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Interpretation of Clitic, Strong and Null Pronouns in the Acquisition of European Portuguese

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DECLARAÇÕES

Declaro que esta dissertação é o resultado da minha investigação pessoal e independente. O seu conteúdo é original e todas as fontes consultadas estão devidamente mencionadas no texto, nas notas e na bibliografia.

A candidata,

Carolina Glória de Almeida Guerreiro da Silva

Lisboa, 3 de Fevereiro de 2015

Declaro que esta dissertação se encontra em condições de ser apreciado pelo júri a designar.

O orientador,

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Maria Lobo

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For my parents

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If you talk to a man in a language he understands, that goes to his head.

If you talk to him in his language, that goes to his heart.

Nelson Mandela

Bill Watterson, author of the comic strip *Calvin and Hobbes*

Interpretation of Clitic, Strong and Null Pronouns in the Acquisition of European Portuguese

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Abstract

The goal of the present research was to investigate how the interpretation of clitic, strong and null pronouns by Portuguese preschool children is influenced by the grammatical status of those forms.

In a first study, picture verification tasks were used in order to verify if the categorial status of object pronominal forms (clitic or strong) is intralinguistically relevant in European Portuguese (EP), especially in contexts of variation between non-reflexives and reflexives. According to the results, children did not have major difficulties with reflexive forms (anaphors), regardless of their clitic or strong status. In the interpretation of non-reflexive forms, their performance got close to the adults' behavior with clitic pronouns, while it deviated with strong pronouns in prepositional contexts. Children overaccepted dispreferred coreferential readings when interpreting non-reflexive strong object pronouns in non-locative PPs.

In a second study, truth value judgment tasks were applied with the intention of specifying if there is an interpretative asymmetry between null and overt pronominal subjects in indicative and subjunctive complement clauses. The results show that, in the indicative (with one or two intrasentential antecedents), children overaccepted the pragmatically inappropriate reading of coreference for overt strong subject pronouns, unlike adults. Children performed more adult-like with null subject pronouns in indicative clauses, when there is only one intrasentential antecedent (the matrix subject). However, they often accepted the dispreferred reading of disjoint reference with null pronominal subjects in the indicative, in the presence of two potential antecedents before the pronoun (the matrix subject and the matrix object). In the subjunctive (selected by volitional verbs or declarative verbs of order), children incorrectly assigned coreferential readings to both null and overt subject pronouns.

Strong pronominal forms are argued to be licensed post-syntactically. The difficulties in the post-syntactic rejection of the dispreferred coreference when interpreting object and embedded subject strong pronouns (constrained by semantic and/or pragmatic factors) are based on processing problems at the interface level. Here, there is competition between convergent derivations and the comparison between those structures is costly for children's limited working memory. In turn, clitic and null pronouns are licensed in syntax (making the establishment of the referential dependency of these forms to be more economical), since both are dependent on functional categories as inflection. However, there are some processing constraints in the interpretation of null pronominal subjects in indicative clauses, when the matrix object antecedent linearly intervenes in the referential dependency between the preferred matrix subject antecedent and the null embedded subject pronoun. In this case, children's performance is guided by the linear proximity of the matrix object antecedent preceding the null pronoun. The subjunctive obviation (with both types of subject pronouns) is not completely acquired yet by children. Nevertheless, they show sensitivity to the contrast between the indicative and the subjunctive. The full mastery

of obviation involves not only syntactic knowledge of the anaphoric nature of Tense (e.g. Meireles & Raposo, 1983) but also lexical and semantic knowledge of the matrix verbs, which takes some time to acquire. In the pronominal system, the more pronouns are syntactically licensed, the less problematic their acquisition becomes.

Keywords: acquisition, European Portuguese, interpretation, clitic pronouns, strong pronouns, null pronouns, object, subject, indicative, subjunctive.

Interpretação de Pronomes Clíticos, Fortes e Nulos na Aquisição do Português Europeu

Carolina Glória de Almeida Guerreiro da Silva

Resumo

O objetivo do presente estudo foi investigar como a interpretação de pronomes clíticos, fortes e nulos por crianças portuguesas em idade pré-escolar é influenciada pelo estatuto gramatical dessas formas.

Num primeiro estudo, foram utilizadas tarefas de verificação de imagens a fim de verificar se o estatuto categorial da forma pronominal em posição de complemento (clítico ou forte) é relevante intralinguisticamente em Português Europeu (PE), designadamente em contextos de variação entre não-reflexos e reflexos. De acordo com os resultados, as crianças não têm grandes dificuldades com formas reflexas (anáforas), independentemente do seu estatuto clítico ou forte. Na interpretação de formas não-reflexas, o seu desempenho aproximou-se do dos adultos com os pronomes clíticos mas desviou-se com os pronomes fortes em contextos preposicionais. As crianças sobreaceitaram leituras correferenciais não-preferidas ao interpretar pronomes fortes complemento não-reflexos em sintagmas preposicionais não-locativos.

Num segundo estudo, foram aplicadas tarefas de juízo de valor de verdade com a intenção de especificar se há uma assimetria interpretativa entre sujeitos pronominais nulos e plenos em orações completivas com indicativo e conjuntivo. Os resultados mostram que, no indicativo (com um ou dois antecedentes intrafrásicos), as crianças sobreaceitaram a leitura pragmaticamente inadequada de correferência para pronomes sujeito plenos, ao contrário dos adultos. As crianças aproximaram-se do desempenho dos adultos com pronomes sujeito nulos em orações com indicativo, quando há um só antecedente intrafrásico (o sujeito matriz). Contudo, aceitaram frequentemente a leitura disjunta não-preferida com sujeitos pronominais nulos no indicativo, na presença de dois potenciais antecedentes na frase (o sujeito matriz e o objeto matriz). No conjuntivo (selecionado por verbos volitivos e declarativos de ordem), as crianças atribuíram incorretamente leituras correferenciais a ambas as formas de pronome sujeito (nulo e pleno).

Argumentamos que as formas pronominais fortes são licenciadas pós-sintaticamente. As dificuldades na rejeição pós-sintática da correferência não-preferida ao interpretar pronomes fortes em posição de complemento e de sujeito encaixado (restringinda por fatores semânticos e/ou pragmáticos) são baseadas em problemas de processamento ao nível das interfaces. Aqui, há competição entre derivações convergentes e a comparação entre essas estruturas envolve custos para a limitada memória de trabalho das crianças. Por sua vez, os pronomes clíticos e nulos são licenciados na sintaxe (fazendo com que o estabelecimento da dependência referencial destas formas seja mais económica), pois ambos são dependentes de categorias funcionais como a flexão. No entanto, existem algumas restrições de processamento na interpretação dos sujeitos pronominais nulos em orações com indicativo, quando o antecedente objeto matriz intervém de forma linear na dependência referencial entre o antecedente sujeito matriz preferido e o pronome sujeito nulo encaixado. Neste caso,

o desempenho das crianças é guiado pela proximidade linear do antecedente objeto matriz que precede o pronome nulo. A obviação conjuntiva (com ambos os tipos de pronome sujeito) não está ainda completamente adquirida pelas crianças. Todavia, mostram sensibilidade ao contraste entre o indicativo e o conjuntivo. O domínio completo da obviação envolve não só conhecimento sintático do caráter anafórico de Tempo (e.g. Meireles & Raposo, 1983) mas também conhecimento lexical e semântico dos verbos matriz, o que demora algum tempo a adquirir. No sistema pronominal, quanto mais os pronomes são sintaticamente licenciados, menos problemática se torna a sua aquisição.

Palavras-chave: aquisição, português europeu, interpretação, pronomes clíticos, pronomes fortes, pronomes nulos, complemento, sujeito, indicativo, conjuntivo.

