combing one child, the grandparents are combing the other child. Which child would you rather be? Start with ‘‘I would rather be . . .’’

Target sentence: Vorrei essere il bambino che i vicini/nonni pettinano

‘‘(I would rather be) the child that the neighbors/grandparents are combing”

(9) Elicitation of an OR with singular head and subject (and verb) of the relative plural: *Verb change condition*

Ci sono due bambini, gli amici cercano un bambino e gli amici trovano l'altro bambino. Quale bambino ti piacerebbe essere? Inizia con: “Vorrei essere il bambino...”

There are two children. The friends are looking for one child, the friends are finding the other child. Which child would you rather be? Start with ‘‘I would rather be . . .’’

Target sentence: Vorrei essere il bambino che gli amici cercano/trovano

‘‘(I would rather be) the child that the friends are looking for/are finding’’

2.2.3 The ambiguity issue: Plural head /subject singular. Second task

The structure of the second task resembles that of the first one with the other possible mismatch condition avoiding ambiguity implemented, where the relative head is plural and the subject of the relative clause is singular. 10 SRs and 10 ORs where elicited with a plural head and a singular subject (and agreeing verb) within the RC.

Similarly to the previous task, we have two conditions for SR (Object and a Verb change condition) and two conditions for OR (Subject and Verb change condition). An example of the elicitation of SR an OR with Plural head /subject singular is given in (10)-(13).

(10) Elicitation of a SR: *Object change condition*
Ci sono due gruppi di bambini. Dei bambini mangiano la cioccolata, dei bambini mangiano il gelato. Con quali bambini ti piacerebbe stare? Inizia con: "Vorrei stare con i bambini..."
"There are two groups of children. Some children eat chocolate, the other children eat ice cream. With which children would you rather stay? Start with ''I would rather stay with . . .''
Target sentence: Vorrei stare con i bambini che mangiano la cioccolata/il gelato
''(I would rather stay with) the children who are eating chocolate/ice cream''

(11) Elicitation of a SR: *Verb change condition*
Ci sono due gruppi di bambini. Dei bambini trovano una palla, dei bambini comprano una palla. Con quali bambini ti piacerebbe stare? Inizia con: "Vorrei stare con i bambini..."
"There are two groups of children. Some find a ball, the other children buy a ball. With which children would you rather stay? Start with ''I would rather stay with . . .''
Target sentence: Vorrei stare con i bambini che trovano/comprano una palla
''(I would rather stay with) the children who are finding/buying a ball"

(12) Elicitation of a OR: *Subject change condition*
Ci sono due gruppi di bambini. Il vicino pettina i bambini e il nonno pettina gli altri bambini. Con quali bambini ti piacerebbe stare? Inizia con: "Vorrei stare con i bambini..."
There are two groups of children. The neighbor combs some children, the grandpa combs the other children. With which children would you rather stay? Start with ''I would rather stay with the children . . .''
Target sentence: Vorrei stare con i bambini che il vicino/nonno pettina
''(I would rather stay with) the children that the neighbor/grandpa is combing"

(13) Elicitation of a OR: *Verb change condition*
Ci sono due gruppi di bambini. Il nonno cerca i bambini e il nonno trova gli altri bambini. Con quali bambini ti piacerebbe stare? Inizia con: "Vorrei stare con i bambini..."
"There are two groups of children. The grandpa looks for the children and the grandpa finds the other children. With which children would you rather stay? Start with ''I would rather stay with the children . . .''
Target sentence: (Vorrei stare con i bambini) che il nonno cerca/trova
''(I would rather stay with) the children that the grandpa is looking for/finding"

Results of the three number conditions (Singular head /subject singular, Singular head /subject plural, Plural head /subject singular) will be presented separately. We will sometimes focus on the head plural/subject singular battery

only, as it gives clearer results, but we will also present material from the singular head/subject plural battery and use it comparatively.

2.3 Coding

The experiment was administered to children in individual sessions in a separate, quiet room in their school. All the responses of the participants were recorded and transcribed after each session.

Non-intelligible utterances were discarded. Sometimes, when the children produced a declarative sentence instead of a relative clause, the experimenter invited the child to describe the situation again, beginning with ‘‘I would rather be /I would rather stay with….’’. If a relative clause was finally produced, that was the response taken into account.

3. Results

In this section we present the main results of the productions tasks. In Section 3.1 and 3.2 we will describe results for SRs and ORs, respectively. In section 3.2.1 we will analyze children's productions when an ORs is expected and in Section 3.2.2 we will describe the type of ORs produced, focusing on resumptive ORs and on the presence/position of the subject within the relative clause (section 3.2.3). Finally, in section 3.2.4 we will discuss the production of passive ORs.

3.1 Subject relative clauses

In Table 2 we present the percentages of responses given when a SR is expected in the Singular head/subject singular and in the Plural head /subject singular tasks, respectively.

Table 2. Total amount of SRs produced by children in the Singular Head/subject singular and Plural Head/subject singular conditions out of the total of relatives expected.

	Singular Head/subject singular		Plural Head/subject singular	
		%		%
3:4-3:11	97/120	80.8	71/120	59.1
4-4.11	130/140	92.8	125/140	89.2
5-5:11	141/160	88.1	146/170	85.9
6-6:11	222/230	96.5	205/230	89.1
7-7:11	102/120	85	107/120	89.1
8-8:10	184/200	92	214/220	97.2

The following sentences are examples of children's productions of SRs.

Singular head/subject singular battery:
Target answer: (Vorrei essere) il bambino che fotografa l'uomo/la donna
''(I would rather be) the child who is photographing a man/woman''
(14) Il bambino che fotografa un uomo
''The child who is photographing a man'' (M.C. 5:2)

Plural Head/subject singular battery:
Target answer: (Vorrei stare con) i bambini che fotografano l'uomo/la donna
''(I would rather stay with) the children who are photographing a man/woman''
(15) I bambini che fotografano un uomo
''The children who are photographing a man'' (B.F. 6:0)

In the next section we will discuss the issue of ambiguity and agreement in ORs. In section 3.2.1 results of elicitation of ORs are presented, and the number of SRs produced by children is compared to that of ORs.

3.2 Object relative clauses
As discussed in Belletti & Contemori (2010), ORs are frequently avoided by children in all the three number agreement conditions. Moreover, some ORs involve agreement changes within the relative clause. Children also produce a number of unambiguous ORs.
The ambiguity issue arises in the matching condition of the Singular Head/subject (and verb) singular battery. In this task, part of the relatives produced by the children when an OR is expected are ambiguous relative clauses, that could be interpreted as either ORs or as SRs[29]
See examples (5)-(7) of ambiguous relatives produced by the children in the number matching condition, repeated here as (16), (17) and (18).

Target answer: Vorrei essere il bambino che l'elefante solleva/bagna
''(I would rather be) the child that the elephant is lifting/spraying''
Answers produced:
(16) Che bagna l'elefante
''(The child) that is spraying the elephant'' (M.F. 5:7)
(17) Quello che bagna

[29] The percentages of ambiguous RC produced by the children (out of the ORs expected) is the following:
3:4-3:11: 43.3%
4-4.11: 40%
5-5:11: 34.3%
6-6:11: 39.5%
7-7:11: 36.6%
8-8:10: 26%

‘‘That one that is spraying’’ (A.M. 5:7)

(18) Vorrei essere il bambino che bagna il bambino

‘‘I would rather be the child that is spraying the child” (M.C. 4:9)

As for the production of agreement changes they took place in the Plural Head /subject (and verb) singular condition and in the Singular Head /subject (and verb) plural condition. In these tasks, when an OR is expected children sometimes changed the number agreement on the verb of the relative clause from singular to plural (19)-(20) and from plural to singular (21)-(22). The changes occur in relatives where the subject-DP is either postverbal, as in (19) and (21), or null, as in (20) and (22).

