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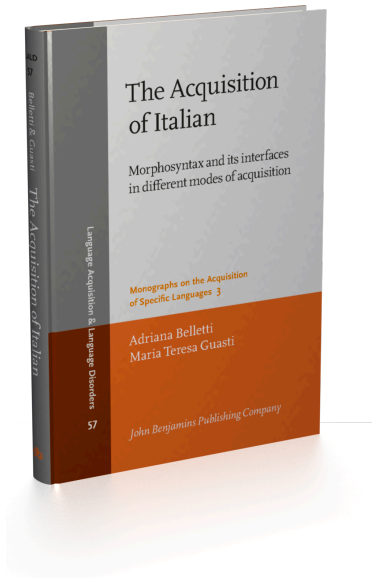

The Acquisition of Italian

Morphosyntax and its interfaces in different modes of acquisition

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A major contribution to the study of language acquisition and language development inspired by theoretical linguistics has been made by research on the acquisition of Italian syntax. This book offers an updated overview of results from theory-driven experimental and corpus-based research on the acquisition of Italian in different modes (monolingual, early and late L2, SLI, etc.), as well as exploring possible developments for future research. The book focuses on experimental studies which address research questions generated by linguistic theory, providing a detailed illustration of the fruitful interaction between linguistic theorizing and developmental studies. The authors are leading figures in theoretical linguistics and language acquisition; their own work is featured in the research presented here. Students and advanced researchers will benefit from the systematic review offered by this book and the critical assessment of the field that it provides.

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Table of contents

"A highly readable, truly informative, and remarkably thought provoking piece of work."

Gennaro Chierchia, *Harvard University*

"*The Acquisition of Italian* is a comprehensive, up-to-date overview of grammatical development in Italian-speaking children. [...] I highly recommend this volume to anyone interested in grammar acquisition in young children, especially as viewed through the lens of Italian."

Nina Hyams, *UCLA*

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It was a pleasure to write this book and thus have the opportunity to collect the available rich production of theoretically oriented studies on the acquisition of Italian. This type of enterprise inevitably owns a lot to many people. We cannot even attempt to explicitly try to mention them all. We will only mention here a few of them most directly involved in joint work with us; many, however, will recognize their presence throughout the following pages.

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CHAPTER 6

The acquisition of Wh-questions

1. Introduction

Italian wh-questions generally display the order in (1), that is, the wh-element and the verb must be adjacent. In subject wh-questions, as shown in (1a), the order is the canonical order of Italian (SVO). In non-subject wh-questions, as shown in (1b-d), the subject typically comes at the very end of the sentence.[1]

(1) a. Chi ha mangiato la mela?
'Who has eaten the apple?'

b. Cosa ha fatto Gianni?
what has done Gianni?
'What has Gianni done?'

c. A chi ha dato un libro Gianni?
to whom has given a book Gianni?
'Who has Gianni given a book to?'

d. Quando ha parlato Gianni?
when has talked Gianni?
'When has Gianni talked?'

The position of the subject in a question is likely not the focus position that the post-verbal subject typically occupies in a declarative sentence (Belletti, 2001b, 2004a). Although the position cannot be identified with a right dislocated position, it has been argued that the post-verbal subject is in a

[1] Questions like *Che cosa ha dato Gianni a Maria?* 'What has given Gianni to Maria' (What has Gianni given to Maria) with the PP complement surfacing after the subject are acceptable. It is likely that the PP here is marginalized or in a dislocated position.

marginalized position (Antinucci & Cinque, 1977; Guasti, 1996b; Cardinaletti, 2007) or in a low topic position (Belletti, 2004) and is destressed. The adjacency requirement between the wh-element and the verb observed in (1) is removed in the case of *perché* (why). With this wh-element the subject can either be pre-verbal or post-verbal, as in (2) (Rizzi, 1996).

(2) Perché (Gianni) ha dipinto la casa (Gianni)?
why (Gianni) has painted her house (Gianni)?
'Why has Gianni painted her house?'

As in declarative sentences, the subject of a question can be null, if this option is pragmatically appropriate. For first and second person, the use of null subjects is the unmarked option, as in (3).

(3) Cosa hai fatto?
What have (you) done?

Besides the order in (1), the order exemplified in (4) is also possible, with the subject in a left dislocated position before the wh-element. The question in (4) is pronounced with a short pause between the left dislocated subject and the wh-element, that is, in (4), the subject forms a prosodic unit on its own. In contrast, in (1b) there is no pause between the verb and the post-verbal subject.

(4) Gianni, cosa ha fatto?
Gianni, what has (he) done?

In spoken language, it is also possible to express a question through a cleft structure, as in (5). In this structure, the subject can stay either in a pre-verbal or in a post-verbal position, with the latter option being more natural.

(5) Cos'è che (Gianni) ha fatto (Gianni)?
What is it that (Gianni) has done (Gianni)?

Yes/no questions, instead, can display the same order of declarative sentences and they are distinguished from these by intonation. While a declarative sentence ends with a descending contour, an interrogative ends with an ascending contour.

Given the structure of Italian wh-questions, ambiguity can be observed when the verb is reversible, the subject is at the very end of the sentence and thus the sentence is with the typical order *Wh V N*, as exemplified below.

(6) Chi ha richiamato il venditore?

who has called-back the seller?

Interpretation 1: 'Who called the seller?'

Interpretation 2: 'Who did the seller call?'

Without a context, (6) is ambiguous: it can be a subject or an object question, as evident from the two English translations. This ambiguity stems from the fact that Italian subject and object questions display the same order, and the verb *ha richiamato* (has called-back) in (6) is reversible. Accordingly, *chi* (who) in (6) can be the subject or the object of the verb. Depending on whether (6) is a subject or an object question, the post-verbal NP stays either for the object or for the subject. Thus, a question like (6) can be disambiguated through the extra-linguistic context in which it is used. It could also be disambiguated through the linguistic-pragmatic context, e.g., if the question in (6) continues as in (7), it is no longer ambiguous (examples from De Vincenzi, 1992).

(7) a. Chi ha richiamato il venditore, per chiedere uno sconto? (SUBJECT Q)

who called-back the seller, to ask for a rebate?

b. Chi ha richiamato il venditore, per offrire uno sconto? (OBJECT Q)

Who called-back the seller, to offer a rebate?

'Who did the seller call-back, to offer a rebate?'

(7a) is a subject question, because typically, someone calls the seller to ask for a rebate, and (7b) is an object question, because the seller typically calls people to offer rebates. Disambiguation is brought about by the purpose clause. Subject and object questions can also be disambiguated when the wh-element and the post-verbal NP have different number features. Consider (8).

c. a. Quali bambini tirano il cavallo? SUBJECT Q

Which-masc-pl children pull-pl the horse?

b. Quali bambini tira il cavallo? OBJECT Q

Which-masc-pl children pull-sg the horse?

'Which children does the horse pull?'

(8a) is unambiguously a subject question with the verb agreeing with the plural phrase *quali bambini* (which children); (8b) is an object question with the singular verb agreeing with the singular post-verbal NP subject. *Which*-phrases in Italian can be singular and plural.[2] This is not so for the wh-element *chi* (who). A question like in (9a) is a subject question with the singular verb agreeing with the wh-operator and the post-verbal plural NP is the object. (9b) is an object question with the plural verb agreeing with the plural post-verbal subject. The wh-element *chi* is strictly

[2] The *which*-phrase could also be singular as in (i). The verb agrees with the post-verbal NP and this is an object question.

i) Quale bambino tirano i cavalli?
Which-masc-sg child pull-pl the horses
'Which child do the horses pull?'

singular and for the question to be interpreted as a subject question, the verb must be 3rd person singular.[3]

d. a. Chi tira i cavalli?

Who pulls the horses?

b. Chi tirano i cavalli?

Who pull-pl the horses?

'Who do the horses pull?'