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LIST OF ABBREVIATIONS

ACC	Accusative
Agr	Agreement
AgrP	Agreement Phrase
BP	Brazilian Portuguese
CFC	Complete Functional Complex
CL	Clitic
C / Comp	Complementizer
coref. / CO	Coreference
D	Determiner
DAT	Dative
disj. ref. / DJ	Disjoint reference
DO	Direct Object
DP	Determiner Phrase
DPBE	Delay of Principle B Effect
ECM	Exceptional case marking
EP	European Portuguese
fem. / FEM	Feminine
Infl	Inflection
IP	Inflection Phrase
IO	Indirect Object
LF	Logical Form
masc. / MASC	Masculine
NP	Noun Phrase
O	Object
OBL	Oblique
Plur / PL	Plural
PP	Prepositional Phrase
QA	Quantificational Asymmetry
QP	Quantifier Phrase
R	Reference time
REC	Reciprocal
R	Referential
REFL	Reflexive
S	Subject
Sing / SG	Singular
Spec	Specifier
S-structure	Surface structure
T	Tense
TO	Tense Operator
t	Trace
V	Verb
VP	Verb Phrase

1. Introduction

The general goal of the present research is to investigate how the interpretation of clitic, strong and null pronouns by typically developing Portuguese preschool children (between 3 and 6 years and 6 months old) is influenced by the grammatical status of those forms.[1] Thus, we try to determine to what extent the categorial and morphological status of different classes of pronouns and their functional nature is relevant in the process of acquisition of European Portuguese (EP). In this thesis, the investigation was developed within the framework of Principles and Parameters Theory of Generative Grammar.

The interpretation of pronouns in first language acquisition is a domain *par excellence* for the study of linguistic interfaces, raising relevant questions in the articulation between core syntax and other components of grammar. Additionally, the current research seeks to understand how the interpretation of different types of pronouns (clitic, strong and null) in the acquisition of EP involves not only mastery of syntactic rules, semantic knowledge and pragmatic information but also the interaction among these different linguistic components. Hence, this investigation aims to determine how syntactic, semantic and pragmatic properties condition the acquisition of pronouns. The intention is to contribute, through the study of the acquisition of the pronominal system, for a finer definition of the role played by the several interfaces and by processing constraints in the initial stages of linguistic development.

Consequently, we carried out two sets of experimental studies in EP: the first one refers to the interpretation of clitic and strong pronouns in object position, and the second one concerns the interpretation of null and overt pronouns in embedded subject position (within indicative and subjunctive complement clauses).

Study One aims at researching the behavior of Portuguese children regarding the interpretation of object pronouns in terms of their categorial status (clitic and strong) and their type (non-reflexive and reflexive). In EP, both clitic and strong pronouns can

[1] This research was included in the projects *Syntactic Dependencies from 3 to 10* (PTDC/CLE-LIN/099802/2008) and *Crosslinguistic and Crosspopulation Approaches to the Acquisition of Dependencies* (PTDC/MHC-LIN/4812/2012), both funded by Fundação para a Ciência e a Tecnologia (FCT).

occupy the object position, although strong forms only occur in prepositional phrases (PPs). In this first study, the purpose is to verify if a distinction between clitic and strong pronouns is intralinguistically relevant in EP, namely in contexts of variation between non-reflexives and reflexives (cf. (1) and (2)). Besides, we intend to explore the differentiation between binding and coreference as well as trying to define the role of semantics and pragmatics in the interpretation of object pronouns by children.

(1) a. A avó está a penteá-**la**. (**non-reflexive clitic pronoun**)

the grandma is combing-her

b. A avó está a pentear-**se**. (**reflexive clitic pronoun**)

the grandma is combing-herself

(2) a. O rei está a bater n**ele**. (**non-reflexive strong pronoun**)

the king is hitting in-him

b. A princesa está a apontar para **si**. (**reflexive strong pronoun**)

the princess is pointing at herself

Study Two aims at analyzing how Portuguese children interpret null and overt pronominal subjects in finite complement clauses with the indicative and the subjunctive moods. The objective is to specify if there is an interpretative asymmetry between null and overt subject pronouns in the acquisition of EP. In indicative complement clauses, a null pronominal subject is preferentially interpreted as coreferential with the matrix subject (cf. (3)a) while an overt pronominal subject is preferentially interpreted as disjoint from the main subject (cf. (3)b). In subjunctive complement clauses, selected by volitional verbs like *querer* (to want) for example, both types of pronominal subjects are necessarily disjoint in relation to the matrix subject (cf. (4)). Thus, this experimental study proposes to contribute to a better understanding on how Portuguese children establish anaphoric relations with different

types of subject pronouns (null or overt) and in different embedded contexts (indicative or subjunctive). It also tries to determine if children's performance is influenced by the type of matrix verb that selects the subjunctive, by the presence of one or two available antecedents in the sentence, and by the introduction of an object antecedent before the pronoun or after the pronoun.

(3) a. O príncipe disse que ***pro*** chorou. (**null pronoun in the indicative**)

the prince said that *pro* cried

b. O bombeiro disse que **ele** chorou. (**overt pronoun in the indicative**)

the fireman said that he cried

(4) a. O avô quer que ***pro*** cante. (**null pronoun in the subjunctive**)

the grandpa wants that *pro* sings

b. O avô quer que **ele** cante. (**overt pronoun in the subjunctive**)

the grandpa wants that he sings

In general, this dissertation intends to check if the grammatical status of pronouns, with syntactic function of object or subject, establishes differences in acquisition, affecting children's interpretation. Thus, we will try to determine the nature of eventual difficulties that preschool children may face in the acquisition of pronominal forms in EP. Therefore, we will consider the following research questions:

a) Do children have difficulties in the interpretation of some specific type of pronouns (clitic, strong or null)?

b) Do children have difficulties, in the interpretation of pronouns, due to a delay in the acquisition of pragmatic principles?

c) In the interpretation of pronouns, do children have difficulties that may be explained by a processing problem related to working memory limitations at the interface level?

In sum, the purpose of this investigation is to add new elements to the studies about the interpretation of pronouns in first language acquisition, especially in EP.

1.1. Outline of the thesis

The content of this dissertation is organized as follows.

Chapter 2 gives an introduction of the typology and distribution of personal pronouns (strong, clitic and null) in EP. It also discusses the properties of these different types of pronominal forms according to the terminology suggested by Cardinaletti & Starke (1999) with examples from EP.

Chapter 3 accounts for the conditions that regulate the interpretation of object and embedded subject pronouns in different contexts. It begins by presenting a review of different theoretical proposals about binding and coreference, including the Binding Theory (Chomsky, 1982, 1986) and the Reflexivity Theory (Reinhart & Reuland, 1993). This is followed by a description of how strong object pronouns are interpreted within prepositional phrases (Menuzzi, 1999; Estrela, 2006). After that, we indicate the different interpretations that null and overt pronominal subjects can assume within indicative and subjunctive complement clauses in EP (Brito, 1991; Meireles & Raposo, 1983; Raposo, 1985). Here, the Position of Antecedent Hypothesis (Carminati, 2002) is taken into consideration, since it is argued to be operative in the preferential readings of null and overt embedded subject pronouns.

In chapter 4, we review some of the main studies on the acquisition of pronominal reference. The first part reports crosslinguistic investigations on the acquisition of interpretation of strong and clitic pronominal objects (e.g. Chien & Wexler, 1990; McKee, 1992; Varlokosta, 2002; Grolla, 2006). The second part makes an analysis of crosslinguistic studies on the acquisition of interpretation of null and overt pronominal subjects in finite complement clauses, with the indicative and the subjunctive moods (e.g. Padilla, 1990; Avrutin & Wexler, 1999/2000).

Chapter 5 describes the first study of the current research, on the interpretation of clitic and strong pronouns in object position in EP. It is composed of a test on the comprehension of non-reflexive and reflexive clitics and by two tests on the

interpretation of non-reflexive and reflexive strong pronouns: a pretest applied only to adults and an acquisition test applied to both children and adults. At the end of this chapter, there is a general discussion about the results observed in study one.

Chapter 6 describes the second study of this dissertation, on the interpretation of null and overt pronouns in embedded subject position of indicative and subjunctive complement clauses in EP. This experimental study is composed of a pretest and by four tests (A1, A2, B and C), all applied to children and adults. These tests differ in the possible referential antecedents for the (null or overt) embedded subject pronoun and in the type of matrix verb that selects the subjunctive. This chapter ends with a general discussion about the results of study two.