Plural Head /Subject (and verb) Singular: the verb of the RC is changed into plural

Target sentence: “(Vorrei stare con i bambini) che (il nonno/il maestro) fotografa (il nonno/il maestro)”

‘‘(I would rather stay with) the children that (the grandpa/the teacher) is photographing (the grandpa/the teacher)”

(19) Sentence produced: “Coi bambini che fotografano il nonno”

‘‘With the children that are photographing the grandpa’’ (D.P. 3:6)

Target sentence: “(Vorrei stare con i bambini) che (l’elefante) bagna/solleva (l’elefante)”

‘‘(I would rather stay with) the children that (the elephant) is spraying/lifting up (the elephant)”

(20) Sentence produced: “Che bagnano”

“(The children) that are spraying”

(T.V. 3:10)

Singular Head /Subject (and verb) plural: the verb of the RC is changed into singular

Target sentence: “Il bambino che (i genitori) fotografano/disegnano (i genitori)”

‘‘The child that (the parents) are photographing/drawing (the parents)’’

(21) Sentence produced: “Quello che disegna i genitori”

‘‘The child that is photographing the parents’’

(D.S. 5:1)

(22) Sentence produced: “Che fotografa”

‘‘(The child) That is photographing’’ (S.I. 5:2)

There are no verbal agreement changes when the subject is preverbal. The only exception to this tendency is one sentence produced in the whole corpus reproduced in (23). However, in this case a resumptive plural clitic is also present[30].

[30] In Belletti & Contemori (2010), we suggest to interpret (at least part of) the errors in number agreement as the manifestation of agreement attraction from the relative head. In (23) attraction may be induced by the clitic.

Plural Head /Subject (and verb) Singular: the verb of the RC is changed into plural
Target sentence: "(Vorrei stare) Con i bambini che il papà/vicino pettina"
"(I would rather stay) with the children that the father/neighbor is combing'
(23) Sentence produced: "Che il papà li pettinano"
"That the father are combing them" (F.D. 4:11)

In the present paper we do not examine ambiguous ORs and ORs with agreement changes, on which we refer to the discussion in Belletti & Contemori (2010). We will focus here exclusively on the unambiguous ORs produced by the children.
First of all, we present the quantitative analysis of the unambiguous responses. Then, we will look at the data from a qualitative point of view, focusing on the types of unambiguous ORs produced by children at different age stages.

3.2.1 Quantitative analysis of the structures produced when an OR is expected
In Table 3 we present the total amount of unambiguous ORs produced by children over the number of relatives expected. Data of the three elicitation tasks and age groups are presented separately.

Table 3. **Percentages of unambiguous ORs produced in the three tasks (over the number of ORs expected)**

	Singular Head/subject singular		Singular Head/subject plural		Plural Head/subject singular	
		%		%		%
3:4-3:11	44/120	36.6	19/72	26.4	47/120	39.2
4-4.11	66/140	47.1	46/84	54.7	73/140	52.1
5-5:11	53/160	33.1	43/96	44.7	83/170	48.8
6-6:11	59/230	25.6	54/138	39.1	151/230	65.6
7-7:11	48/120	40	49/72	68	97/120	80.8
8-8:10	44/200	22	48/120	40	68/220	30.9

Unambiguous ORs produced in the the Singular Head/subject singular are ORs with a preverbal subject and a gap (24) and ORs with preverbal subject where the relative head is resumed by either a clitic pronoun (25) or a full lexical copy (26). Moreover, we counted as unambiguous ORs, those where the head of the relative is resumed by a clitic within the relative clause and the subject is post-verbal (27) and those where the head of the relative is resumed by a first person clitic within the relative clause and the subject may be overt (28) or not.

Target Sentence: (Vorrei essere) la bambina che il vicino/papà pettina
"(I would rather be) the girl that the neighbor/father is combing"

Sentence produced:

(24) OR with preverbal subject and gap: Che il babbo pettina
"(The child) that the father is combing"

(G.G. 5;10)
Target Sentence: Vorrei essere il bambino che l'elefante solleva/bagna
''(I would rather be) the child that the elephant is lifting/spraying''
Sentences produced:
(25) OR with resumptive clitic and preverbal subject: Che l'elefante la sta alzando
''(The child) that that the elephant is lifting her''

(B.L.5;11)
(26) OR with resumptive DP: Che l'elefante bagna il bambino
''(The child) that that the elephant is lifting the child''
(G.G. 5;10)
(27) OR with resumptive clitic and postverbal subject: Che la riprende l'elefante
''(The child) that that the elephant is getting her''
(F.D. 4;11)
Target Sentence: Vorrei essere il bambino che il dottore/l'infermiera visita
''(I would rather be) the child that the doctor/nurse is examining''
Sentence produced:
(28) OR with resumptive clitic "mi" and overt subject: Che mi cura l'infermiera

"(The child) that the nurse is examining me"
(G.D. 6;1)

In the Singular Head/subject plural and Plural Head/subject singular battery we counted as correct ORs all those relatives with target number agreement within the relative clause. As number agreement disambiguates correct ORs, all productions with target number agreement within the relative clause were included in the results shown in Table 3, independently of the presence/position of the subject and of resumptive elements within the relative clause. (29) is an example of a correct OR with gap with Singular Head and subject plural, (30) is an example of a correct OR with gap with Plural Head and subject singular within the relative clause.

Plural Head /Subject (and verb) Singular battery
Target Sentence: Vorrei stare con i bambini che il dottore/l'infermiera visita
''(I would rather stay with) the children that the doctor is examining''
(29) Sentence produced: "Che il dottore visita"
"(The children) that the doctor is examining" (F.B. 6;0)

Singular Head /Subject (and verb) plural battery
Target Sentence: "Il bambino che (i genitori) fotografano/disegnano (i genitori)"
''The child that (the parents) are photographing/drawing (the parents)''

(30) Sentence produced: “La bambina che disegnano i genitori”
‘‘The child that the parents are drawing’’
(S.C. 6;3)

We analyze the total amount of SRs and unambiguous ORs produced by the children with a General Linear Model.
As mentioned above, in the Plural head /subject singular and Singular head /subject plural tasks we considered all the ORs with target agreement within the relative clause, independently of the presence/position of the subject and the presence of resumptive elements[31]. In contrast, in the Singular head /subject singular task we excluded all those relatives with a postverbal/null subject within the relative clause, unless a resumptive clitic was present[32], even though some of them might be correct target ORs. In the lack of a clear way of determining the amount of correct ORs in the Singular head /subject singular task, we have decided for a more constrained way of counting. Therefore, for the Singular head /subject singular task we often have a lower number of ORs compared to the two mismatch tasks (see table 3), which might represent an underestimation of the actual correct sentences produced by the children.
Because of the different criteria used to select unambiguous ORs, we run two separate statistical analyzes, one which compares SRs and ORs across the three tasks and one which only takes into consideration the two mismatch tasks.

In the first analysis, we obtain a main effect of Sentence type, Year group and Task. Moreover, the three variables positively correlate (Sentence type and Year group: $p<.001$, Sentence type and Task: $p<.001$, Year group and Task: $p<.003$; Sentence type, Task and Year group: $p<.004$). The *Bonferroni posthoc test* shows that the overall amount of SRs is significantly higher than the ORs produced in both match and mismatch conditions, ($p<.001$).
For the reason mentioned above, we will not discuss in detail the other main effects and correlations, as the number of ORs in the Match condition might not represent a real estimation of the correct ORs produced by children. The correlation between Sentence type and Year group just seen in the analysis interestingly shows that age affects accuracy in production of the sentences under analysis.
In the second analysis, we compare production of SRs and ORs in the two mismatch batteries (Plural head /subject singular, Singular head /subject plural). The General Linear Model shows again a main effect of Sentence type and Year group, and a positive correlation between the two independent variables ($p<.001$). As far as age group is concerned, *Bonferroni posthoc test* shows that 3 years old children significantly differ from the other age groups (4, 6 and 7 y.o.: $p<.001$; 5 y.o.: $p<.003$; 8 y.o.: $p<.005$). Moreover, 8 years old children produce

[31] Recall that mismatch in number agreement between the head of the relative and the subject (and verb) of the relative clause are sufficient to disambiguate between a SR and an OR interpretation in Italian relative clauses.