Wh-questions feature a dependency between a wh-element in sentence initial position and a gap, annotated as ___ in (10), in the argument position within the clause. This dependency can be characterized in terms of movement of the wh-element to Spec, CP (or in some projection of the CP area). In (10a), we have the derivation of the subject question. In this case, the gap of the moved subject is in Spec, TP (or AgrSP or IP) and the movement is vacuous, as it does not alter the basic word order of Italian (SVO).[4] In (10b), we have a direct object question with the fronted *cosa* (what), the verb, the object gap and the subject. In (10c) we have an indirect object question with the gap after the direct object (in Italian, the unmarked order is direct object – indirect object).

e. a. [$_{CP}$ chi ___ ha mangiato la mela?]

who ___ has eaten the apple?

b. [$_{CP}$ cosa ha fatto ___ Gianni?]

what has done __ Gianni?

c. [$_{CP}$ A chi ha dato un libro ___ Gianni?]

[3] Ambiguity problems do not arise if the verb in the question is not reversible, as in the example in (1b) at the beginning.

[4] As Italian is a null subject language with post-verbal subjects, it is possible that subject extraction occurs from the post-verbal position, as in Rizzi and Shlonsky (2006). For simplicity, we assume the derivation in (10). See also fn. 31 in Chapter 5.

To whom has given a book __ Gianni?

As we said earlier, in Italian non-subject main questions, the subject must stay in the right periphery of the clause. Although Italian is an SVO language, the order *Wh S V* is either impossible (when the wh-element is bare) or highly dispreferred (when the wh-element is a *which*-phrase) (for discussion about the possible orders see Cardinaletti, 2006; Greco, 2013). Rizzi (1996) has formalized the adjacency requirement between the wh-element and the verb in terms of the wh-criterion. This is a universal well-formedness condition on the way wh-expressions are assigned scope and whose formulation is given in (11).

11) a. Each Wh-operator must be in a Spec-head relation with a [+wh] X°.

b. Each [+wh] head must be in a Spec-head relation with a Wh-operator.

In main questions, the [+wh] feature is generated on I and moved along with I (including the inflected verb) to C. In turn, the WH-operator raises to Spec, CP. As a result of these two movements, the [+wh] head (the verb) is in a Spec-head relation with the WH-operator and vice versa, as required by the two clauses of the WH-criterion. This is illustrated in (12b) for the question in (12a).

12) a. Cosa prende Paolo?

what takes Paolo?

'What does Paolo take?'

b. $[_{CP}$ $cosa_j$ $[prende_i$ $[_{TP}$ Paolo t_i $t_j]]]$?

Studies on the acquisition of wh-questions in Italian have shown that children from their first questions are able to perform wh-movement. They can produce a variety of non-ambiguous questions using various wh-elements (who, what, where, when, how, why) from age 2;0. However,

their production and comprehension of object questions including reversible verbs are weak. At age 5;0, Italian-speaking children can produce subject and object questions including reversible verbs of the type in (9) and (10), but to a lesser extent than adult control subjects do. In addition, a clear subject advantage is observed. While subject *who*-questions are not challenging, object who-questions are. In comprehension, this tendency is exacerbated. At age 5;0, children's comprehension of object who-questions is very poor (around 50%) and it is only at age 10-11 that 80% accuracy is reached. Given these findings in typical acquisition, it is not surprising that questions are difficult for children with SLI and for children with Developmental Dyslexia (DD).

This chapter is organized as follows. In section 2, 3 and 4, we investigate the acquisition of wh-questions in children with TD, both comprehension and production will be considered. We examine the production of wh-questions with irreversible verbs (section 2) and with reversible verbs (section 4) and the comprehension of questions with reversible verbs (section 3). In section 5, we put the Italian findings in a cross-linguistic perspective and in section 6, we discuss a proposal about the source of difficulty underlying the acquisition of Italian questions. In section 7, we discuss the hypothesis that *who*- and *which*-questions present distinct sources of difficulties and in section 8, we report findings on the production of wh-questions in children with SLI and DD.

2. The L1 acquisition of wh-questions

Guasti (1996a) investigated the naturalist production of wh-questions, which comprised the natural production of 5 children (Calambrone corpus, Cipriani, Chilosi, Bottari, & Pfanner, 1993). In a period between 1;7 and 2;11, these children produced 296 questions with a fronted wh-element: 166 (56%) were null subject questions and 130 (44%) featured the presence of an overt subject, all in a right peripheral position. In addition, they produced 5 questions which were headed by *perché* (why) with the subject between the wh-element and the verb. This order is allowed in the adult grammar, as we said earlier. Thus, the order of words in early wh-questions is already the same as in the adult grammar.

This finding is confirmed by an additional elicited production study (Guasti, 1996a). Here, 11 children between 3;1 and 4;8 were engaged in an elicitation task aiming at collecting positive and negative yes/no questions and positive and negative wh-questions extracting from different positions (i.e., subject, object and adjunct). The experimenter presented a story to each child and

invited him/her to ask a question to a puppet. In (13a) we give the lead-ins used to elicit an object question and in (13b) to elicit an adjunct question.

(13) a. Exp: C'è qualcosa che Paolo prende. Domanda alla lumaca cosa.

'There is something that Paolo takes. Ask the snail what.'

Target: (che) cosa prende (Paolo)?

(che) what takes (Paolo)?

'What does Paolo take?'

b. Exp: C'è un posto dove il bambino non può andare. Domanda alla lumaca dove.

There is a place where the child can't go. Ask the snail where.

Target: Dove non può andare (il bambino)?

where NEG can go (the child)?

'Where can't the child go?'

Through the experiment, 11 yes/no questions were collected, all displaying grammatical orders in Italian. In addition, 207 wh-questions (including 11 subject questions) were collected, all of which were grammatically correct. Questions extracting from the object or the adjunct position displayed various structures, listed in (14).

(14) a. Null subject questions

Come ti chiami? (M., 4;4)

how you call?

'What is your name?'

b. Questions with left dislocation of the subject

e lui, cosa fa lì da solo? (A., 3;1)

and he, what makes there alone?

'and he, what does (he) make there alone?'

c. Questions with the subject at the end of the sentence

Cosa può fare il cowboy? (A., 3;1)

what can do the cowboy?

'What can the cowboy do?'

d. Cleft structures

Chi è che può andare sull'altalena? (AR., 4;5)

Who is that can go on the see-saw?

'Who can go on the see-saw?'

In the case of questions headed by *perché* (why) and in the case of yes/no-questions the subject could either be pre-verbal or post-verbal. In the examples from children in (15) it is pre-verbal. Notice that it is only in the case of *perché* that the order *Wh S V* was found.

(15) a. Perché la bambina non vuole andare a scuola? (D., 4;7)

why the girl NEG want go to school?

'Why doesn't the girl want to go to school?'

b. Perché la signora non può bere il caffè senza zucchero? (A., 4;5)

why the lady NEG can drink the coffee without sugar?

'Why can't the lady drink coffee without sugar?'

c. Viene in su quello là? (F., 4;3)

comes up the one there?

'Does the one there come up?'

d. Quette, non gli piacciono? (G., 4;5)

these, NEG to+him like-pl?

'Doesn't he like these?'

The number and percentages of positive and negative non-subject questions produced by the group is shown in Table 1. The first column includes questions with pre-verbal subjects, the second questions with left dislocated subjects, the third with subjects at the end of the sentence; the fourth includes null subject questions, the fifth cleft structures. Structures that were not classified were not included.

Table 1. Frequency and percentage of positive and negative wh-questions produced by 11 Italian-speaking children (age range 3;1-4;8). *Wh S V* order was only observed with why-questions. Elicited production data from Guasti (1996a).

	WH S V	S Wh V	Wh V S	Null S	Cleft
Positive Q	0	3 (3%)	13 (15%)	67 (77%)	3 (3%)
Negative Q	3 (2%)	3 (2%)	19 (16%)	73 (64%)	3 (11%)

Therefore, both naturalist data and elicitation data prove that children have good command of the rules implicated in the formation of questions from about age 2;0 and they respect the licit orders in Italian and the adjacency requirement between the wh-element and the verb. They also know that they must front the wh-element, as no case of wh-in-situ is reported in any study on Italian. We can also conclude that they know that they have to move the verb to the C domain or can respect whatever requirement forces the subject not to intervene between the wh-element and the verb and be typically located at the end of the clause.

3. Comprehension of subject and object wh-questions

In previous studies, object questions included the wh-element *cosa* (what), subject questions contained the wh-element *chi* (who) and both featured the presence of irreversible verbs. In order to produce or understand this kind of questions, one needs to know the argument structure of the verb, the meaning of *who* and *what* (*who* stays for an animate entity and *what* for an inanimate one) and the link between these wh-elements and the argument structure of the verb. Children from age 2;0 seem to master these pieces of knowledge.