Lastly, chapter 7 presents the conclusions of the investigation conducted in EP, taking into account the results obtained in both studies.

This doctoral thesis contains, as an appendix, a compact disc (CD) that includes all the tests of interpretation of pronouns used in the two studies of the present investigation. The tests, elaborated for EP, are also translated into English. The appendix CD also contains all the obtained results and their statistical analysis. The content of the CD is in HTML format and it will be opened in any web browser available in the user's computer. To access the information of the appendix, the user should double-click the file named **appendix**.

2. Typology and distribution of personal pronouns in EP

As is well established, personal pronouns are nominal expressions that do not have inherent referential content, that is, do not present referential autonomy. Their reference is always dependent on the discourse situation or on the linguistic context (Lobo, 2013: 2193-2194).

Let us consider the following sentence:

(5) O Papa Francisco recebeu o Cardeal de Lisboa.

the Pope Francis received the Cardinal of Lisbon

Even if we hear the sentence in (5) without any introductory context, the nominal expressions *o Papa Francisco* and *o Cardeal de Lisboa* have referential autonomy and we are able to identify easily their respective referents.

Consider now the sentence below:

(6) Ela ama-o.

she loves-him

If we hear the sentence in (6) but do not know the context, we have to obtain further information about the corresponding referents of the forms *ela* and *o* in order to identify them. Due to the fact that both forms are personal pronouns and do not have referential autonomy, the identification of their referents is not, by itself, possible. However, we can observe that *ela* is a strong pronoun of 3rd person singular and feminine gender, with the grammatical function of subject (nominative case). The form *o* is a clitic pronoun of 3rd person singular and masculine gender, with the function of direct object (accusative case).

Personal pronouns indicate the grammatical person of the participants in a communicative act (speaker, listener and entity that is spoken about) and allow variation not only in person but also in number, gender and case.

In the next sections, we will explain the differences that exist within the different kinds of personal pronouns in European Portuguese (EP) according to the following categories: strong, clitic and null. We will discuss whether the typology established by Cardinaletti & Starke (1999) can be applied to European Portuguese pronouns.

2.1. Strong pronouns

Strong personal pronouns are tonic (stressed) forms that are associated with the grammatical relations of subject (nominative case) and of oblique object or adjunct (oblique case).

The table below is adapted from the one presented by Brito, Duarte & Matos (2003: 819).

Grammatical persons	**Cases**	
	Nominative	**Oblique**
1st Sing	eu	mim, comigo
2nd Sing	tu	ti, contigo
	você	você, si, consigo
3rd Sing	ele **(masc.)**, ela **(fem.)**	ele, ela, si, consigo
1st Plur	nós	nós, connosco
2nd Plur	vós	vós, convosco
	vocês	vocês, convosco
3rd Plur	eles **(masc.)**, elas **(fem.)**	eles, elas, si, consigo

Table 1: Strong pronouns in European Portuguese

As Cunha & Cintra (1992: 292-294) expose, the pronoun of formal treatment of 2nd person singular *você* (you) occurs with the verb in the 3rd person. In this context, the respective pronominal forms (including clitics and possessives) assume the form of

3rd person. Here is an example in which the pronominal subject *você* (you) is accompanied by the verbal form *dança* (dance) inflected in the 3rd person singular of the present of the indicative:

(7) **Você** dança muito bem.

you dance-PRESENT-3SG very well

After a preposition, the pronoun is always strong, working as an oblique object or adjunct. The pronominal elements *comigo*, *contigo*, *consigo*, *connosc*o and *convosco* already contain in their form, by contraction, the preposition *com* (with). The following example shows the use of the pronominal form *comigo* (with-me):

(8) Vem ao cinema **comigo**.

come to-the cinema with-me

The prepositions *de* (of) and *em* (in) contract with the 3rd person strong pronoun *ele*(*s*)/*ela*(*s*), originating respectively the forms *dele*(*s*)/*dela*(*s*) and *nele*(*s*)/*nela*(*s*), as informed in Cunha & Cintra (1992: 291). The following are illustrative sentences:

(9) Os colegas falaram bem **dela**.

the colleagues spoke well of-her.

(10) Os ladrões bateram **nele**.

the thieves hit in-him

The reciprocal constructions (which refer to plural entities) with strong pronominal expressions consist of a complex prepositional phrase with the form "*um* + preposition + *o outro*", including the feminine and plural variants (Lobo, 2013: 2215):

(11) Eles gostam **um do outro**.

they like one of-the other-MASC-SG (each other)

(12) Elas gritaram **umas com as outras**.

they screamed one with the other-FEM-PL (with each other)

The first study of the current research tested the interpretation of 3rd person singular non-reflexive (*ele*/*ela*) and reflexive (*si*) forms of strong object pronouns within PPs in the acquisition of EP (cf. chapter 5). In this case, the strong pronouns were in the oblique case.

The second study tested the interpretation of 3rd person singular overt subject pronouns (*ele*) in indicative and subjunctive complement clauses by Portuguese children and adults (cf. chapter 6). Here, the strong pronouns were in the nominative case.

2.2. Clitic pronouns

Within the personal pronouns in EP, we can find clitic pronouns. These pronominal forms are also called *atonic pronouns*, like in traditional grammars such as the one from Cunha & Cintra (1992: 279), or *special clitics*, designation introduced by Zwicky (1977). According to Brito, Duarte & Matos (2003: 826-827), clitic pronouns prototypically correspond to the atonic (unstressed) forms of the personal pronoun associated with the position of (direct or indirect) complements of verbs. These pronominal forms are dependent on verbs (stressed lexical items), designated as their hosts. Consequently, clitics cannot occur isolated in the discourse. EP only has **object** clitics.

The following table is based on the one displayed in Brito, Duarte & Matos (2003: 827).

Grammatical persons	**Non-reflexive**		**Reflexive**
	Accusative	**Dative**	**Accusative / Dative**
1st Sing	me	me	me
2nd Sing	te	te	te
3rd Sing	o **(masc.)**, a **(fem.)**	lhe	se
1st Plur	nos	nos	nos
2nd Plur	vos	vos	vos
3rd Plur	os **(masc.)**, as **(fem.)**	lhes	se

Table 2: Clitic pronouns in European Portuguese

The clitic pronoun *o*(*s*)/*a*(*s*) assumes the form *lo*(*s*)/*la*(*s*) when the verbal form ends in /*r*/, /*s*/ or /*z*/, which causes simultaneously the disappearance of both of these elements (cf. (13), (14), (15)), as explained in Cunha & Cintra (1992: 280) and Brito, Duarte & Matos (2003: 831). The clitic occurs as *no*(*s*)/*na*(*s*) when the verbal form ends in a nasal sound (cf. (16)). Illustrative examples of these situations are presented below:

(13) O pai está a lavar o carro. → O pai está a lavá-**lo**.

the dad is washing the car the dad is washing-it

(14) Tu comes a sopa depressa. → Tu come-**la** depressa.

you eat the soup fast you eat-it fast

(15) A mãe fez o bolo esta manhã. → A mãe fê-**lo** ontem à noite.

the mom made the cake this morning the mom made-it this morning

(16) A Ana e o Nuno sujaram o tapete. → A Ana e o Nuno sujaram-**no**.

the Ana and the Nuno dirtied the carpet the Ana and the Nuno dirtied-it

The plural clitic forms *nos*, *vos* and *se* are used in the reciprocal constructions, which necessarily involve plural entities:

(17) Telefonamo-**nos** (um ao outro) todos os fins de semana.

we-call-us-CL-REC-1PL (each other) every weekend

In EP, there are several types of clitics. We will focus on argumental clitics with definite reference (pronominals and anaphors), which are the ones used in this research. As stated by Brito, Duarte & Matos (2003: 835), the *non-reflexive pronominal* clitics, that is, the set of accusatives and datives (cf. (18)), and the *reflexive and reciprocal anaphors* (cf. (19)) can be characterized as argumental, since they occur associated with the positions of direct or indirect object of transitive or ditransitive verbs.[2]

(18) a. Chamaram-**na** para ir almoçar.

they-called-her-CL-ACC-3SG to go lunch

b. Ofereci-**lhe** uma saia nova.