[32] Recall that in the Singular head /subject singular task we considered as unambiguous ORs with resumptive clitics those relatives with 3rd or 1st person clitic pronouns and a postverbal subject and those with 1st person clitic pronoun and null subject within the relative clause.

a significantly lower number of object relative clauses than 7 years old children ($p<.011$).

To sum up, the analysis reveals that the production of both SRs and ORs has a considerable improvement from age 3 to 4 and remains quite constant until the age of 7. At the age of 8, even though SRs are fully mastered, the number of ORs highly decreases. As we will see in paragraph 3.2.4, ORs at age 8 are mostly replaced by the use of passive ORs.
In the next section we will focus on the qualitative analysis of unambiguous ORs and in particular on resumptive ORs.

3.2.2 Resumptive ORs
We are now taking into account the different kinds of unambiguous ORs produced by the children in the three tasks[33].
Table 4 shows the percentages of OR with gap and resumptive ORs out of the total amount of unambiguous ORs produced by children. The data are presented by type of task and age group.

Table 4. Percentages of unambiguous ORs with gap and resumptive ORs in the three tasks (over the total amount of unambiguous ORs produced)

	Singular Head/subject singular				Singular Head/subject plural				Plural Head/subject singular			
	OR gap	%	res. OR	%	OR gap	%	res. OR	%	OR gap	%	res. OR	%
3:4-3:11	10/44	23	34/44	77	5/19	26	14/19	74	31/47	66	16/47	34
4-4.11	4/66	6	62/66	94	15/46	33	31/46	67	25/73	34	48/73	66
5-5:11	1/53	2	52/53	98	9/43	21	34/43	79	32/83	39	51/83	61
6-6:11	4/59	7	55/59	93	17/54	31	37/54	69	68/151	45	83/151	55
7-7:11	9/48	19	39/48	81	12/49	24	37/49	76	53//97	55	44/97	45
8-8:10	9/44	20	35/44	80	28/48	58	20/48	42	46/68	68	22/68	32

As Table 4 clearly shows, children often produce resumptive ORs; the relative head is resumed either by a clitic pronoun or by a full lexical DP (corresponding to the relative head)[34].
Although resumption is not a standard relativization strategy in Italian, it is relatively common at a colloquial/substandard level, with a clitic as the resumptive element. Note that resumptive relatives are attested cross

[33] Recall that we consider unambiguous ORs of the Singular Head/subject (and verb) singular number matching condition and correct ORs. Moreover, we consider those ORs with correct number agreement within the relative clause of the Singular Head/subject (and verb) plural and Plural Head/subject (and verb) singular tasks.

[34] In some cases the lexical DP is the exact copy of the relative head; but this is not always the case. Children sometime use DP which are only partly similar to the relative head (e.g. head: il bambino/ DP "quell'altro bambino" …)

linguistically both in child and adult languages. For this reason, we counted ORs with a resumptive pronoun as correct ORs target responses. We also counted as correct target OR unambiguous ORs with a resumptive full DP (see section 3.2.1 for examples).
In Table 4 the percentage of ORs with gap is generally lower than the number of OR with resumption in most of age groups' productions. However, it is important to underline the fact that in the Singular Head/subject singular task the number of ORs with gap is much lower than in the two mismatch batteries. As pointed out in Section 3.2.1., in the Singular head /subject singular task we excluded all those ORs with gap with a postverbal/null subject within the relative clause, even though some of them might be correct target ORs (Table 3). Therefore, for the Singular head /subject singular task we have a lower number of ORs with gap compared to the two mismatch tasks, as only those with a preverbal subject within the relative clause were taken into account.
Table 5 shows in detail the distribution of the resumptive ORs in the three tasks, with respect of the element resuming the head of the relative clause: a clitic pronoun or a full DP.

Table 5. Percentages of unambiguous ORs with resumption in the three tasks (over the total amount of resumptive ORs produced).

	Singular Head/subject singular		Singular Head/subject plural		Plural Head/subject singular	
	% res DP	% res. clitic	% res DP	% res. clitic	% res DP	% res. clitic
3:4-3:11	32	68	43	57	50	50
4-4.11	42	58	55	45	31	69
5-5:11	38	62	50	50	51	49
6-6:11	25	75	35	65	40	60
7-7:11	49	51	67	33	43	57
8-8:10	34	66	50	50	54.5	45.5

Examples of an ORs with a resumptive clitic and an OR with resumptive DP are given in (31) and (32) respectively.

Target Sentence: Vorrei essere il bambino che l'elefante solleva/bagna
‘‘(I would rather be) the child that the elephant is lifting/spraying’’
Sentences produced:
(31) OR with resumptive clitic: Che l’elefante la sta alzando
‘‘(The child) that that the elephant is lifting her’’

(B.L.5;11)

(32) OR with resumptive DP: Che l’elefante bagna il bambino

‘‘(The child) that that the elephant is spraying the child’’
(G.G. 5;10)

In example (33) the resumptive pronoun used by the children is a third person clitic pronoun. However, in some cases, children also produced ORs with first person clitic pronoun “mi” (33). The 1st person clitic pronoun might indicate a direct identification of the child with the character of the action.

Target Sentence: Vorrei essere il bambino che il dottore/l'infermiera visita
‘‘(I would rather be) the child that the doctor/nurse is examining’’
Sentence produced:
(33) OR with resumptive “mi”: Che mi cura l’infermiera
“(The child) that the nurse is examining me”
(G.D. 6;1)

As Table 5 shows, from age 4 the number of clitic pronouns is generally higher than that of resumptive DPs. This phenomenon is mostly visible in the Singular head/subject (and verb) singular and Plural head/subject (and verb) singular tasks. Despite the prevalence of clitics over full DPs, the latter are still produced by the older age groups (7-8 years old).[35]
As one may expect the resumptive DP strategy to decrease to a higher extent in 8 and 7 years old children ORs since it is not an available strategy in the adult language – not even at the substandard level -, we also compared the results of the three batteries (Table 5) with a different type of elicitation task (Table 6). The aim was to find out whether the presence of resumptive DPs in older groups might be related to the type of task administered to the children.
In the Preference production tasks (see section 3 for a detailed description) the child is asked to decide between two children/groups of children, which are mentioned several times by the experimenter in each trial of the task (two times as object of the actions and one time in the question, e.g. The doctor examines one child, the nurse examines the other child. Which child would you rather be? Start with ‘‘I would rather be . . .’’). So, it could be that in the Preference production tasks the way in which the task is presented to the child, repeating the object of the action, might influence the production of a higher number of full DPs in the object position of the relative clause.
The fourth task, adapted from Novogrodsky and Friedmann (2006), aims at eliciting SR and OR as description of pictures. Pairs of pictures, each featuring two figures, were presented. One picture showed one of the figures carrying out an action on the other, while the second picture showed the same figures with the roles reversed. The experimenter described the two scenes using simple sentences, then asked the child a question about one of the figures in order to elicit either a SR (34) or a OR (35):

In these pictures there are two elephants. In one picture the elephant is spraying the lion and in the other picture the lion is spraying the elephant. Which elephant is this (pointing to the first picture)? Start with ‘‘This is the elephant....’’