In additional studies on comprehension and production, object wh-questions were introduced both by the wh-element *chi* (who) or *quale* (which) and included reversible verbs, as in (16) and (17). De Vincenzi, Arduino, Ciccarelli & Job (1999) tested children's comprehension of these questions. Three hundred and fifty-two children from 3;0 to 11;0, which were divided into 8 age groups, took part in the study, and were presented with 36 non-ambiguous reversible questions. De Vincenzi et al. presented children with pictures displaying three sets of characters, as shown in Figure 1, and asked them questions like in (16) or (17).

(16) a. Chi sta rincorrendo le tartarughe? Subject who-question

who is chasing the turtles?

'Who is chasing the turtles?'

b. Chi stanno ricorrendo le tartarughe? Object who-question

who are chasing the turtles?

'Who are the turtles chasing?'

(17) a. Quale gallina sta rincorrendo le tartarughe? Subject which-question

which chicken is chasing the turtles?

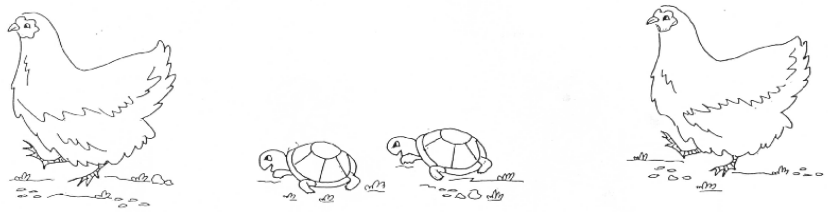
'Which chicken is chasing the turtles?'

b. Quale gallina stanno rincorrendo le tartarughe? Object which-question

Which chicken are chasing the turtles?

'Which chicken are the turtles chasing?'

Figure 1. Material used in De Vincenzi et al., (1999)'s experiment to test comprehension of wh-questions by Italian-speaking children.



Children had either to point to the chicken on the right or on the left, depending on the question. Control questions were included to give children the opportunity to point to the middle characters.

Comprehension of reversible subject questions was already relatively good from 3;0-4;0; however, comprehension of reversible object wh-questions appeared to be extremely delayed, with only the oldest group (aged 10;0-11;0) displaying good performance. Table 2 reports the percentage of correct responses of the groups of children for the four types of questions.

Table 2. Percentage of correct responses to reversible wh-questions (example 16 and 17) by 352 Italian-speaking children (44 for each age group) as a function of question type (Subject vs. Object) and wh-type (*who* vs. *which*) (data from De Vincenzi Arduino, Ciccarelli & Job 1999)

Age group	S who	S which	O who	O which
3-4	64	75	53	45
4-5	83	83	56	38
5-6	90	92	54	39

6-7	97	98	50	36
7-8	97	97	54	47
8-9	96	99	60	52
9-10	97	98	58	53
10-11	97	99	89	81

In all age groups, subject questions were easier than object questions. While children were almost at ceiling in the comprehension of subject questions (both *who*- and *which*-questions) from age 5;0, they moved toward a ceiling performance (80% accuracy) in the comprehension of object questions at age 10;0-11;0. In addition, a statistical difference was observed between object *which*- and object *who*-questions in the groups 4-5, 5-6 and 6-7, with the former being harder than the latter. In the other groups, instead, no difference was evident. These findings are in striking contrast to previous results based on production reported in section 2: children from age 3;5 on were adult-like in the production of a range of questions, including object questions, as established through the elicited production experiment, but even from age 2;0 on they spontaneously produced object questions. There are two caveats. First, although production and comprehension are related they are likely to involve different processes. Production is under the speaker control, namely, the speaker decides which structure to use and how to express a concept, while comprehension is not controlled by the hearer. In addition, there is one major difference between the questions used in the comprehension study and the questions produced in the elicitation experiment reported in section 2: the verbs were all reversible in the former case, while they were irreversible in the latter. De Vincenzi et al. pointed out that reversibility per se cannot be a problem, as in a standardized test for comprehension of the Italian grammar (TCGB, Chilosi and Cipriani, 2006) children at age 6;0 understood reversible passive sentences correctly 95% of the time. Thus, it appears that passives are comprehended earlier than object questions in Italian. This is coherent with the discussion in chapter 4 on passives. Additional evidence that reversibility *per se* cannot be the problem comes from studies on other early languages. First, Avrutin (2000) established that 4;3 year old English-speaking children were equally good in comprehending subject and object *who*-questions including reversible verbs (80% correct responses in both cases). The same result is confirmed by Hirsch and Hartman (2006). Similarly, Yoshinaga (1996) found that, in the production of object *who*-questions with reversible verbs, English-speaking children did not have problems at age 5;0. Interestingly, Avrutin also found

that the same English-speaking children understood object *which*-questions less well than subject *which*-questions (48% correct versus 86% correct responses). Thus, a subject/object asymmetry is evident in English only in the case of *which*-questions at the age of 4;3. Friedmann, Belletti and Rizzi (2009), replicated the comprehension result with 4;3 year old Hebrew-speaking children: object *which*-questions elicited 58% correct responses while subject *which*-questions 78%. These findings raise the question of why in Italian the comprehension of questions headed by *who* and *which* is so delayed compared to other languages. This issue was investigated through a study on the production of reversible wh-questions, which is introduced in the following section.

4. Production of subject and object questions with reversible verbs

To explore the delay in the comprehension of object questions by Italian-speaking children, Guasti, Branchini and Arosio (2012) engaged thirty-five 4;0-5;0 year-old Italian-speaking children (mean age 4;10) in an elicitation task aimed at leading them to produce subject and object questions, introduced by *who*- or *which*. All questions included reversible verbs (in many cases the same used in the comprehension experiment by de Vincenzi et al., 1999) and all questions were unambiguous. This was achieved by manipulating the number features on nouns staying for the agent and the patient; when the agent was plural, the patient was singular and vice versa. In addition, 20 adult controls were also tested. Children and adults were presented with pictures like in Figure 2, through a laptop computer. One character was covered and the two others were performing some action to it. A puppet was used that had to guess who was covered. While watching the picture, a pre-recorded voice introduced with a brief description the scene as in (18).