I-offered-her-CL-DAT-3SG a skirt new

(19) a. O Leonardo magoou-**se** quando brincava na rua.

the Leonardo hurted-himself-CL-REFL-3SG when he-played in-the street

[2] Some authors, as Cinque (1988), consider that reflexive clitics are not argumental or are not associated with the position of internal arguments. Thus, Cinque (1988) admits that the reflexive clitic absorbs the thematic role of the external argument. However, Brito, Duarte & Matos (2003: 835) state that the possibility of clitic doubling seems to point to the opposite perspective, since the doubled expression apparently occupies the position of internal argument.

b. Abraçaram-**se** antes de a corrida começar.

they-hug-themselves-CL-REC-3SG before the race began

Brito, Duarte & Matos (2003: 836) inform that these argumental clitics admit clitic doubling constructions, in which the doubled constituent occupies the argumental position with which the clitic is associated:

(20) a. Chamaram-**na a ela** para ir almoçar.

they-called-her to she to go lunch

b. Ofereci-**lhe a ela** uma saia nova.

I-offered-her to she a skirt new

c. O João magoou-**se a si próprio** quando brincava na rua.

the John hurted-himself to himself when he-played in-the street

d. Abraçaram-**se um ao outro** antes de a corrida começar.

they-hug-themselves one to-the other (each other) before the race began

In the first study of the present investigation, we tested the comprehension of 3rd person singular non-reflexive (*o*/*a*) and reflexive (*se*) forms of accusative object clitics in the acquisition of EP (cf. chapter 5).

2.3. Null pronouns

Pronouns can also be phonetically null in EP (Brito, Duarte & Matos, 2003: 823-825). The following is a brief introduction and description of null subject pronouns.

Null pronominal subjects can be argumental, quasi-argumental or non-argumental, depending on the argument structure of the verb (Chomsky, 1982: chapter 6; Rizzi, 1986).

In the example below, the subject is a null pronoun (***pro***) and its identification (as a 1st person singular pronoun) is done through the verbal agreement form. This null pronoun is **argumental**, having the semantic value (that is, the thematic role) of agent in the sentence:

(21) ***pro*** Comprei um carro novo.

I-bought a car new

In the following example, *pro* is **quasi-argumental** and its referential content is minimal. In this case, the null subject is also named **expletive**. It is mostly the subject of weather verbs, which describe atmospheric phenomena. Although these verbs usually describe on its own a given weather situation, as in (22), they may present a cognate object as argument, like in sentence (23):[3]

(22) ***pro*** Nevou esta manhã.

it-snowed this morning

(23) Nevaram minúsculos flocos de neve esta manhã.

snowed tiny snowflakes this morning

In the next example, *pro* is a **non-argumental** subject with no semantic value in the sentence. This means that its function is purely grammatical, not referring to any entity. This type of null subjects is known as **expletive** or **non-referential** (Lobo, 2013: 2312).

[3] On account of this fact, some authors (Chomsky, 1982; Rizzi, 1986) have proposed that the null subject of the sentence in (22) is somehow a non-explicit constituent equivalent to *minúsculos flocos de neve* (tiny snowflakes) of the sentence in (23). The sentence in (22) would thus be equivalent to *neva neve* (snows snow). The null subject of these verbs is called a quasi-argument.

(24) ***pro*** Parece que a Catarina está doente.

it-seems that the Catarina is sick

These examples are typical occurrences of a **null subject language** like EP, which allows the subject position to be occupied by an empty pronoun in **finite** clauses. Consequently, EP is a language that sets the positive value for the Null Subject Parameter (Jaeggli & Safir, 1989; Raposo, 1992).

Sentence (25) contains a null subject in a **finite complement clause** with the **indicative** mood, which is selected by the declarative verb *dizer* (to say) in the higher clause. In cases like this, as Brito (1991) describes, the stronger interpretation is the one in which the null pronoun of the complement clause is coreferent with the DP *o avô*, subject of the main clause:

(25) O avô disse que ***pro*** adormeceu no cinema.

the grandpa said that *pro* fell-asleep at-the cinema

In (26), the null pronoun of the finite complement clause with the **subjunctive** (selected by the volitional verb *querer* – to want) is obligatorily interpreted as disjoint from the subject DP of the higher clause (Meireles & Raposo, 1983; Raposo, 1985). This null embedded subject pronoun may have the interpretation of 1st person singular *eu* (I), of 2nd person singular of formal treatment *você* (you) or of 3rd person singular forms of the strong pronouns *ele*/*ela* (he/she):

(26) A Madalena quer que ***pro*** emagreça.

the Madalena wants that *pro* loses-weight

Section 3.2. describes in detail the interpretative alternation between the null pronoun and its phonetically overt counterpart in subject position within indicative and subjunctive complement clauses, which is one of the research topics of this dissertation.

In the following example, a coreference relation is established between the nominal expression of the higher clause and the null subject (PRO) of the **non-inflected infinitive** complement clause through a **control** structure (Brito, Duarte & Matos, 2003: 824-825). This means that the null subject of the subordinate clause is controlled by the subject of the main clause and it has the same reference:

(27) A Madalena quer ***PRO*** emagrecer.

the Madalena wants *PRO* to-lose-weight

The example (28) corresponds to a complex sentence that contains a **non-inflected infinitive** clause (*dançar*) as subject. In this case, the null pronoun (PRO) has an arbitrary interpretation (Brito, Duarte & Matos, 2003: 825). The existence of a null pronoun, in these types of sentences, is legitimated by the fact that the verb selects an external argument:

(28) ***PRO*** Dançar faz bem à alma.

PRO to-dance is good for-the soul

Brito, Duarte & Matos (2003: 825, fn. 56) inform that the control of PRO (the empty subject pronoun of non-inflected infinitives) is not associated with the positive value of the Null Subject Parameter because it is a phenomenon that is also available in languages like French and English (which are called non-null subject languages since they require a phonetically realized subject in finite clauses).

EP can express morphology of person in the infinitive and, accordingly, the verbal forms are designated as **inflected infinitives** (Raposo, 1987). The example (29)

shows a phonetically null pronoun occupying the subject position in an inflected infinitive clause. In this case, the null embedded subject presents a distinct reference from the subject of the matrix clause:

(29) O chefe acha importante ***pro*** chegarmos cedo à reunião.

the boss thinks important *pro* arrive-INF-1PL early to-the meeting

As Lobo (2013: 2325) indicates, the null pronominal subjects of inflected infinitive clauses are similar to the null pronoun *pro* that occurs in finite clauses. For instance, they can alternate with a phonetically overt pronoun (cf. (30)).

(30) O chefe acha importante **nós** chegarmos cedo à reunião.

the boss thinks important we arrive-INF-1PL early to-the meeting

Lobo (2013: 2332) states that null subject pronouns in EP can be identified by the verbal inflection, by a linguistic antecedent within the same sentence or previously introduced in the discourse context, or even through a referent present in the situational context. The next section 2.4. provides more details on null pronominal subjects and their properties.

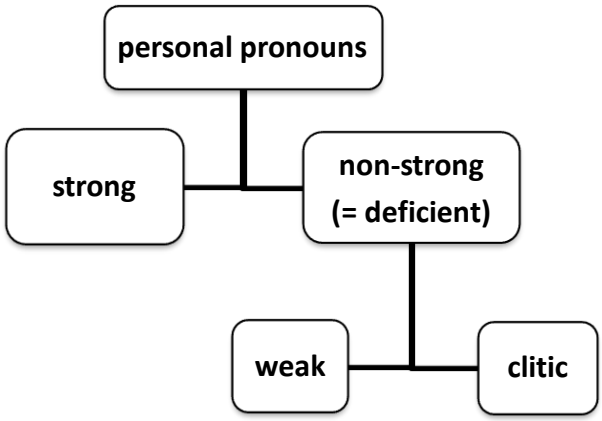
The second study of this research evaluated the interpretation that Portuguese children and adults attribute to null subject pronouns (*pro*), with one or two intrasentential antecedents, in both indicative and subjunctive complement clauses (cf. chapter 6).