[35] Not all DPs counted as resumptive are identical full copies of the head of the relative clause, as noted in the preceding footnote.

(34) Target SR: L'elefante che bagna il leone
‘‘The elephant that is spraying the lion’’
And now which elephant is this (pointing to the second picture)? Start with ‘‘This is the elephant..’’

(35) Target OR: L'elefante che il leone bagna
‘‘The elephant that the lion is spraying’’

Table 6 shows the results of ORs with resumptive clitics and resumptive DPs in the Picture Description Task. Only a subset of the age groups (e.g. older children from 5 to 8 years of age) is presented in the table.

Table 6. Percentages of resumptive ORs produced by older children in the Picture description task.

	5-5:11	6-6:11	7-7:11	8-8:11
OR with resumptive DP	15	23	45	13
OR with resumptive clitic	85	77	55	87

The hypothesis that the type of task might influence the production of OR with resumptive DPs is partly confirmed by the results in Table 6. In the Picture description task, the difference between ORs with resumptive clitic and ORs with resumptive DPs is higher than in the Preference tasks from age 5. Moreover, resumptive DPs in the older group (8 years old) are virtually disappearing.
Notice also incidentally that the 7 years old group still produces a not-negligible amount of ORs with resumptive DPs. This might be a side effect of the lower number of subjects that participated in this group, compared to the 6 and 8 years old group. This is also the group which made a rather limited use of Passive Object Relatives, as shown in 3.2.4. The results of this group thus look peculiar in two (related) respects, which suggests that this age group should be further tested in the future.

In the next section we turn to a further qualitative aspect of the results and consider the produced ORs according to the pre- or post-verbal position of the subject within the relative clause.

3.2.3 The position/presence of the subject in ORs with resumptive clitics and ORs with gap

In this section we analyze ORs with gap and resumptive ORs with respect to the presence/position of the subject within the relative clause.

ORs with resumptive DPs always have a preverbal or null subject within the relative clause (see example (38)). In contrast, ORs with resumptive clitic might either have a preverbal or a postverbal or a null[36] subject within the relative clause.

In the analysis, we are taking into account only the Plural head /subject singular and the Singular head /subject plural tasks as they provide a clearer picture of the distribution of the subject in ORs, especially in ORs with gap. Results of the two batteries have been collapsed, as they show the same trend.

We remind the reader that in the Singular head /subject singular task we excluded ORs with gap that either have a postverbal or null subject, as they have an ambiguous interpretation (see section 3.2). For this reason, we are likely to have underestimated the number of ORs with gap in this task, as (possibly) some of them could actually be correct ORs with postverbal/null subject within the relative clause. We are not going to present data of the Singular head /subject singular task in this section, focusing on the two mismatch conditions only.

Table 7 and Table 8 show the distribution of the subject within the relative clause in unambiguous ORs with gap and in clitic resumptive ORs, respectively. The percentages are calculated over the total amount unambiguous ORs produced by each age group.

Table 7. Distribution of the subject in ORs with gap (Plural head /subject singular and the Singular head /subject plural tasks)

	OR with gap Preverbal subject		OR with gap Postverbal subject		OR with gap Null subject	
		%		%		%
3:4-3:11	9/66	13.6	21/66	31.8	6/66	9
4-4:11	3/119	2.5	30/119	25.2	7/119	5.8
5-5:11	2/126	1.5	27/126	21.4	12/126	9.5
6-6:11	30/205	14.6	47/205	22.9	8/205	3.9
7-7:11	32/146	21.9	24/146	16.4	9/146	6.1
8-8:10	36/116	31	30/116	25.8	8/116	6.8

Table 8. Distribution of the subject in ORs with resumptive clitics (Plural head /subject singular and the Singular head /subject plural tasks)

	ORs with resumptive clitics	ORs with resumptive clitics	ORs with resumptive clitics

[36] As mentioned in section 3.2.2., resumptive ORs with null subject within the relative clause that we counted as correct are those with a 1st person clitic pronoun. 3rd person clitic pronouns and null subjects give rise to ambiguity between SR and OR interpretation.

	Preverbal subject		Postverbal subj		Null subject	
		%		%		%
3:4-3:11	11/66	16.6	4/66	6	1/66	1.5
4-4.11	39/119	32.7	8/119	6.7	-	-
5-5:11	7/126	5.5	18/126	14.2	17/126	13.4
6-6:11	25/205	19.8	42/205	20.4	7/205	3.4
7-7:11	32/146	21.9	3/146	2	2/146	1.3
8-8:10	12/116	10.3	7/116	6	1/116	0.8

The productions in (36)-(41) are examples of ORs with gap and either a preverbal (36), postverbal (37) or null subject (38) within the relative clause. Examples (39)-(41) show resumptive ORs with either a preverbal (39), postverbal (40) or null subject (41) within the relative clause.

Target sentence: "(Vorrei stare) con i bambini che la zia fotografa/disegna"
"(I would rather stay) with the children that the aunt is photographing/drawing"
OR with gap and preverbal subject:
(36) Sentence produced: "Che la zia fotografa"
''(The child) That the aunt is photographing"
(L.P. 3:11)

Target sentence: "(Vorrei stare) con i bambini che il papà pettina/abbraccia"
"(I would rather stay) with the children that the father is combing/hugging"
OR with gap and postverbal subject:
(37) Sentence produced: "Che abbraccia il papà"
''(The child) That the father is hugging"
(G.T. 5:09)
OR with gap and null subject:
(38) Sentence produced: "Che abbraccia"
''(The child) That (the father) is hugging"
(E.L. 5:11)

Target sentence: Vorrei stare coi bambini che il dottore/l'infermiera visita
''(I would rather stay with) the children that the doctor/nurse is examining"
OR with resumptive clitic and preverbal subject:
(39) Sentence produced: "Che l'infermiera li cura"
''(The children) that that the nurse is examining them''
(L.P.4:5)
OR with resumptive clitic and postverbal subject:

(40) Sentence produced: Che li visita il dottore
‘‘(The children) that that the doctor is examining them’’
(E.V.4:10)

Target sentence: “(Vorrei stare) con i bambini che il papà pettina/abbraccia”
OR with resumptive clitic and null subject:
(41) Sentence produced: “Che li abbraccia”
‘‘(The children) that (the father) is hugging them”
(B.L. 5:11)

In the next section, we will analyze the emergence of passive and its use as a way to avoid ORs in children. In section 3.2.5, the use of passive in children will be compared to the results collected with adult speakers of Italian.

3.2.4 Passive Object Relatives: children
As discussed in Belletti & Contemori (2010), children around the age of 5 start producing passive object relatives (see also Utzeri 2007 and Belletti 2009 for similar results on school-age children).

The OR is transformed into a SR by means of different kinds of passive, as illustrated by the productions in (42)-(44). Tables 9 shows in detail the percentages of the different kinds of passive produced by children in the three tasks. Data of the three tasks are collapsed, as they show a similar trend. As is clear from the results, the use of passive to avoid an OR increases with age.