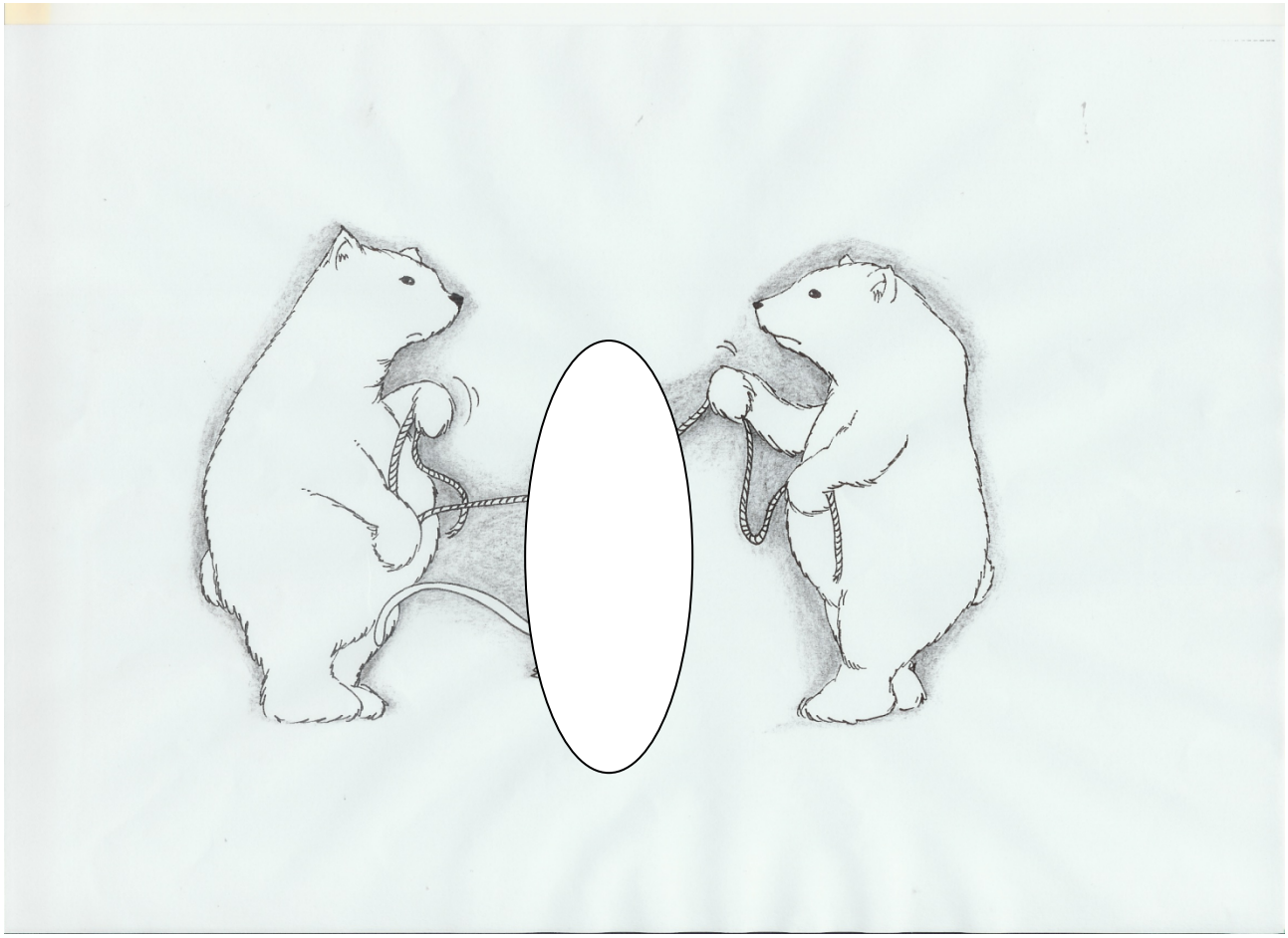
(18) Guarda. Ci sono due orsi che legano qualcuno. Lui sa chi. Domandagli chi

Look here. There are two bears that tie someone. He knows who. Ask him who.

Target: Chi legano gli orsi?

'Who do the bears tie?'

Figure 2. Material used to elicit wh-question in Guasti et al. (2012)'s study.



After the child had addressed the question to the puppet and the puppet had answered, the covering disappeared and the hidden character became visible, so that the child could establish whether the puppet had answered correctly or not. The procedure to elicit *which*-questions required the use of an additional picture, in which the relevant characters were introduced, in order to meet the pragmatic conditions for the use of such type of questions. For example, in one picture there were two football players, one with a red shirt and the other with the blue shirt, and one cook. These characters were all verbally described. In the second picture, only the cook was visible and children were told that the cook was saying good-bye to one of the football players and we wanted to know from the puppet which football player was. The experiment was quite successful in eliciting 656 correct questions from children (each child had to produce 24 questions) and 434 for adults. Incorrect responses were 183 for children and 46 for adults. Although children made more errors than adults, they produced a lot of wh-questions. Table 3 reports the percentages of subject and object questions produced by children and adults as a function of the wh-element.

Table 3. Percentage of correct subject and object questions produced by 35 Italian-speaking children and 20 adults as a function of extraction site (subject= S or object=O) and wh-element (*who* or *which*). Mean age of children 4;10. Elicited production data from Guasti, Branchini and Arosio (2012).

PRODUCTION RESULTS				
	WHO-S	WHICH-S	WHO-O	WHICH-O
Children	88	80	71	73
Adults	98	83	93.5	85

Beyond the difference between children and adults, the statistical analysis of the data revealed that children were better in subject than in object questions, but this held true only in the case of *who*-questions. In the case of *which*-questions, the asymmetry disappeared, as subject *which*-questions were also demanding. *Which*-questions were more difficult than *who*-questions and no asymmetry was evident between object *who*- and *which*-questions. Comparing the results in Table 3 and those in Table 2, it is clear that children (age 4-5) produce more object questions (71% and 73%, respectively) than they comprehend (56% and 38%, respectively). We return to this asymmetry later. The most interesting aspect of this study, however, is the kind of structures produced. Table 4 offers a breakdown of the various structures produced by children and adults.

Table 4. Percentage of correct subject and object questions produced by 35 Italian-speaking children and 20 adults as a function of extraction site (subject = S or object = O) and wh-element (*who* or *which*) and type of structure produced. Mean age of children 4;10. Elicited production data from Guasti, Branchini and Arosio (2012)

Type of structure	Type of questions	Children	Adult
WH V N	WHO-S	73%	92%
	Who-O	38%	83%

	Which-S	91%	93%
	Which-O	30%	60%
S-left dislocation	WHO-S		
	Who-O	20%	2%
	Which-S		0.9%
	Which-O	21%	
Null argument	WHO-S	3%	0.8%
	Who-O	30%	0.8%
	Which-S	7%	
	Which-O	46%	
Passive	WHO-S		5%
	Who-O		14%
	Which-S		0.6%
	Which-O	6%	14%
Cleft	WHO-S	24%	0.8%
	Who-O	13%	0.8%
	Which-S	3%	3%
	Which-O	2%	

For subject questions, children and adult produced the structure exemplified in (19) displaying the SVO order.

(19) Chi lega le cavallette?

who ties the grasshoppers?

'Who ties the grasshoppers?'

Instead, for object questions, a variety of structures were used, all of which were correct. Beyond the structure with the post-verbal subject in (20a), the structure with left dislocation of the subject (20b) and with a null subject (20c) were employed. Although structures equivalent to (20b-c) could also have been used to form subject questions (with an object clitic included, as in *Gli orsi, chi li lega?* (Lit. The bear, who them ties?, "The bears, who ties them?"), they were not.

(20) a. Chi legano gli orsi?

who tie-pl the bears?

'Who do the bears tie?'

b. Gli orsi, chi legano?

the bears, who tie-pl?

'The bears, who (do they) tie?'

c. Chi legano?

who tie-pl?

'Who (do they) tie?'

Another finding was that children sometimes split the *which* NP, by producing questions like in (21), which are perfectly grammatical in Italian.

(21) Il cuoco, quale sta salutando dei calciatori?

the cook, which is waving of the football players?

'At which of the football players is the cook waving?'

Children sometimes changed the wh-element *who* into *what*. These questions are structurally correct (the order of words is correct), but the features of the wh-element have been changed from animate to inanimate (as e.g., in *Cosa legano gli orsi*, What do the bears tie? rather than *Chi legano gli orsi?* Who do the bears tie?). In addition, children used cleft structures for both subject and object questions. When used for object questions, the subject could be in the post-verbal position, in the pre-verbal position (something that is not possible in simple questions) or null, as in (22). However, most of the time, the subject was in the post-verbal position. Thus, cleft structures most of the time displayed the order Wh (is that) V N, for both subject and object questions.

(22) Chi è che (gli orsi) legano (gli orsi)?

who is (it) that (the bears) tie-PL (the bears)?

Adults displayed a different behavior in the case of object questions: they produced passive object questions of the type in (23).

(23) Chi è legato dagli orsi?

Who is tied by the bears?

Finally, children made errors. For example, they produced subject rather than object questions. The target object question in (24a) was turned into a subject question in (24b), by changing agreement on the verb.

(24) a. Quali bambini tira la fatina?

which children pull-sg the fairy?

'Which children is the fairy pulling?'

b. Quali bambini tirano la fatina?

which children pull-pl the fairy?

Other incorrect answers included the production of only the wh-element or the production of structures other than questions. The results of Guasti et al.'s (2012) study indicate that:

(1) Italian-speaking children can produce subject and object wh-questions including reversible verbs at age 4;0-5;0;

(2) Object *who*-questions are more difficult than subject *who*-questions;

(3) There is no asymmetry between subject and object *which*-questions;

(4) There is no asymmetry between object *who*- and *which*-questions;

(5) *Which*-questions are more difficult than *who*-questions.