2.4. A theory of tripartition of pronouns: strong, weak and clitic

Cardinaletti & Starke (1999) start to distinguish the personal pronouns in two classes: **strong** and **deficient** (non-strong). However, they consider that the *deficient* pronouns, in turn, are divided into **weak** and **clitic**. Consequently, due to this subdivision,

these authors defend a theory of tripartition for the system of personal pronouns that is observable, from their perspective, in natural languages and in which they are divided into these classes: **strong**, **weak** and **clitic**. The investigators argue that these formats are also found in other grammatical categories (adverbs, adjectives, quantifiers , nouns, wh-pronouns, etc.).

The following scheme properly illustrates the proposal of the theory of tripartition of personal pronouns by Cardinaletti & Starke (1999):



Scheme 1: Proposal of a tripartition of personal pronouns according to Cardinaletti & Starke (1999)

Cardinaletti & Starke (1999) argue that the distinction between strong pronouns and deficient pronouns (in which the clitics and the null forms are included) triggers a series of asymmetries, especially from the morphological, syntactic and semantic point of view. The researchers consider that these pronominal contrasts seem to be universal and they propose a set of generalizations. The deficient elements are characterized as being restrictive in relation to a set of properties that are distributed over all these components of grammar.

Subsequently, a description of the relevant properties that distinguish these types of pronouns, for the purposes of the current investigation, will be presented and complemented with examples in EP.

A. Morphological property

Morphologically, as Cardinaletti & Starke (1999: 149) show, the deficient elements present a reduced form in relation to the strong elements, formalized in the following way:

morphology (deficient forms) $\leq$ morphology (strong forms)

In example (31), it is possible to observe two morphologically distinct forms that denote the indirect object in each of the sentences in EP:

(31) a. Ordenei-**lhes** que saíssem da sala.

I-ordered-them-CL-DAT-3PL that leave of-the room

b. Ordenei **a elas** que saíssem da sala.

I-ordered to them-Strong-OBL-3PL that leave of-the room

Cardinaletti & Starke (1999: 180-181) argue that, in this case, the strong element *a elas* results from the combination of the pronoun *elas* and the morpheme *a*. Thus, it is possible to verify that only the whole expression (containing *a*) can be modified and coordinated. It can also introduce new referents using a contrastive stress. These are typical properties of strong pronouns (compare (32) and (33)):

(32) a. *Telefonei **a** só [ela]

I-called to only her

b. *Telefonei **a** [ela e ela]

I-called to her and her

c. *Telefonei **a** [ELA], não [ela]

I-called to her, not her

(33) a. Telefonei só [**a** ela].

I-called only to her

b. Telefonei [**a** ela] e [**a** ela].

I-called to her and to her

c. Telefonei [**a** ELA], não [**a** ela].

I-called to her, not to her

B. Syntactic properties

Cardinaletti & Starke (1999: 150-152) explain that the deficient pronouns, from a syntactic point of view, have a restrictive distribution compared to the strong pronouns.

(i) Base/θ-Positions

Unlike strong personal pronouns and DPs, deficient pronouns cannot occur in base positions (θ-positions). The following examples illustrate the base position of indirect objects (cf. (34)) and direct objects (cf. (35)):[4]

(34) a. O Bruno disse que telefonou à Rita.

the Bruno said that called to-the Rita

b. O Bruno disse que telefonou **a ela**$_S$.

the Bruno said that called to her

[4] The reference x_S (juxtaposed to a pronoun) means that it is strong, while the reference x_D indicates that the pronoun is deficient.

c. *O Bruno disse que telefonou-**lhe**$_D$.

the Bruno said that called-her-CL-DAT-3SG

d. O Bruno disse que **lhe**$_D$ telefonou.

the Bruno said that her-CL-DAT-3SG called

(35) a. Não empurrei **a Diana**.

not I-pushed the Diana

b. *Não empurrei **ela**$_S$. (in standard EP)

not I-pushed her

c. *Não empurrei-**a**$_D$.

not I-pushed-her-CL-ACC-3SG

d. Não **a**$_D$ empurrei.

not her-CL-ACC-3SG I-pushed

The use of the strong pronoun in contexts of direct object is not grammatical in standard EP (cf. (35)b), but it is allowed in Brazilian Portuguese (BP).

(ii) Peripheral positions

According to Cardinaletti & Starke (1999: 151), contrarily to what happens with strong personal pronouns and DPs, deficient forms are prevented from occurring in certain peripheral positions (considering the position in which the constituent occurs isolated as being peripheral and as a result of a subcase of dislocation):

(36) a. É {***lhe**$_D$; **a ele**$_S$; ao Tiago} que deves dinheiro. (cleft)

it-is { (CL-DAT-3SG); to him; to-the Tiago} that you-owe money

b. {***Lhe**$_D$; **A ele**$_S$; Ao Tiago}, deves dinheiro. (left dislocation)

{ (CL-DAT-3SG); to him; to-the Tiago}, you-owe money

c. A quem deves dinheiro? {***Lhe**$_D$; **A ele**$_S$; Ao Tiago}. (isolation)

to whom do-you-owe money { (CL-DAT-3SG); to him; to-the Tiago}

(37) a. Foi {***a**$_D$; **ela**$_S$; a Susana} que o Jorge convidou. (cleft)

it-is { (CL-ACC-3SG); her; the Susana} that the Jorge invited

b. {***A**$_D$; **Ela**$_S$; A Susana}, o Jorge convidou. (left dislocation)

{ (CL-ACC-3SG); her; the Susana}, the Jorge invited

c. Quem é que o Jorge convidou? {***A**$_D$; **Ela**$_S$; A Susana}. (isolation)

who did the Jorge invite { (CL-ACC-3SG); her; the Susana}

(iii) C-Modification / Coordination

Cardinaletti & Starke (1999: 151-152) defend that deficient elements cannot be modified by adverbs that affect the whole DP (which the authors call *c-modifiers*) nor coordinated.

The first case seems to be observed in EP (cf. (38)), since an interpretation similar to the one obtained with a strong pronoun or a DP cannot be obtained with a clitic pronoun (deficient form). The sentence with the dative clitic *lhe* is grammatical when meaning that *the only thing that Matilde did was to thank him* (or *her*). But the same sentence cannot mean that *Matilde thanked only to him*, because the clitic deficient pronoun cannot be modified by the adverb *só*.

(38) a. A Matilde agradeceu só **a ele** / ao Tiago.

the Matilde thanked only to him / to-the Tiago

b. A Matilde agradeceu-**lhe** só. (*with an interpretation similar to (38)a)

the Matilde thanked-CL-DAT-3SG only

In turn, the sentence in EP with the dative clitic pronoun *lhe* coordinated (cf. (39)b) should be ungrammatical, according to what is predicted by Cardinaletti & Starke (1999: 151-152). However, some adult speakers of EP were consulted, who considered (and insisted) that the sentence in (39)b is acceptable in EP, while others considered it of doubtful grammaticality.

(39) a. A Isabel confessou **a ela** e à Joana que estava apaixonada.

the Isabel confessed to her and to-the Joana that was in-love

b. ?A Isabel confessou-**lhe** e à Joana que estava apaixonada.

the Isabel confessed-CL-DAT-3SG and to-the Joana that was in-love

C. Semantic properties

(i) Prominent discourse referents

Cardinaletti & Starke (1999: 153-154) argue that deficient pronouns cannot receive contrastive stress, except when referring to an entity that is already prominent in the discourse.[5]

[5] Cardinaletti & Starke (1999: 153) present the following example, in which they defend that the deficient pronoun can be contrastively focused:
(i) A: Je **te** casserai la gueule!
I you will-break the face
B: Ah ouais? Tu veux dire que je **TE** casserai la gueule!
oh yeah? you want to-say that I YOU will-break the face
The example (ii) in EP is inspired by the one presented in French by the authors. In this case, even if the deficient form has a prominent discourse antecedent, the sentence still does not seem acceptable (cf. (ii)). Nevertheless, it would become more natural if the strong pronoun of 1st person singular *eu* (I) was introduced, giving it a more reinforced intonation (cf. (iii)).
(ii) A: Eu parto-**te** a cara!
I break-you-CL-DAT-2SG the face
B: ??Não, não… deves estar a querer dizer que **TE** parto a cara!
no, no… you-must be meaning that you-CL-DAT-2SG break the face
(iii) A: Eu parto-**te** a cara!