Target Sentence: (Vorrei essere) il bambino che la mamma/ragazza abbraccia
“(I would rather be) the child that the mother/girl is hugging”
(42) “Si fa”/Causative passive: Quello che si fa abbraccia' dalla mamma

“The one that is hugged by the mother” (E.D. 6;2)
(43) Copular passive: Quello che viene abbracciato dalla mamma
“The one that is hugged by the mother” (B.G. 6;3)

Target Sentence: (Vorrei essere) il bambino che il maestro/nonno fotografa
“(I would rather be) the child that the teacher/grandpa photographs”

(44) Reduced passive: Fotografato dal nonno
“(The child) Photographed by the grandpa” (F.C. 4;11)

Table 9. Percentages of passive ORs produced by children in all the three task: Plural Head/subject (and verb) singular; Singular Head/subject (and verb) singular; Singular Head/subject (and verb) plural

	3:4-3:11	4-4:11	5-5:11	6-6:11	7-7:11	8-8:11
OR “Si fa passive”	-	1.9	4.6	8.5	0.3	8.8
OR Copular passive	-	-	5.1	3.5	0.3	34.6

OR Reduced passive	-	-	1.6	1	5.1	2.9

Causative passive (labeled “si fa” passive) appears to be the first kind of passive to emerge in children’s productions, around the age of 4 and 5. At age 5, we can observe that children also start producing sentences with copular passive. Reduced passive, on the other hand, seems to develop somewhat later, around 6 years of age.

Passive is consistently used to avoid ORs at the age of 8, with copular passive preferred over the other kinds of passive. It is interesting to note that 8 years old children still produce causative passive to a certain extent. We will come back to this result in the next section, when comparing children to adult controls.

It is important to notice that the use of passive is not uniform through the age groups. In Table 10, we present the total number of children taking part into the study and the number of children in each group who produced at least one passive OR in one of the three tasks.

Table 10. Number of participants who adopt passive ORs in each age group (Preference Tasks)

	Total Number of participants	Participants producing passive ORs
3:4-3:11	12	-
4-4:11	14	2
5-5:11	17	5
6-6:11	23	8
7-7:11	12	2
8-8:10	22	16

As clearly emerges from Tables 9 and 10, passive emerges gradually and seems to be adopted consistently by a small subset of children in each age group. The number of children adopting passive ORs, relatively to the size of the age group, remains rather constant until the age of 8. In 8 years old children it drastically increases and more than half of the participants use it productively.
Results of Table 10 are confirmed by productions collected with an additional elicitation test. In Table 11, we present the percentages of passive ORs produced by the same children with a Picture Description Task (see section 4.2.2 for a description of the task).

Table 11. Total amount of passive ORs produced by children in the Picture Description Task.

	3:4-3:11	4-4:11	5-5:11	6-6:11	7-7:11	8-8:10
OR "Si fa" passive	0.4	3.2	16.8	20.4	8.75	40.4
OR Copular passive		-	4	6.9	10.8	31.5
OR Reduced passive		-		0.4	7.5	0.9

Data in Table 11, replicate the results observed in the Preference Task (Table 9). By comparing results in Table 11 and 9, it clearly emerges that children produce a higher amount of passive ORs in the Picture description Task (Table 11) than in the Preference Tasks (Table 9).
Furthermore, looking at the number of children that adopt passive to avoid ORs in the Picture Description Task (Table 12) in comparison to the Preference Tasks (Table 10), we observe that an increased number of participants produce passive ORs, in particular from age 5 to 8. Therefore, use of a different kind of task reveals that a higher number of children has acquired passive as a productive way to avoid ORs.

Table 12. Number of participants who adopt passive ORs in each age group (Picture Description Tasks)

	Total Number of participants	Participants producing passive ORs
3:4-3:11	12	1
4-4:11	14	2
5-5:11	17	8
6-6:11	23	14
7-7:11	12	5
8-8:10	22	19

In the following section we present data collected with adult speakers of Italian. We will then compare children's and adults production of ORs.

3.2.5 Passive Object Relatives: adults

The results discussed in the previous section are particularly interesting if we compare them with the adults' responses presented in Table 13. The table sums up the amount of SRs and ORs produced by the Italian adult speakers.

10 Italian adult speakers participated in the Plural Head/subject (and verb) singular task and 18 participated in the Singular head/subject (and verb) singular or plural task. The adult control groups are aged 18-28.

Table 13. Percentages of relatives produced by adults.

	Plural Head/subject (and verb) singular	Singular head/subject (and verb) singular	Singular head/subject (and verb) plural
SR	97	99.5	-
OR	10	11.6	7.4

Unlike children, adults produce ORs only in very few cases. The very low production of ORs strongly contrasts with their ceiling level performance on SRs, as illustrated in Table 13.

Instead of ORs, Italian adults prefer to produce passive ORs, as shown in Table 14[37].

Table 14. Percentages of Passive ORs produced by adults in the three tasks

	Plural Head/subject (and verb) singular	Singular head/subject (and verb) singular	Singular head/subject (and verb) plural
"Si fa" passive	-	-	-
Copular passive	67	40	33
Reduced passive	21	47	59

[37] The remaining productions when a SR or an ORs is expected are equally relatives with either Change of Character or change of verb, declarative clauses and other productions.

The production of passive ORs emerging around the age of 5 (Table 9-11) becomes the most widespread strategy to avoid ORs in the adult age (Table 14). Note that, whereas children make extensive use of causative "si fa" passive in their passive ORs, this kind of passive is never used by adult controls. Indeed, adults prefer to use copular and reduced passive to a comparable extent[38].

In the following sections, we will move to a different study which investigates the comprehension of passive ORs in Italian children aged 6-8:10.

4. Study II: Comprehension

In Section 3.2.2 we pointed out that, among the unambiguous ORs produced, children of all age groups often use resumptive ORs. In section 3.2.3 we observed that children from the age of 5 start producing passive ORs when an active ORs are expected and their production gradually increases with age. Therefore, elicited production clearly indicates the presence of resumptive and passive ORs at different stages of children's grammar.
Given the findings of Study I on production, we decided to further test the two structures in comprehension. In particular, in study II we investigate the comprehension of ORs with gap, ORs with resumptive clitics and (different types of) passive ORs in Italian children from 6:5 to 8:10 years old.
The main reason of choosing this age range is that children from the age of 6 are known to comprehend passive in Italian (as shown by Manetti (2008), MA Thesis, University of Siena).

4.1 Participants

3 Italian-speaking children Italian aged 6:5-8:10 participated in the comprehension study. The children, who came from a public school in Chianciano Terme (SI), were divided into three age groups. They also took part in the elicitation study.

Table 15 shows the number and the age mean of each age group.

Table 15. Description of the participants

Age groups	N of participants	Age mean	SD
6:5-6:11	19	6:4	0:4
7-7:11	12	7:5	0:4
8-8:10	22	8:5	0:3

4.2 Material

[38] Notice that in the Plural Head/subject (and verb) singular adults have a preference in the use of copular passive over reduced passive. In the Singular head/subject (and verb) singular or plural, however, this tendency is reversed. If the data of the two tasks are collapsed, the amount of ORs with copular passive produced by adults is comparable to the amount of reduced passive.

Comprehension of ORs and passive ORs was tested with a binary picture comprehension task adapted from Friedmann and Novogrodsky (2004).
The aim of the test is to observe whether (and from which age) children comprehend those relatives that they appear to master in production (e.g., different types of passive ORs and ORs with resumptive clitic).
We included in the task items testing ORs with a gap and a preverbal subject within the relative clause, non-standard ORs with resumptive clitic pronoun (see section 3.2.4 for a discussion of children's production of resumptive ORs) and three types of passive ORs (see section 3.2.6).
Each subject was presented with two pictures and was asked to choose the one which matched the sentence read by the experimenter. The first of each pair of pictures showed a figure carrying out an action on another figure, while the second picture showed the same figures with the roles reversed. Comprehension of 60 sentences was tested: 12 right-branching ORs (45), 12 right-branching ORs with resumptive clitic (46), and 36 right-branching passive ORs. Passive ORs include 3 different types of verbal passive: 12 items with a causative passive (47), 12 items with a copular passive (48), 12 items with a reduced passive (49).