5. Some reflections of comprehension and production of Italian wh-questions in a cross-linguistic perspective

We started with the question of why Italian-speaking children are delayed with respect to English- or Hebrew-speaking children, especially in comprehending object *who*- and *which*-questions. This question becomes even more notable, as Italian-speaking children produce a fair amount of questions, the most popular structure for subject questions being Wh V N. This structure is also used to express object questions, but other structures are also employed. Notice that the structure that was employed in comprehension experiment by De Vincenzi et al. (1999) for both subject and object questions was WH V N. To get a quick view of the findings, we have summarized the percentage of comprehension and production of subject and object *who*- and *which*-questions in Table 5. In the case of production, we report the percentage of production of all structures together

and of the Wh V N structure separate. In the latter case, between parentheses, we indicate the percentage of production of cleft structures, which also display the order Wh (is that) V N.

Table 5. Percentage of correct questions produced and comprehended by Italian-speaking children at age 4-5. Production questions are reported in two ways; in the first raw, we report the percentage of all structures together and in the second raw, we report the percentages of only the Wh V N structure (in parentheses, we report the percentages of cleft). Production data are from Guasti, Branchini and Arosio, (2012) and comprehension data are from De Vincenzi et al., (1999).

	WHO-S	WHICH-S	WHO-O	WHICH-O
ITALIAN-production (all structures)	88	80	71	73
ITALIAN production (structure WH V N)	73 (24)	91 (3)	38 (13)	30 (2)
ITALIAN-comprehension	83	83	56	38

If we examine the results together in Table 5, we observe that the production rate of the structure WH V N used in comprehension was 38% (plus 13%) and 30% (plus 2%) for *who*- and *which* questions, respectively. These percentages align well with those obtained in comprehension. Thus, when we compare the same structure there is no longer an advantage for production. The advantage is apparent only if the whole set of structures produced is considered. A fair conclusion is that Italian-speaking children are equally challenged by the Wh V N structure both in comprehension and production, but this challenge is more evident in the former modality that in the latter one, because in production, children are guiding the race and can choose alternative grammatical structures. This hypothesis generates the prediction that children should comprehend the other structures they produced well. This remains to be tested.

Another point of cross-linguistic relevance needs to be addressed. Earlier we noticed that 5-year-old English-speaking children and Hebrew-speaking children obtained higher scores in the

comprehension of object *who*-questions than in the comprehension of object *which*-questions. At the same age, De Vincenzi et al. (1999) reported an asymmetry in Italian as well, but the scores were lower than those in the other two languages. For example, Hebrew score for comprehension of object *who*-questions was 81% and of object *which*-questions was 58%. Scores for Italian were 56% and 38%, respectively. We think that the source of the different scores obtained by Italian- and Hebrew-speaking children is the fact that a common structure for subject and object questions in Italian is Wh V N. This fact blurs the object *who* versus *which* asymmetry, which is also present in Italian comprehension, at least at age 5. The fact that in production this asymmetry is not evident in Italian raises the question of what happens in other early languages, such as English and Hebrew. We know that English-speaking children at age 5 produce object *which*-questions without trouble, as shown by Thornton (1996). However, we do not know whether there is any asymmetry between the production of subject and object *which*-questions or of object *who*- and *which*-questions at that age, as this was not the focus of that study. This is an issue for future research.

6. Why are Italian wh-questions hard?

We established that object *who*- and *which*-questions are harder than subject questions for Italian-speaking children. The locus of the difficulty is the presence in Italian of the structure Wh V N, i.e., of the fact that subject and object questions may have the same structure with the post-verbal N being either the object or the subject, respectively. There is no asymmetry between comprehension and production, once we compare the same structure, Wh V N, in the two modalities. The only difference that remains is due to the fact that children produce alternative structures. As for the cross-linguistic dimension, the difference between Italian and the other languages is essentially due to the presence in Italian of the Wh V N structure.

De Vincenzi et al. (1999) accounted for the difficulties with object questions in terms of processing. They assumed that the Minimal Chain Principle (MCP) (De Vincenzi, 1992) operate in child and adult processing of sentences. According to the MCP, the parser attempts to interpret a moved element as soon as possible to avoid keeping it in memory for a long time due to economy reasons. If the initial analysis is not confirmed by further incoming material, reanalysis must apply. In (25a,b) *chi* (who) leads one to postulate a gap in the pre-verbal subject position and to link it to its antecedent, *chi*. This chain is assigned the subject function, case and an Agent thematic role. This choice is economic, as *chi* is interpreted immediately.

(25) a. Chi$_i$ ___$_i$ rincorre le tartarughe? (chi, ___) =Agent/Subject, Nominative

Who chases the turtles?

b. Chi$_i$ ___$_i$ rincorrono le tartarughe? (chi, ___) =Agent/Subject, Nominative

who chase-pl the turtles?

'Who are the turtles chasing?'

When the verb *rincorre* (chases) is heard in (25a), the analysis is confirmed and thus comprehension proceeds smoothly. By contrast, when in (25b) the verb *rincorrono* (chase-pl) is heard, an incongruence between the feature of the verb (plural) and the feature of the wh-operator (singular) is detected. This leads one to reanalyze the previous assignment of the grammatical function, the thematic role and the case to the element *chi*. The subject trace is canceled and an object trace has to be postulated, instead; in addition, the chain must be reassigned a new grammatical function, thematic role and case. De Vincenzi et al. concluded that Italian-speaking children follow the MCP and interpreted subject questions correctly. However, they misinterpreted object questions, because they attempted to postulate a subject gap, thus obeying the MCP, but failed to revise the initial incorrect analysis, at least up to age 10;0-11;0.[5]

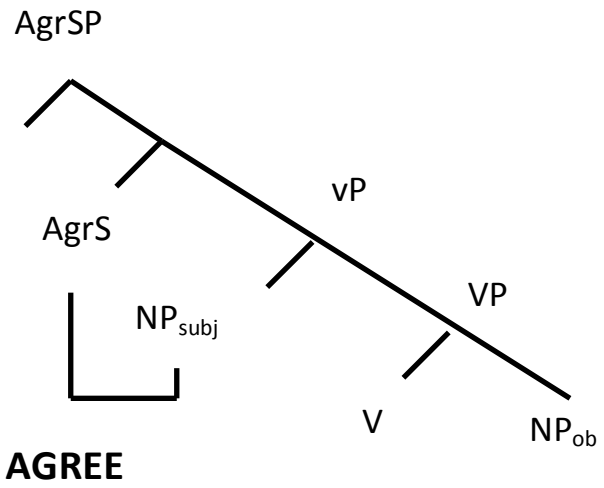
Although this account explains the comprehension facts, it does so less well in the case of the production facts. Specifically, it can explain the subject/object asymmetry in the production of questions, but it cannot explain why Italian-speaking children resorted to different structures specifically in the case of object questions and it cannot account for the form of the errors that they produced. To account for these additional pieces of data, Guasti et al. (2012) proposed the Agree

[5] De Vincenzi et al. (1999) noticed that passives, which also involve movement and reversibility, are less difficult than object questions at age 5;0. They explained the discrepancy between passives and object questions by assuming that when the first NP of a passive sentence is heard, it is assigned the grammatical function subject, nominative case and the thematic role Agent. Upon encountering the verb and retrieving its argument structure, assignment of the grammatical function and case is confirmed (the subject remains a subject and is still assigned nominative), but assignment of the thematic role has to be revised. Revision involves the postulation of a gap in object position, formation of a chain connecting the initial NP with its gap and re-assignment of a thematic role to the chain. De Vincenzi et al. suggested that the revision process was simpler in the case of passive (revision of only the thematic role) than it is in the case of object questions (revision of thematic role, case and grammatical function). This difference should be responsible for the fact that children at age 6;0 comprehend reversible passives, but not reversible object questions.