In EP, when the deficient pronoun is focused in a contrastive way, the sentence is not acceptable (cf. (40)a), while the strong pronoun is possible to be contrastively focused in the same context (cf. (40)b).

(40) a. *O Francisco telefonou-**LHE**.

the Francisco called-CL-DAT-3SG

b. O Francisco telefonou a **ELA**.

the Francisco called to her

The authors also point out that, if a deficient pronoun has an entity that is already prominent in the discourse as a referent, it can be allowed with ostension (act of showing or pointing out), under "flat" intonation.

The contrast between the example of (41)a and both examples of (42) in EP show that it is possible for a clitic deficient pronoun to accompany ostension, without the necessity to change its intonation, only when it has as referent a prominent topic in the discourse.[6] In turn, the strong pronoun of (41)b in EP is able to refer to an entity which is non-prominent in the discourse (as formulated by Cardinaletti & Starke, 1999: 154).

(41) a. *Acenei à Sílvia e depois acenei☞-**lhe**.

I-waved to-the Sílvia and then I-waved-her-CL-DAT-3SG

b. Acenei à Sílvia e depois acenei ☞a **ela**.

I-waved to-the Sílvia and then I-waved to her-STRONG

I break-you-CL-DAT-2SG the face

B: Não, não… deves estar a querer dizer que **EU** te parto a cara!

no, no… you-must be meaning that I you-CL-DAT-2SG break the face

[6] The symbol "☞" indicates ostension. The sentence of (41)a is inspired by the following example in French (cf. (i)), presented by Cardinaletti & Starke (1999: 153) in order to demonstrate that deficient pronouns must have an antecedent prominent in the discourse:

(i) *J'ai vu Marie puis je ☞**l'**ai vu.

I have seen Mary then I her have seen

(42) a. Vem para aqui e olha para aquele rapaz. Consegues vê☞-**lo** bem agora?

come to here and look at that boy can-you see-him-CL-ACC-3SG now

b. Não consegues ver o palco daqui? Eu vejo☞-**o** perfeitamente!

not can-you see the stage from-here I see-it-CL-ACC-3SG perfectly

(ii) Expletives

Expletive and quasi-expletive constructions always require subject pronouns to be deficient, because strong pronouns are not interpretable in these non-referential positions. In the case of EP, such positions are occupied by phonetically **null** pronouns (*pro*):

(43) a. ***pro*** Aconteceu uma desgraça!

it-happened a disgrace

b. ??**Ele** aconteceu uma desgraça! (in standard EP)

he happened a disgrace

(44) a. ***pro*** Chove torrencialmente.

it-rains torrentially

b. ??**Ele** chove torrencialmente. (in standard EP)

he rains torrentially

The examples from (43) and (44) refer to the standard variety of EP, since there are dialectal varieties in which the expletive subject can be phonetically overt, corresponding to the form *ele* (he). In the presence of this overt pronoun in these

expletive contexts, the sentences become *stylistically marked* (or even *marginal*) for a standard EP speaker (cf. (43)b and (44)b).[7]

(iii) Impersonal constructions

Similarly, only deficient elements can have an impersonal use, behaving as arbitrary subjects.

In EP, the nominative clitic pronoun *se* (cf. (45)a) and the null subject pronoun *pro* (cf. (45)b) occur in impersonal contexts, whereas the arbitrary interpretation with a strong pronoun is blocked (cf. (45)c). In this last case, the occurrence of the overt subject pronoun *eles* implies the loss of the impersonal interpretation.

(45) a. Diz-**se** que vai haver seca este ano.

it-says-CL that there will be dry this year

b. ***pro*** Dizem que vai haver seca este ano.

they-say that there will be dry this year

c. **Eles** dizem que vai haver seca este ano. (*impersonal interpretation)

they say that there will be dry this year

According to the perspective of Cardinaletti & Starke (1999), it is possible to consider that null pronouns belong to the class of deficient pronouns: they occur in both expletive and impersonal constructions.

[7] The sentences in (43)b and (44)b, with the overt expletive subject *ele*, are considered acceptable in EP dialects. Carrilho (2009: 10) states that, as many expletive subjects, *ele* assumes the form of a personal pronoun of the 3rd person singular, masculine in both examples, in a subject position (in which it receives nominative case). However, it does not present a referential interpretation. The constructions in which it occurs are usually impersonal, involving a non-argumental subject position.
This expletive subject *ele* is an optional phenomenon in EP dialects, quite different from the obligatory overt realization of an expletive subject in languages like English (Carrilho, 2009: 14).

(iv) Non-referential datives

Non-argumental datives do not have any referent and, therefore, are associated with a deficient pronoun. According to Cardinaletti & Starke (1999: 155), the interpretation expressed by these forms is not possible with strong pronouns.

In EP, there is an ethical dative clitic of non-argumental nature. However, as described by Brito, Duarte & Matos (1999: 840), the clitic pronoun associated with this dative is referential and typically designates the speaker that manifests his interest in the realization of the situation expressed by the sentence (cf. (46)a). This ethical dative clitic indicates an entity that can be considered as a beneficiary. A strong pronoun cannot occur in these contexts (cf. (46)b), since only deficient forms can have an ethical use.

(46) a. Arruma-**me** imediatamente o quarto!

tidy-me-CL-DAT-1SG immediately the bedroom

b. *Arruma imediatamente o quarto **a**/**para mim**!

tidy immediately the bedroom to/for me

(v) [+/-human] interpretation

Cardinaletti & Starke (1999: 155) defend that, semantically, strong pronouns cannot refer to non-human entities. On the contrary, deficient pronouns may have as referents not only human entities but also non-human entities.

With respect to EP, as we can see in example (47), strong pronouns are not restricted to human referents and may denote other animate entities. It is legitimate to say that the classification [+/-human] is not sufficient to characterize the strong forms concerning its referent, at least in EP. Therefore, in this case, a classification like [+/-animate] is more appropriate.

(47) Não te preocupes, **o cavalo** é dócil. → Não te preocupes, **ele** é dócil.

do-not worry, the horse is gentle do-not worry, he is gentle

Cardinaletti & Starke (1999: 145-147) also argue that a coordinated personal pronoun cannot refer to a non-human entity. Once again this is not applicable to EP, in which a coordinated strong pronoun can also have as a referent a non-human animate being:

(48) **O teu cão** está bem amestrado. Tu e **ele** formam uma boa equipa.

your dog is well trained you and he make a good team.

As was seen before, in EP strong pronouns are generally used for animate referents. In turn, for non-animate entities, null forms (cf. (49)) or demonstratives (cf. (50)) are preferably used.

(49) **O sofá** é confortável. → ***pro*** É confortável.

the sofa is confortable it-is confortable

(50) **O copo** caiu. → **Isso** caiu.

the glass fell that fell

Nevertheless, as Baauw, Escobar & Philip (1997) point out, when Spanish strong pronouns are complements of a preposition, both human and non-human referents are allowed. In the same way, in EP strong pronouns within PPs are not restricted to [+human] referents and, therefore, they may also be used with both animate and non-animate entities:

(51) Toquei n**a tartaruga**. → Toquei n**ela**.

I-touched in-the turtle I-touched in-her

(52) A: Onde está **o carro**? B: Estou a apontar para **ele**.

A: where is the car B: I-am pointing to it

Clitics are always underspecified for the feature [human]. Consequently, they can admit both [+human] and [-human] referents:

(53) O avô telefonou **aos netos**. → O avô telefonou-**lhes**.

the grandpa called to-the grandchildren the grandpa called them

(54) A Rita comprou **uma saia** ontem. → A Rita comprou-**a** ontem.

the Rita bought a skirt yesterday the Rita bought it yesterday

In turn, in clitic doubling constructions, both the clitic and the strong pronoun can only refer to animate entities (cf. (55) and (56)) and never to non-human entities, otherwise the sentences are ungrammatical (cf. (57) and (58)).