(45) Mostrami la bambina che la giraffa lava
"Show me the child that the giraffe is washing"
(46) Mostrami la bambina che la giraffa *la* lava
"Show me the child that the giraffe is washing her"
(47) Mostrami la bambina che si fa lavare dalla giraffa
"Show me the child that is washed by the giraffe"
(48) Mostrami la bambina che è lavata dalla giraffa
"Show me the child that is washed by the giraffe"
(49) Mostrami la bambina lavata dalla giraffa
"Show me the child washed by the giraffe"

All the sentences were semantically reversible and the noun phrases were always animate. They were presented in random order.

4.5 Coding
The experiment was administered to children in individual sessions in a separate, quiet room in their school. All the responses of the participants were transcribed during each session. The child heard the sentence and was asked to point to the picture matching the sentence. No time limit was set and, when the child requested, the experimenter repeated the sentence.

5. Results
Table 16 shows the total amount of correct responses scored by the three age groups in the comprehension task. The row scores and the correspondent percentages are grouped by age group and type of condition.

Table 16. Number and Percentages of relatives correctly comprehended by children of the three age groups

	6-6:11		7-7:11		8-8:10	
		%		%		%
OR with gap	143/228	62.7	92/144	63.9	170/264	64.4
OR with resumptive clitic	151/228	66.2	100/144	69.4	203/264	76.9
OR "Si fa passive"	189/228	82.9	126/144	87.5	250/264	94.7
OR Copular passive	173/228	75.9	122/144	84.7	243/264	92
OR Reduced passive	176/228	77.2	123/144	85.4	247/264	93.6

The data have been analyzed with a General Linear Model. The analysis revealed a main affect of sentence type ($p<.004$) and a main effect of age group ($p<.001$), but no interaction between the two variables.
Bonferroni posthoc test shows that 6 and the 7 years old differ significantly from the 8 year old group ($p<.001$ and $p<.021$, respectively). On the other hand, the difference between 7 and 6 years old group is not significant. Moreover, the effect of sentence type emerges when comparing ORs with both gap and resumptive clitic to passive ORs of all types (($p<.001$). No statistical significance is found between the comprehension of ORs with gap and ORs with resumptive clitic and between the comprehensions of the three types of passive ORs.
Even though no interaction between age and sentence type emerged from the first analysis, a developmental pattern can be observed in the row data (Table 16), at least as far as passive ORs are concerned. For this reason, we run two General Linear Model analyses, separating OR with gap and ORs resumptive clitic from passive ORs, to verify whether this intuition could apply to our data.
If we take into account ORs with gap and ORs with clitic pronoun, the General Linear Model shows that there is a main effect of sentence type ($p<.035$), while age does not represent a significant factor and does not interact with sentence type. Therefore, analyzing the two types of sentences separately, we can observe that OR with gap and ORs with clitic pronoun are comprehended better than ORs with gap; however, this difference does not seem to be affected by age.
Conversely, when we compare the three types of passive ORs only, we don't find an effect of sentence type, but we observe a main effect of age ($p<.001$). *Bonferroni posthoc* test shows that 8 years old perform significantly better than 6 and 7 years old children ($p<.001$ and $p<.015$, respectively) and the 7 years old group is significantly better than the 6 years children ($p<.044$). Therefore, while children understand equally well the three kinds of passive ORs a clear developmental pattern emerges, with children performing better with all kinds of verbal passive with age.

6. Discussion

We concentrate our discussion on the two most significant aspects of our results: first, the overwhelming preference for Passive Object Relatives in the adults' productions when an OR is elicited, and the fact that children approach the adults' behavior as they grow older; second the fact that Passive Object

Relatives are also preferred in comprehension by children, at the age in which they can master passive. We also briefly comment on other aspects, in particular the fact that resumptive ORs are rather frequently produced by children. We start the discussion from this last point.

6.1 Resumptive ORs

As shown in Table 4, children of all ages often produce resumptive relatives in place of the standard ORs which, in Italian, have a gap in the merge position of the relative head. When resumption is realized through a clitic pronoun, the strategy used by children corresponds to a colloquial/informal, slightly substandard, way of forming an OR in current standard Italian. Beside this kind of resumptive object relatives, children of all ages, also frequently adopt a form of resumption which is not possible in current standard Italian, not even at the substandard level: they use a lexical DP corresponding to the relative head. As shown in Table 5, resumption through a clitic or through a full DP is quite balanced in our results from the three batteries of the Preference task. Resumption through a clitic, is instead clearly much preferred to DP resumption in the Picture description task. From the comparison of the results in the two tasks, we tend to conclude that the relatively significant presence of DP resumption in the Preference task is in fact mainly an artifact of the design. As noted, DP resumption is extremely low in the older children of our groups in the Picture description task. Given the task related shape of the data on DP resumption, we do not make any explicit hypothesis on what exactly the phenomenon could correspond to in the children's productions. In part, it could be a real form of resumption, a repetition of the head of the relative clause, a possibility that some languages do allow as a grammatical option. As has been occasionally but repeatedly noted in the literature, this is a strategy that especially young children tend to adopt in their first productions of ORs (see Guasti & Cardinaletti 2003, Utzeri 2007, Labelle 1990, 1996, Pérez-Leroux 1995, De Viliers et al. 1994, a.o.). In this respect, the developmental path of the Picture description task looks coherent with previous results, from different languages. However, as it is not always the case that the resumptive DP in the relative clause realizes an exact copy of the relative head (footnote 7), one cannot be sure of what kind of computation children are actually implementing in cases of this sort. Hence, considering both the task related shape of the results pointed out above, and the heterogeneous form of the resumptive DP just noted, we do not attempt at any speculation in regard to this type of resumptive object relatives.

The situation is different with clitic resumption, a possible option in colloquial/informal Italian, as noted[39]. In this case, we can simply assume that children are using a relativization strategy which is available in the language, possibly implemented with a doubling derivation, with movement of the relative head and stranding of the clitic inside the relative clause (Belletti (2009a, chapter 11, for discussion). Given the colloquial, informal level of clitic resumptive object relatives, it is no surprise that children adopt this strategy to a not negligible extent.

[39] And also often the only option of forming an object relative clause in various dialects of Italy.

Our results also suggest a possible correlation between use of resumption and position of the subject in the relative clause, as there is a tendency to have more resumptive Ors when the subject is preverbal (with the exception of the oldest group of children). As we will discuss in some detail in the following section, presence of a preverbal subject creates a disturbing intervention configuration in the computation of an OR (Friedmann, Belletti, Rizzi 2009, Belletti 2009, 2010; Belletti & Contemori 2010). To the extent that stranding part of the relative DP head in the merge position in the relative clause can be considered a somewhat facilitating strategy (e.g. Utzeri 2007, for discussion along these lines), it is tempting to interpret the described tendency as ultimately due to intervention: an easier relativization strategy is mostly adopted in the hardest configuration. A complementary aspect of the same tendency is also indicated by preference for a gap OR in cases in which the subject is located post-verbally. However, as this aspect of the results, considering the correlation between gap/resumptive ORs and position of the subject (Tables 7, 8), only suggests a tendency and not a robust finding, we do not strongly endorse the view that relativizing through clitic resumption necessarily qualifies as a facilitating strategy and leave the suggestion at this speculative level, pending further evidence from further research. See 6.3. for further relevant considerations.

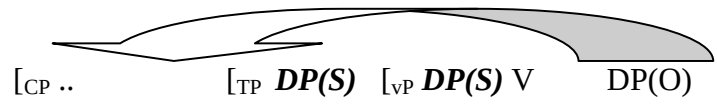
6.2 Passive Object Relatives in production

The production of Passive Object Relatives in both the adopted designs presented in this article, is much more than a tendency, it is a strong result for adults, and a very clear developmental path for children. In essence, adults produce very few target object relatives and produce instead around 90% of Passive Object Relatives in all tasks; children tend to approach the adults' performance, as is clearly shown by the significant number of Passive Object Relatives in the older children. As passive is known to develop around age 5-6 (in Italian) it is no surprise that it may be utilized to a greater extent by the children of the oldest group. However, children of all ages in the Picture description task and children from age 4 on in the Preference task do produce few Passive Object Relatives, indicating that their attempt at avoiding the production of an (active) object relative in a way that the intended meaning may be preserved - as it happens in the case of a Passive Object Relative - starts out from very early on.