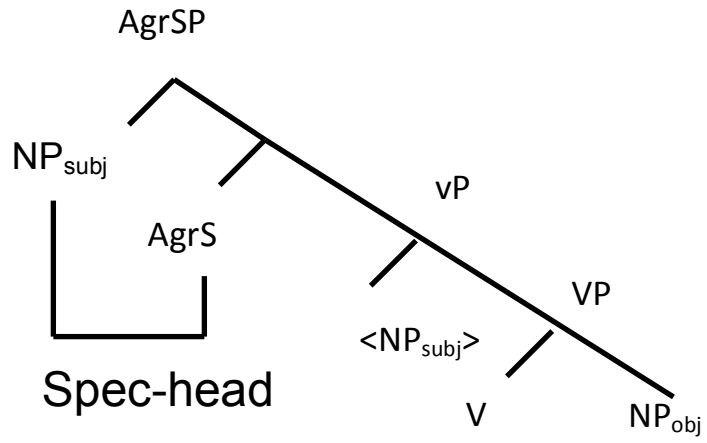
interference approach (AIA). This analysis builds on insights from Guasti and Rizzi (2002), further developed in Franck, Lassi, Frauenfelder, and Rizzi (2006). In this approach, the subject-verb agreement relation plays a key role, as agreement is crucial to decide whether a subject or an object question is intended in Italian.

Franck et al. proposed that agreement, a process occurring at the interface between syntax and morphology, may occur in two steps: AGREE and Spec-Head agreement. AGREE is the operation whereby the subject in the specifier of the vP (see Koopman and Sportiche, 1991) copies its person and number features into the inflectional node AgrS above it, under c-command and in a local configuration, as displayed in the lower portion of (27a). Spec-Head agreement is an additional operation of verification, ensuring that the subject and the verb share the same features. It only occurs when the subject moves from vP to Spec AgrS and in that position establishes a Spec-Head relation with the inflected verb in AgrS, as displayed in the upper part of (27b). Thus, in sentences with the SV order, agreement is obtained by AGREE, MOVE (of the subject), and Spec-Head, while in sentences with the VS order agreement is obtained solely from AGREE.

(27a)

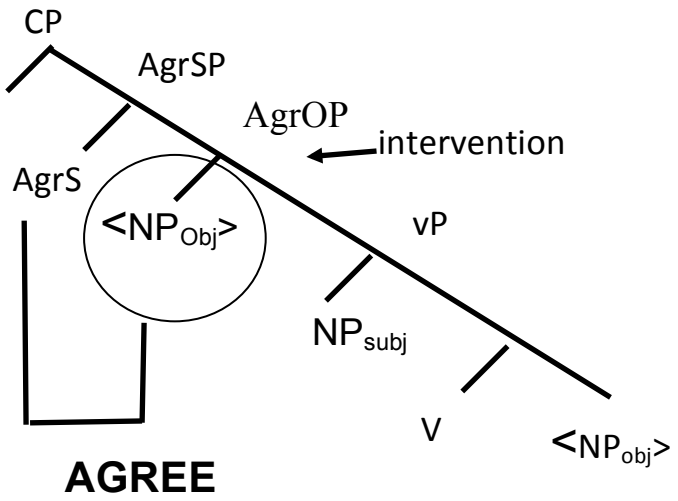


(27b)



Let us now see how this proposal fares with the production of Italian wh-questions. We start with object questions. There are reasons to assume that object movement to the left periphery, as in questions, is stepwise and proceeds with a preliminary movement to an intermediate projection above vP (e.g. AgrOP; Kayne, 1989; Chomsky, 1995, see chapter 3). When AgrS looks for a goal in its c-command domain, it first finds the object in Spec AgrOP, which can sometimes erroneously value AgrS and pass its features to it. Thus, the occurrence of the object wh-element in AgrOP interferes in the AGREE relation between AgrS and the subject in Spec vP. This is displayed in (28).

(28)



In object questions with a post-verbal subject, nothing else happens. This entails that if the object copy has erroneously valued AgrS, the object question looks as a subject question and this was one of the errors found in children's production (of course one does not know whether the intended question is a subject or an object question; we merely notice that the output will look like a subject question). When the subject occurs in a pre-verbal position, i.e., it has moved out of the vP to Spec AgrSP, agreement is further checked in the Spec-head configuration by verifying that the subject and the verb share the same features. In this way, (most of the) agreement errors created during AGREE are purged. This second part of the agreement process is meant to explain the various shapes that object questions take in Italian child grammar. They can be seen as ways to correct the errors originated during AGREE and to strengthen the agreement relation, which is crucial in Italian questions. Let us see how it works. In Italian wh-questions, the wh-element must be adjacent to the verb, as we said in the introduction. In other words, Spec AgrSP (or IP) is forbidden to lexical subjects, as shown in (29) (see Rizzi, 1996; Cardinaletti, 1997; Greco, 2013).

(29) *Chi i cavalli mordono?

Who the horses bite?

However, Spec AgrS is available to phonologically null subjects, as shown in Cardinaletti (1997). Based on this, Guasti et al. (2012) argued that questions featuring null subjects or left dislocation of the subject (also called NP-topicalization) are questions featuring both the presence of a null subject in Spec AgrS and an optionally left dislocated subject (which can be left unpronounced in the case of null subject questions, see Belletti, 2005), as in (30).

(30) a. Chi [$_{AgrSP}$ pro mordono] ?

who bite-pl?

'Who (do they) bite?'

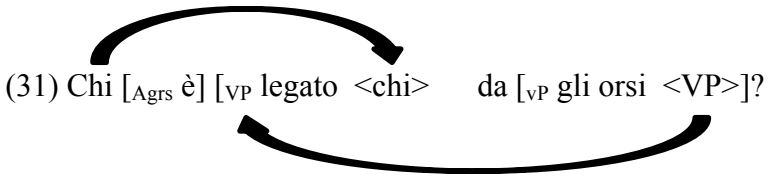
b. I cavalli, chi [pro mordono]?

the horses, who bite?

'The horses, who (do they) bite?'

In these structures, the null subject is in a Spec-Head relation with AgrS and verifies the agreement features, thus allowing the correction of errors stemming from AGREE (for an analysis of left dislocation, see Belletti, 2005, Cardinaletti, 2007 and Cecchetto, 2000).[6]

Under this approach, either intervention does not give rise to agreement errors, in which case the Wh V S structures is produced. If agreement errors occur, there are two options: either an incorrect wh-question is produced or the second step of the agreement process occurs and questions with null subject or left dislocation of the subject ensue.[7] Although adults produced more questions with the Wh V S order, they were also challenged by the interference of the object in the AGREE relation, witnessed by the fact that they produced a certain amount of passive object questions. This result is similar to that obtained in the elicitation of object relative clauses (see chapter 5). When prompted to produce an object relative clause, both adults and older children produced passive object relative clauses. Passive object questions (POQ) can also be viewed as a radical way of eliminating the interference problem, as we assumed for relative clauses. In fact, under any analysis, passive clauses include a single argument (Jaeggli, 1986; Baker et al., 1989; Collins, 2005; Gehrke and Grillo, 2008). For concreteness, assume the smuggling account of passive already adopted in chapter 4 (see reference cited there; see also chapter 5). POQs are derived by smuggling of the VP including the verb and the internal argument to a position above vP, as illustrated in (31).



Who is tied by+the bears?

[6] Guasti et al. (2012) extended Cecchetto's (2000) analysis of left dislocation. In this analysis, left dislocation is derived by movement of a big DP including the NP-subject and the null subject, which acts like a clitic. The null subject is moved to Spec AgrSP and the NP is moved in the left periphery of the clause.

[7] Cleft questions occurred both with subject and object questions and this suggests that they are not specific ways to deal with the interference problem. Moreover, cleft object questions had the subject in the post-verbal position most of the time and were assimilated to Wh V S.

In (31), when AgrS looks for a goal, it only finds the internal argument (the wh-element *chi*) that copies its features into AgrS and then moves to CP. In this way, a POQ or a correct passive subject rather than an active object question is produced. Passivization is not exploited by younger children, as it is known that young children have trouble with passives (Borer & Wexler, 1987 and the reference cited in chapter 4). We expect that older children will produce passive object questions, as they do for object relative clauses (Chapter 5).

Subject questions are not problematic because when AgrS looks for a subject to agree with there is only one candidate: the subject in Spec vP.

Both subject and object *which*-questions were difficult for children speaking Italian and no asymmetry was observed in their production. We think that this is due to additional sources of complexity featured by these questions. On the one hand, movement of the *which*-phrase is more complex as it involves pied piping of the nominal element. On the other, both the *which*-element and the N-element display agreement features and have to agree. In addition, in subject question the *which*-phrase has to agree with the verb. Agreement per se cannot be a problem, as Italian-speaking children master determiner-noun agreement and subject-verb agreement around 2-3 years (see chapter 1). What may be demanding for children and exceed their computational capacity is the whole set of processes to be performed: agreement among various elements plus pied piping. This conjecture is supported by the avoidance of pied piping and production of questions featuring a split between *which* and the Nominal part (see (21)).