(55) Telefonei à avó esta tarde. → Telefonei-**lhe a ela** esta tarde.

I-called to grandma this afternoon I-called-her to she this afternoon

(56) Encontrei o cão na rua. → Encontrei-**o a ele** na rua.

I-found the dog in-the street I-found-him to he in-the street

(57) A Rosa partiu o copo. → *A Rosa partiu-**o a ele**.

the Rosa broke the cup the Rosa broke-it to it

(58) A: Onde encontraste os brincos? B: *Descobri-**os a eles** no sótão.

A: where did-you-find the earrings B: I-found-them to they in-the attic

Cardinaletti & Starke (1999) defend that the class of deficient pronouns should be divided into weak forms (in which the null pronouns are integrated) and clitic forms. We cannot say that the two sets of deficient pronouns are simply in opposition to the class of strong pronouns. The weak elements have an intermediate status between strong and clitic pronouns. For instance, according to Cardinaletti & Starke (1999), the French *subject clitics* are part of the group of weak pronominal forms. On the contrary, in European Portuguese, within the category of deficient pronouns, one does not observe a subgroup of weak pronouns, distinct from the clitic and the null pronouns. Hence, there are no phonetically realized weak forms in EP.

Cardinaletti & Starke (1999: 168) argue that clitic pronouns are syntactically analyzed as heads, while weak pronouns occupy positions of maximal projections (a case-marked specifier of AgrP).

As we can verify in many examples of EP presented in this chapter, clitics adjoin to the verb, which works as their host. There are numerous syntactic analyses on the behavior of clitic pronouns in EP and other languages. A review of all those theoretical proposals is beyond the scope of this research, but we will briefly refer to two hypotheses.

Sportiche (1995) proposes that clitics are analyzed as heads of their own functional projection (Clitic Phrases), licensing in its specifier position a particular property of a given argument with which they agree in the relevant features (person, number, gender and Case). In this analysis, some host must become available to clitics, namely verbs. These clitic constructions may also involve movement.

In turn, for the particular case of EP, Duarte & Matos (2000) assume that clitics are heads of DPs, generated as arguments of a designated verb and then moved to V or to some functional projection targeted by the verb, checking strong formal features (V-host and Case). In this case, the authors follow Corver & Delfitto (1993) and consider clitics to be transitive Ds that subcategorize for a *pro* complement.

We consider that the two analyses are not mutually exclusive, but rather they correspond to different status of clitics, related to the availability of clitic doubling in various languages.

Cardinaletti & Starke (1999: 175) consider the null (subject) pronoun *pro* as a deficient pronominal form. The authors argue that *pro* has the semantics of a deficient pronoun and not of a strong pronoun. Therefore, *pro* can be expletive (cf. (59)), impersonal (cf. (60)) and may have non-human referents (cf. (61)). These properties are attributed to deficient elements. Examples in EP are presented below:

(59) ***pro*** Chove muito aqui.

it-rains a lot here

(60) ***pro*** Venderam-me um livro danificado.

they-sold-me a book rotten

(61) ***pro*** É muito caro.

it-is very expensive

Moreover, Cardinaletti & Starke (1999: 175) state that *pro* has a syntactic distribution of a deficient pronoun and not of a full pronoun. The authors justify this assertion resorting to Rizzi (1986) that, as rephrased by Chomsky (1993), concluded that *pro* can only occur in a case-marked specifier of AgrP (subject position), reflecting precisely the distribution of weak elements. Therefore, within the category of the

deficient pronouns, the null forms are classified as weak pronouns (in contrast to strong and clitic pronouns).

For consistent null subject languages like EP, Holmberg (2005) assumes the classification by Cardinaletti & Starke (1999) according to which the null subject *pro* is a weak pronoun, being a referentially deficient form. Moreover, Holmberg (2005) proposes that, in these type of languages, there is a D(eterminer)-feature in Infl. Thus, a null deficient pronoun (specified for interpretable phi-features such as person and number) has to enter an Agree relation with Infl (containing D, which encodes definiteness) in order to be interpreted as a definite argument. In this case, the definite null subject will be dependent on an antecedent to have its reference fixed, since it lacks descriptive content. This hypothesis implies that the null subject is a pronoun that is not pronounced.

In turn, Barbosa (2009) argues in favor of another hypothesis for consistent null subject languages, of the rich verbal agreement type like EP, in which *pro* is redundant. The set of phi-features of Infl (person and number agreement inflection – Agr) is itself interpretable. In consequence, the morphologically rich Agr is regarded as a referential definite pronoun, which is phonologically expressed as an affix. The basic idea of this proposal is that Agr is an affix-like pronominal category, having a D/N feature capable of checking the Extended Projection Principle (EPP)[8] via V raising to T(ense).

Further analysis on the null subject construction is outside the scope of this dissertation. In the current research, the experimental hypotheses and predictions are defined according to the typology of pronouns suggested by Cardinaletti & Starke (1999), trying to verify if the grammatical status of the different pronominal forms has implications in the acquisition of EP. Therefore, null pronominal subjects are considered to be a type of weak pronoun (with no phonetic realization), contrasting either with strong or with clitic pronouns. Study Two of this dissertation evaluates how Portuguese children interpret null subject pronouns in different embedded contexts, that is, in indicative and subjunctive complement clauses (cf. chapter 6).

[8] The EPP is a universal principle, which states that all clauses must have a subject.

2.4.1. Summary

Cardinaletti & Starke (1999) divide the personal pronouns into strong forms and deficient (non-strong) forms. In turn, the deficient pronouns are separated into two categories: weak and clitic. Therefore, the authors propose a tripartite classification for the personal pronouns: strong, weak and clitic.

In the case of EP, within the set of deficient forms, only clitic and null pronouns are observed and the latter is considered to be a special type of weak element. EP does not present phonetically overt pronominal forms that can be interpreted as weak.

It is argued that there are properties that enable the distinction among these types of pronouns. Morphologically, the deficient elements present a reduced form with respect to the strong ones.

From a syntactic point of view, deficient pronouns are incompatible with c-modification and coordination. Strong pronouns have the distribution of a corresponding DP (they can occur in base positions, structures of dislocation and cleft sentences), while deficient pronouns must occur in a derived position at S-structure. Clitic forms have the syntactic status of a head and null subject forms (included in the subgroup of weak pronouns) occupy a position of a maximal projection (the case-marked specifier of AgrP).

Semantically speaking, deficient personal pronouns are only permissible with a contrastive stress and ostension if they have a prominent discourse antecedent. Only a deficient form can occur in expletive and impersonal constructions. Non-argumental datives are associated with deficient pronouns as well. EP strong elements refer to animate entities, but only deficient elements can refer to non-animate entities. However, strong pronouns within PPs may also refer to non-animate entities.

This dissertation intends to verify if the grammatical status of the different pronouns (strong, clitic and null) in EP has implication in their interpretation by preschool children.

3. Pronominal reference: accounting for the interpretation in object and embedded subject positions

The possibility of referring to an entity of the extralinguistic world (real or imaginary) is one of the functions of language.

As stated in chapter 2, personal pronouns are characterized for not having referential autonomy. Therefore, their referential content is determined by the discourse situation or by a linguistic expression, working as their antecedent.

In the current chapter, the conditions that regulate the interpretation of object and embedded subject pronouns in different contexts will be described. These conditions are important in order to evaluate children's performance in the two experimental studies conducted in this dissertation.

3.1. Theoretical proposals about binding and coreference

The interpretation of pronouns involves binding and coreference phenomena. The following sections present a review of different theoretical proposals about referential dependencies.