Following Belletti (2009, 2010), Belletti & Contemori (2010), we interpret the emergence of use of passive in the relative clause when an object relative is elicited as a most suitable way to avoid the disturbing intervention of the preverbal subject, which inevitably occurs in the establishment of the dependency between the relative head and the gap in its merge object position within the relative clause. Presence of the intervening (lexical) subject would be problematic for locality, expressed through a featural approach to the Relativized Minimality principle (Rizzi (1990, 2004)), along the lines proposed in Friedmann, Belletti, Rizzi (2009). The intervention situation is illustrated in (50)[40]:

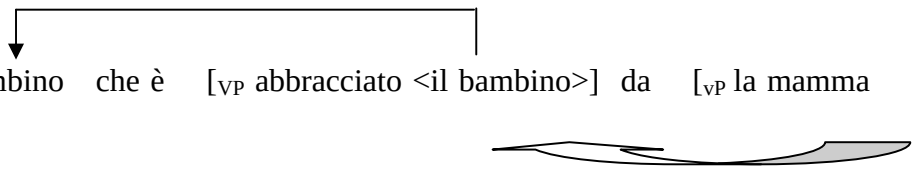
[40] In (50) the intervening subject is indicated as DP(S) and the dependency of the relative head in CP and its merge position in the relative clause is indicated in terms of movement, along the raising analysis of relative clauses (Bianchi (1999, 2002). DP(S) is indicated both in the vP

(50)



Assuming a derivation of passive in the terms proposed in Collins (2005), intervention by the subject is altogether avoided in passive sentences. Given the assumed derivation, a crucial step is involved in passive: the operation which takes a chunk of the verb phrase containing (at least) the verb and the direct object, and moves it across the vP-internal subject DP, *smuggling* in Collins's terminology. Movement of this chunk of the verb phrase has the direct consequence that it allows movement of the object into the relative head position in the CP, without any violation of locality, as there is no intervention of the subject from the moved /smuggled position (Belletti & Rizzi (2010) for further discussion). The relevant steps of this assumed derivation are illustrated in (51):

(51)



Locality is then the fundamental principled reason which leads to passive in the production of object relatives across an intervening preverbal lexical subject, as would be the case in all the elicited object relatives of the tasks reported in this work.

6.3 The Comprehension of Passive Object Relatives

The coherence of the results of our comprehension experiment with children, with those found in production is especially interesting and neat. We decided to test children from age 6 on, as we wanted to be reasonably sure that the children were at an age in which they could master passive fairly well. And indeed they did understand all three types of Passive Object Relatives tested. Comprehension increases with age, and it becomes almost perfect in the age range 8-8:10; it is, however, already very good at age 6, as Table 16 clearly indicates. The interesting aspect of our results here is the comparison between the almost perfect comprehension of Passive Object Relatives with the comprehension of (active) object relatives both with a gap and with a resumptive clitic, which is much lower, for all age groups, and it remains fairly constant and does not increase with age. We interpret this result as a clear indication that, once again, the hardest structures are those where intervention by the subject is at stake.[41] The passive structures, in which, according to the

internal merge position and in the high subject position in TP: in either position the subject would intervene in the establishment of the relevant dependency

[41] Recall that the subject was akways preverbal in the sentences tested.

analysis illustrated in 6.2, no intervention occurs, are those which are best understood.

As we saw, in the production experiments the overwhelmingly adopted way to realize an object relative clause is through the production of a Passive Object Relative; in comprehension, where the structures to process are given by the experimenter, the clear preference for Passive Object Relatives over active object relatives is indicated by the significantly better understanding of the former compared to the latter, with no significant difference as to whether the object relative clause contains a gap or is realized with a resumptive clitic. This latter aspect of the results may suggest that clitic resumption is a way to realize an object relative which probably shares significant properties with relativization with a gap. This is indeed expected under the analysis involving movement + stranding of the clitic pronoun mentioned in 6.1. This analysis makes one expect that, other things being equal, an object relative with a gap and an object relative with a resumptive (clitic) pronoun should have an essentially comparable status. This is what the comprehension results strongly suggest. If this conclusion is correct, the impression that clitic resumption may represent a facilitating strategy in production (6.1), may turn out to
be mainly epiphenomenal. We leave the development of this hypothesis to future further research.

7. Conclusion

The main result presented here is twofold: first, the fact that Passive Object Relatives have been confirmed to be the most privileged strategy to avoid the production of an object relative in the assumed experimental conditions, adopted by both adults and children, and that this strategy is developmentally preferred, as older children tend to adopt it more and more; second, the fact that a parallel result is found in comprehension, with the comprehension of different kinds of Passive Object Relatives giving consistently significantly better results than the comprehension of (active) object relatives, both with a gap and with a resumptive clitic pronoun. We have proposed, following previous work, that Passive Object Relatives may acquire this privileged status as they represent a most suitable way, possibly an optimal way (Belletti 2010), to avoid the intervention of the lexical subject in the establishment of the dependency between the relative head and its merge position as the object of the relative clause. This is so, since the *smuggling* derivation of passive *à la* Collins (2005), primarily yields a computation in which no intervention arises in the movement of the object both into the subject position of the clause and into the position of the relative head.

A featural approach to Relativized Minimality, along the lines proposed in Starke (2001), Rizzi (2004), leads one to expect that other ways may modulate intervention in the computation of an object relative clause. In particular, a mismatch in features between the relative head and the intervening lexical subject may ameliorate in principle the processing of an object relative clause. In the number mismatch conditions created in the production tasks designed in this work, this has not turned out to be the case, as Passive Object Relatives have been the preferred production selected in all conditions anyway, by both adults and (older) children. It can be speculated that this overwhelming preference for Passive Object Relatives could be a partly task related effect,

ultimately linked to the fact that both the relative head and the subject of the relative clause are animate in the adopted experimental conditions[42]. Current work in progress(Belletti & Chesi in prep) on both a corpus analysis and on a version of the Preference Production task controlling for the animacy feature in the mismatch condition, is addressing precisely this issue; preliminary results indicate that the issue is likely to be set in precisely these terms, with the production of object relatives increasing for adults in the animacy mismatch condition. Indeed, number mismatch has been shown to facilitate the comprehension of an object relative clause with an intervening lexical subject in various experimental conditions (Adani 2010, Adani et al. 2010, Arosio et al. 2009). Gender mismatch as well has been shown to facilitate the comprehension of object relative clauses, with interesting contrasting results between languages (e.g. Hebrew vs Italian, Belletti, Friedmann, Brunato, Rizzi submitted). Hence, it is to be expected that mismatch in further relevant morphosyntactic features may facilitate parsing to various extents. The main contribution of the results presented in this work has been to show that passive in relatives may have a clear effect in enhancing both the production and the comprehension of object relative clauses, with Passive Object Relatives much preferred over other possible structures, including resumptive object relative clauses, and often overwhelmingly so.

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Appendix – graphs

Figure 1. Total amount of SR and OR produced by children in the three batteries of the Preference task (data of the three batteries and data of the age groups have been collapsed).