So far, we have examined cases of interference due to a DP copy that only differs from the goal in terms of number features. In section 2, we have seen that wh-questions with an inanimate object are not problematic for Italian children (see (32)). These object questions also display the order Wh V S. Within the approach we have adopted, the lack of subject/object asymmetry, can be explained as follows. Although *cosa* (what), while moving to Spec CP, goes through a position (Spec AgrOP) where it intervenes in the AGREE relation between AgrS and the post-verbal subject *il bambino* (the child), it is endowed with [-animate] feature. If animacy is a feature associated with AgrS (as it is in some languages, e.g., Georgian (see Harris (1981:149)), then AgrS would look for an animate goal and *cosa* (the object), being [-animate], is not an eligible goal and does not create interference.

(32) Cosa vuole il bambino?

what wants the child?

'What does the child want?

Notice that the lack of asymmetry in these cases is hard to capture by the MCP, as a trace needs to be postulated both when the wh-question is introduced by *chi* (who) as well as when it is introduced by *cosa* (what).

In sum, object questions are challenging in Italian because the object copy intervenes in the AGREE relation. Errors ensuing in this process can be fixed by the additional Spec-Head agreement checking, which occurs if the subject moves to Spec AgrS, an optional process in Italian. When this additional process occurs, we obtain questions with a null subject or with left dislocation of the subject; when it doesn't, we obtain questions with the post-verbal subject or incorrect questions (if the object copy values AgrS). Finally, intervention can be radically removed by turning to passive object questions, an option mostly exploited by adults. Subject questions are not problematic, because nothing intervenes in the AGREE relation in this case.

We have described this process with reference to production, but it can be extended to comprehension as well (Guasti, Stavrakaki and Arosio, 2012). During comprehension, children have to reconstruct the underlying structure from what they hear. In particular, they have to perform the AGREE relation and, in the case of object questions, they have to face the interference of the object copy. If something goes wrong in the AGREE process, i.e., the object trace values AgrS, children end up understanding the question as a subject question. There is an asymmetry between comprehension and production that can be reduced to the fact that in production, children can venture to produce other structures and purge the errors, but in comprehension the errors cannot be fixed. Cross-linguistic differences are to be attributed to the fact that in Italian movement of the subject is not compulsory and object questions resulting only from the application of AGREE are common.

7. How many interference processes?

In chapter 5 on relative clauses, we propose that the pre-verbal DP subject endowed with the +NP feature intervenes between the relative head and its copy, as schematically represented in (33a).

Intervention in the configuration in (33), is responsible for children's failure to comprehend Object relatives with a pre-verbal subject.

(33) a. +R, +NP +NP

b. Il bambino che la mamma bacia

the child that the mother kisses

'the child that the mother kisses'

For Hebrew, Friedmann et al. (2009) have also shown that if the relative head does not have the +NP feature (as in free relatives) or if the subject does not have the +NP feature (as in relatives with an arbitrary *pro* subject), children's comprehension is accurate. Thus, the presence of the NP feature is crucial. Friedmann et al. extended their approach to *which*-questions. Consider the English example in (34), with the abstract representation of relevant features.

(34) Which child does the mother kiss <which child>?

+Q +NP +NP

Similar to (33), the subject endowed with the +NP feature disrupts the local relation between the *which*-phrase and its trace or copy. This move allowed the authors to account for the fact that *which*-object questions are more problematic than *which*-subject questions in English and Hebrew. In the same vein, they explained the lack of asymmetry in English and Hebrew *who*-questions: *who* does not have a +NP feature and thus the intervening subject and the moved element do not share any features, as illustrated in (35).

(35) Who does the mother kiss?

+Q +NP

However, this explanation cannot do justice to the full array of facts that we know. First, Italian *who*-questions display a subject/object asymmetry; second, before age 4, this asymmetry is observed in English production (Yoshinaga, 1996) as well. Hence, one has to acknowledge that some other factor is responsible for the asymmetry in *who*-questions; this factor ceases to be operative in English at age 5, but at the same age is still operative in Italian and it must be distinct from that uncovered by Friedmann et al.. For one thing, the factor involved in *who*-questions is operative in English for a shorter than the additional factor responsible for children's difficulty with object *which*-questions. As we have seen, Guasti et al. (2012) proposed that this factor consisted in the violation of locality in the AGREE relation, i.e., the intervention of the object copy in the AGREE relation. Thus, we must acknowledge the presence of two interference processes: the interference in the AGREE relation and the interference of the NP subject between *which* NP and its copy.

In a developmental perspective, we can propose that initially children have trouble with object *wh*-questions (including reversible verbs) because of the intervention of the object copy in the AGREE relation and of the failure to raise the subject to Spec AgrS in wh-questions. Likely, facing these processes exceeds children's capacities. Hence, children fail to produce (and likely comprehend) object questions up to age 4-5. This holds true in Italian, English (based on Yoshinaga, 1996) and likely Hebrew (for which data are not available). However, in English and Hebrew, movement of the subject to Spec AgrSP is compulsory and, as children grow older, their computational resources increase; this put them in a position to check agreement for a second time across the board, hence also in wh-questions. Therefore, around age 5, *who*-questions are no longer a problem for English- and Hebrew-speaking children, because the effects of interference in the AGREE relation can be fixed, as Spec Head is independently required in the language. In Italian, at age 5, *who*-questions may remain difficult, because Spec Head agreement is not compulsory and only AGREE may apply. Italian-speaking children have the computational resources necessary to compute the additional process of Spec Head agreement, as proven by the fact that they do, when they produce null subject questions and questions with a left dislocated subject. However, they do not always perform this additional process and may produce a subject rather than an object question.

At age 5, when children have overcome problems with AGREE in English and Hebrew, there is another threat and here is where Friedmann et al.'s account comes in. This time, it is the pre-verbal subject with a subset of the feature of the wh-phrase that makes object *which*-questions challenging.

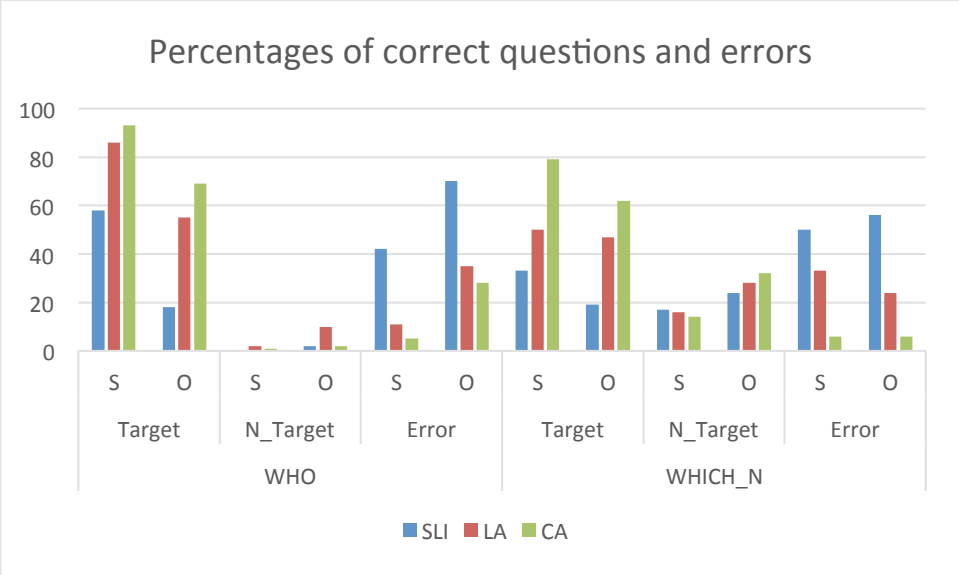
In summary, there are at least two processes in the generation of an object question that violates strict locality operations: one is interference of the object copy in the AGREE relation (between AgrS and the post-verbal subject) and one is interference in the chain connecting the moved wh-element and its copy (the pre-verbal subject). These processes are independent, operate at given times in development and are regulated by language specific properties. For example, compulsory application of movement of the subject to the pre-verbal position pave the way for Spec Head agreement in addition to AGREE and this frees children from problems in the application of only AGREE.