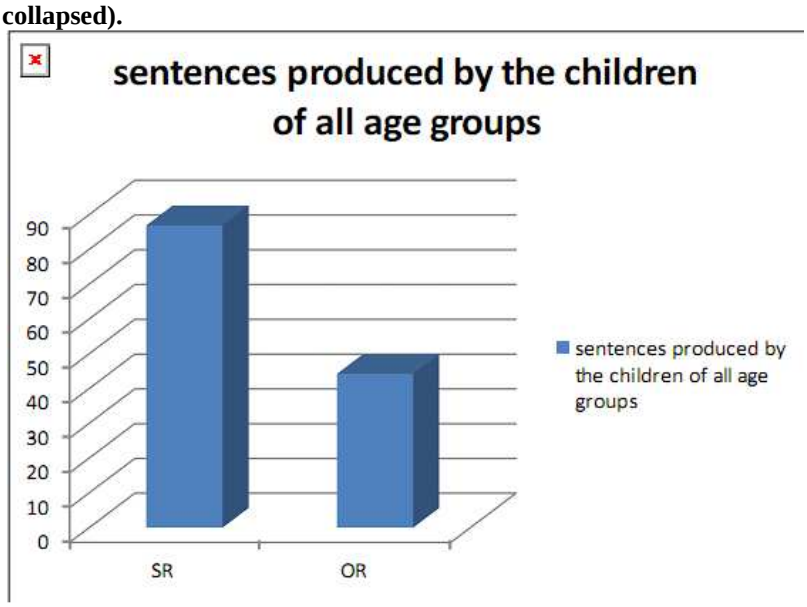

Figure 2. Total amount of unambiguous ORs with gap and resumptive ORs over the total amount of unambiguous ORs produced (data of the three tasks have been collapsed)

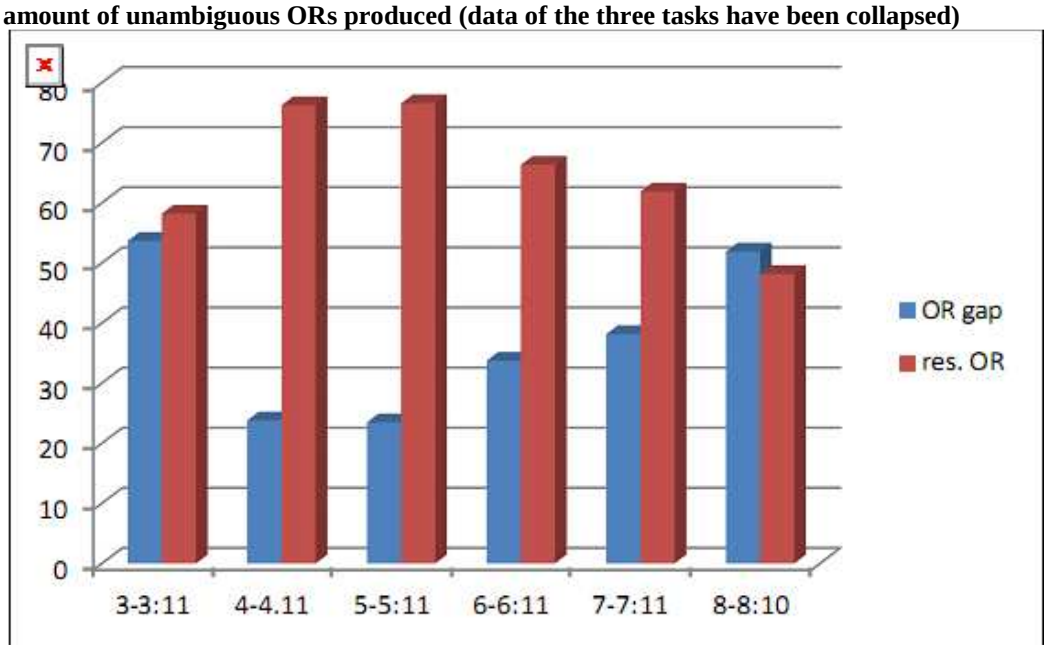

Figure 3. Percentages of Passive Object Relatives produced by children in all the three batteries of the Preference task: Plural Head/subject (and verb) singular; Singular Head/subject (and verb) singular; Singular Head/subject (and verb) plural

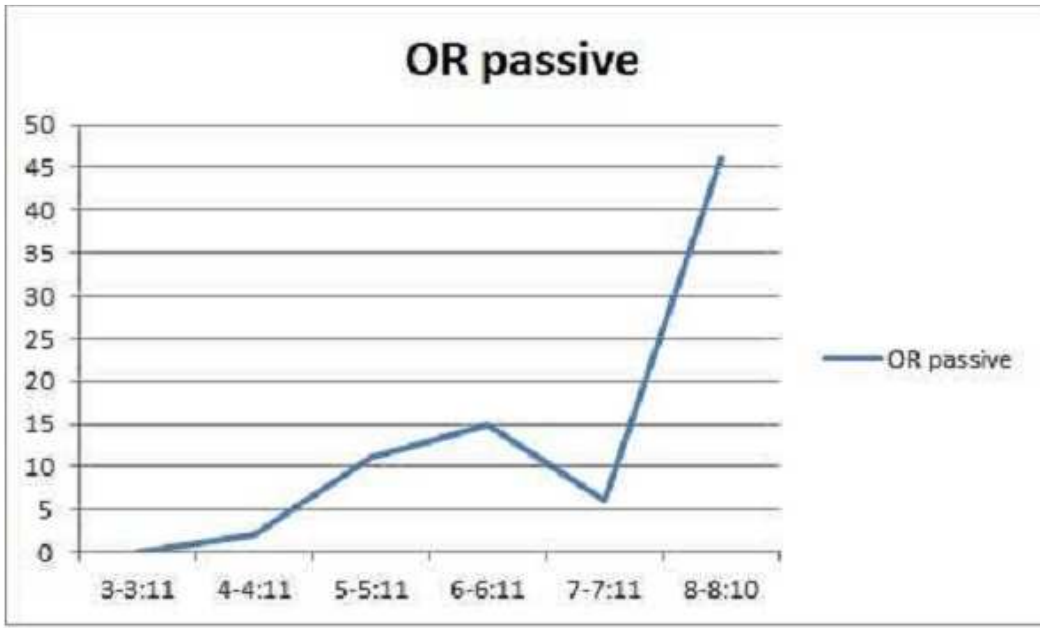

Figure 4. Total amount of SR and OR produced by adults (data of the three batteries of the Preference task collapsed)

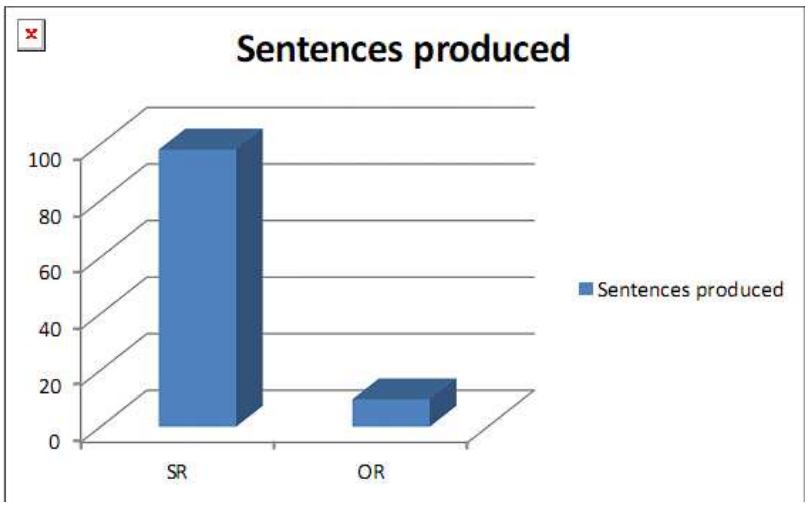

Figure 5. Total amount of adults' productions when an OR is expected (data of the three batteries of the Preference task collapsed)