8. Wh-questions in children with SLI or Developmental Dyslexia

Guasti, Branchini, Vernice, Carravieri, and Arosio (submitted) investigated the production of questions in 7-year old children with SLI. They found that wh-questions are challenging for them. These children produced less questions (both subject and object) than chronologically age (CA) matched and Language age (LA) matched children, but similar tendencies were evident in all groups. In particular, subject questions had the order Wh V O (see (19)). Object questions with the order Wh V S (Target questions) were also found, but often other structures were used (see (20)): object questions displaying left dislocation of the subject or featuring a null subject (N_Target questions). In addition, for *which*-questions, children with SLI split the Wh-element and the N-part (see (21)). Thus, children with SLI displayed the same patterns observed in previous sections during typical development. Figure 3 depicts the percentages of the structures produced. Target-questions are those with the order Wh V O/S and N_target questions are correct questions featuring left dislocation of subjects, null subjects, passives. Errors were of three types: (1) agreement errors; (2) change of the wh-element *chi* (who) into *cosa* (what)[8] (3) other errors (use of the wh-element alone, production of a declarative, irrelevant questions). Agreement errors resulted in object questions being turned into subject questions (see (24)).

[8] In Guasti et al. (2012), questions introduced by *cosa* (what) rather than *chi* (who) were included among correct questions, as the structure was indeed correct. However, this choice may not do justice to the fact that the use of *what* is indeed an indication of a difficulty with the feature ±animate.

Figure 3. Percentage of wh-questions produced by children with SLI, Language age (LA) matched children and chronologically age (CA) matched children. Questions may have a Target structure (Wh V N) or a N_target correct structure (left dislocation of subjects, null subjects, passives). Errors are all conflated together. Questions are presented as a function of extraction site (subject and object) and type of wh-element (*who*- and *which*-questions). Elicited production data from Guasti, Branchini, Vernice, Carravieri, and Arosio (submitted)



Children with SLI were particularly taxed in the formation of object questions and a clear subject/object asymmetry was observed but only in the case of *who*-questions. Subject and object *which*-questions, instead, were equally challenging (see later for discussion of this issue). Children with SLI made more errors than control children. In particular, they made more agreement errors than CA matched children, but not than LA matched children. This observation square well with the observation reported in Chapter 1, whereby 5-year-old children with SLI have problems with 3rd person plural morphology. In questions, children with SLI had problems when they had to produce questions with 3rd person plural verbs, which were changed into 3rd person singular verbs. Thus, it appears that the processing of agreement is demanding for children with SLI, but not more than it is for LA matched children, that is, their ability to compute agreement matches that of 5-year-old children. Notice that children with SLI were weaker than LA matched controls in the production of questions, particularly object questions. Thus, difficulties with agreement cannot entirely account for difficulties in question formation. These data indicate that the course of language development

in children with SLI is not uniformly delayed. When an object *who*-question was elicited, children with SLI made more changes of *chi* (who) into *cosa* (what) than children with LA, but not than children with CA. The source of this error may be the fact that object questions are often introduced by *cosa* (what) and are about the theme, which is often an inanimate entity. This finding is a hint that children with SLI rely on lexical features such as animacy as much as CA control children do. Their linguistic development, in this respect, is age appropriate or not delayed.

In summary, the study of wh-questions reveals that children with SLI are more than 2 years behind typically developing children. They display the same difficulties, however. Object questions and subject *which*-questions are challenging for them, as they are for control children, although to a greater extent. Children with SLI make the same errors as control children; in some respects, they are similar to LA matched children (agreement errors); in other respects, they are similar to CA matched children (changes into *what*), revealing an uneven profile.

Wh-questions are challenging also for children with Developmental Dyslexia (DD). Although, at the group level, these children did not differ from CA matched control children, at the individual level they did. Guasti, Branchini, Vernice, Barbieri and Arosio (2014) reported that children with DD with mean age 9;4 (SD=1.3) produced wh-questions, but had more trouble with object than with subject wh-questions, like CA matched children. Similarly to these, they changed the *which*-element more frequently when an object question was targeted than when a subject question was. They produced various types of object questions: questions with left dislocation of the subject, with a null subject and some passive questions. However, no group effect was found. Likely, this is due to the fact that not all children with DD had trouble with wh-questions. In fact, at the individual level, it was found that 9 out of the 18 children with DD scored below the means of the CA group on either *who*- (2 children) or *which*-questions (7 children). This confirms the fact that, among the children with DD, only a subset have problems with oral language. As we pointed out in other chapters, it is possible that these children are indeed affected by SLI, although no formal diagnosis was performed.

In conclusion, the production of object wh-questions is challenging for Italian-speaking children with TD, even at age 5, for children with SLI at age 7 and for some children with DD, at age 9.

9. Summary and questions for future research

In this chapter, we have been dealing with the acquisition of wh-questions. Monolingual Italian-speaking children from about age 2;0 spontaneously produce a variety of wh-questions featuring movement of the wh-element to the left periphery of the clause. In these questions, the subject is either null or at the end of the clause, but never appears in between the wh-element and the verb. In other words, children's questions respect the requirement that the wh-element is moved to the left periphery and that it must be adjacent to the verb. In spite of the early use of wh-questions, a full mastery of these structures takes some time: in comprehension, object wh-questions featuring reversible verbs are hard to understand up to age 11;0, and by contrast, subject wh-questions are well understood from age 3-4 years.

In production, we observed the same subject/object asymmetry at age 5 and in adults. Production provides additional information with respect to comprehension, because it shows that participants produce a variety of structures when object questions are elicited, with differences between children and adults. In contrast, both children and adults produce only a single type of structure when subject questions are elicited (wh V N). Production provides us with the information that object questions with the structure wh V N are particularly taxing for children.

To deal with this range of facts, we discussed an account which is inspired by the same ideas exploited to explain the subject/object asymmetry in relative clauses. The leading idea is that locality is central in the computation of linguistic structures and intervention by some qualified element in a given local relation affects or disrupts the computation. The specific execution of this idea is different (but compatible) from that adopted in the chapter 5, because the elements involved are in different configurations. Specifically, object questions are difficult because the object copy intervenes in the AGREE relation between the functional head hosting agreement features and the post-verbal subject. AGREE interference may not be the only challenge in the formation of wh-questions.

Besides the difficulties observed with object questions (both *who* ad *which*), we also observed that subject *which*-questions were challenging for children. This suggests that the operation of pied-piping the nominal part, in combination with the various processes of agreement (between the wh and the nominal part and between the wh-phrase and the verb or between the verb and the subject), is challenging for (Italian) children.

Given these findings on typical development, it is not surprising that 7-year-old children with SLI are challenged in the production of object questions. Although they produce wh-questions, they are more than 2 years behind age expectations (LA matched control were 5 year olds). Some

children with DD are also taxed in the production of questions, suggesting that these children may be affected by additional SLI.

These studies raise a number of questions. First, we have seen that children produce a variety of object wh-questions. Their comprehension has been tested with only one type of structure, the one with the post-verbal subject (wh V S). One natural area of investigation would focus on the comprehension of passive object questions, questions with null subjects or questions with subjects dislocated in the left periphery. Recall from chapter 5, that passive object relatives (POR) are better comprehended than active object relatives by monolingual children from age 6 on.

A second area of inquiry concerns the development of the production of wh-questions. The data reported in this chapter concerns 5 year olds and adults, but one may want to know whether some of the structures produced by 5 year olds become obsolete at later ages, as adults do not produce object questions with left dislocation of the subject.

In this chapter, we have seen mainly subject and object questions. One study has looked at other types of questions introduced by other wh-elements (e.g., *where*, *why*). However, other types of wh-elements have not been tested, specifically those requiring pied-piping of prepositions like *a chi* (to whom), *con chi* (with whom), *in quale posto* (in which place), etc... If pied piping is challenging, one may observe difficulties with these wh-elements. Interestingly, some wh-elements do not display agreement, like *a chi*, while others do, like *in quale posto/in quali posti* (in which-pl place-pl). Thus, if pied piping is challenging when it is combined with agreement processes, then one may observe selective problems.