3.1.1. Binding Theory

In the Principles and Parameters framework, Binding Theory is one of the subsystems of principles of grammar. It concerns the relations established between nominal expressions and possible antecedents. Chomsky (1982: 188) divides nominal expressions into three categories:

a) **anaphors**[9], which are referentially deficient and dependent on a local syntactic antecedent (cf. (62));
b) **pronouns**[10], which do not referentially depend on a local syntactic antecedent (cf. (63));

[9] Reflexive and reciprocal forms are included in the set of anaphors.
[10] Within the theoretical framework of Principles and Parameters of Generative Grammar, the term *pronoun* (or *pronominal*) is used to indicate **non-reflexive** forms. In this dissertation, the non-reflexive

c) **referential expressions** (R-expressions), which are inherently referential and do not require any antecedent (cf. (64)).

(62) O Filipe$_i$ sujou-**se**$_{i/*j}$.

the Filipe dirtied-himself

(63) O Filipe$_i$ abraçou-**o** $*_{i/j}$.

the Filipe hugged-him

(64) O Filipe$_i$ empurrou **o vizinho**$*_{i/j}$.

the Filipe pushed the neighbor

The term *anaphor* denotes any nominal expression that is referentially dependent on another nominal expression, which works as the antecedent of the anaphor. In turn, **anaphora** is the interpretative relation established between the anaphor and its antecedent. Both constituents must share the same grammatical features such as person, number and gender.

Usually, the antecedent precedes the anaphoric element. Nevertheless, it is possible for the antecedent to come after the anaphoric constituent. This case is designated as **cataphora** (also known as **anticipatory anaphora**). This type of anaphoric relation corresponds to a situation in which an anaphoric expression referentially depends, by anticipation, on another expression that only occurs afterwards (Lobo, 2013: 2182).[11]

There is **coreference** when two elements in a structure refer to the same extralinguistic entity and the same semantic value is assigned to both elements. There is **disjoint reference** when two elements refer to different extralinguistic entities, that is, do not have the same referent. In turn, **binding** is the (syntactic) relation in which the reference of an element depends on the reference of another element, which

pronominal forms are specifically mentioned. Moreover, the null subject pronoun *pro*, studied in this research, is specified as [-anaphoric, +pronominal] in the Binding Theory.

[11] The following sentence is an example of cataphora, in which the non-reflexive clitic pronoun *a* occurs before its antecedent *a Clara*.

(i) Quando **a**$_i$ vi, a Clara$_i$ estava triste.

when her I-saw, the Clara was sad

involves coindexing and c-command in a local domain. Therefore, α locally binds β if α and β are coindexed, and α c-commands β (Chomsky, 1982: 59; 1995: 93).[12]

Let us consider the following examples:

(65) [A avó d[a Marta]$_i$]$_j$ penteou[-**a**]$_{i/*j}$.

the grandma of-the Marta combed her

(66) [A avó d[a Marta]$_i$]$_j$ penteou[-**se**]$_{*i/j}$.

the grandma of-the Marta combed herself

In sentence (65), the non-reflexive clitic *a* establishes a relation of coreference with the DP *a Marta*, meaning that they share the same referent. This coreferential interpretation is pragmatically established, through the attribution of a semantic value in the discourse. However, there is no binding between these two elements because the DP *a Marta* does not c-command the non-reflexive clitic. Therefore, it is a case in which there is coreference but not binding. In turn, there is disjoint reference between the non-reflexive clitic and the subject of the sentence *a avó da Marta*. This means that both elements have different referents.

In sentence (66), there is coreference and binding between the subject of the sentence *a avó da Marta* and the reflexive clitic *se*. This anaphor is referentially dependent on the subject and, accordingly, the two elements refer to the same entity. Furthermore, the reflexive clitic is bound by the subject because the subject c-commands the anaphor. In turn, the reflexive form presents a disjoint interpretation in relation to the DP *a Marta*, meaning that they refer to different entities.

According to Chomsky (1982: 188, 220; 1986: 166), Binding Theory consists of a set of principles (also known as conditions) that concern the interpretation of each nominal expression previously described:

[12] A node α c-commands a node β if α does not dominate β and β does not dominate α, and the first branching node dominating α also dominates β (Haegeman, 1994: 134; Chomsky, 1995: 35).

Principle A

Anaphors must be bound in their local syntactic domain.

(67) A avó$_i$ penteou-**se**$_{i/*j}$. / Grandma$_i$ combed **herself**$_{i/*j}$.

Principle B

Pronouns must be free in their local syntactic domain.

(68) A avó$_i$ penteou-**a**$_{*i/j}$. / Grandma$_i$ combed **her**$_{*i/j}$.

Principle C

An R-expression must be free.

(69) A avó$_i$ penteou **a neta**$_{*i/j}$. / Grandma$_i$ combed **the granddaughter**$_{*i/j}$.

Local syntactic domain is also called *binding domain* or *governing category*. According to Chomsky (1982: 188), the governing category for α is the minimal domain containing α, a governor[13] of α and an accessible subject. Later on, Chomsky (1986: 169) considers that a governing category is a *complete functional complex* (CFC), corresponding to the minimal domain where all grammatical functions compatible with a head (the subject and the complements selected by the head) are fulfilled.

In the examples (67) and (68), it is possible to verify that the object position is occupied by a clitic pronoun in European Portuguese (EP), while a strong pronoun occurs in that position in English.

In the sentences of (67), a relation of coreference is established between the subject (*a avó* / *grandma*) and the reflexive pronoun (*se* / *herself*). Additionally, the anaphor is bound by the local subject. In turn, in the examples of (68), there is a relation of disjoint reference between the subject (*a avó* / *grandma*) and the non-

[13] A category governs its complements in a construction of which it is the head (Chomsky, 1982: 50).

reflexive pronoun (*a* / *her*). In (69), the subject (*a avó* / *grandma*) also establishes a relation of disjoint reference with the object DP (*a neta* / *the granddaughter*). In all these contexts, the antecedent is a referential subject.

When the antecedent of the pronoun is a quantified expression, the pronoun presents an interpretation of **bound variable** and does not establish a relation of strict coreference with the quantified antecedent. Therefore, only binding can be involved if the pronoun has a quantified antecedent. Consider the following sentences:[14]

(70) Cada menina$_i$ **se**$_{i/*j}$ penteou. / Every girl$_i$ combed **herself**$_{i/*j}$.

(71) Cada menina$_i$ **a**$_{*i/j}$ penteou. / Every girl$_i$ combed **her**$_{*i/j}$.

The examples in (70) receive the following paraphrase "para cada menina x, x penteou x" / "for each girl x, x combed x". Thus, the sentences cannot mean that the set of girls combed that same set of girls, which would correspond to the coreferential interpretation. In these cases, the reflexive clitic pronoun in EP and the reflexive strong pronoun in English only have a reading of bound variable with respect to the quantified antecedent.

On the other hand, the non-reflexive pronouns in (71) cannot be interpreted as bound variables, since they necessarily express disjoint reference in relation to the quantified subject of the main clause (they are free in their local syntactic domain).

Binding Theory predicts a complementary distribution between reflexive and non-reflexive forms. This is true for object clitics in European Portuguese. However, this complementarity breaks down in certain contexts. For instance, in EP non-reflexive strong pronouns within non-locative prepositional phrases (PPs) can take an antecedent

[14] According to Martins (2013: 2253-2254), regarding the universal quantifier *cada*, the position of clitic pronouns can be proclitic or enclitic in EP, depending on the option of the speaker. The author explains that there are no semantic or structural factors which determine either the proclitic or the enclitic positions with *cada*:
(i) Cada menina **se** penteou.
(ii) Cada menina penteou-**se**.
every girl combed herself

within a local domain. This is argued to be partly dependent on the semantic and/or pragmatic properties of the involved predicates, which can favor a coreferential reading with a non-reflexive strong form in non-locative PPs (Menuzzi, 1999; Estrela, 2006).[15] In turn, the reflexive strong pronoun *si* in EP may not have a local antecedent, working as a long-distance anaphor. Besides, the form *si* can work either as an anaphor or as a pronoun (with a deictic value) in EP.[16]

3.1.2. Reflexivity Theory

In the Reflexivity Theory, a different approach is taken by Reinhart & Reuland (1993), who defend that the distribution of anaphoric forms is based on the information of predicates. The authors (1993: 658) begin by distinguishing different types of lexical anaphoric expressions:

a) Anaphors[17], which fall into two types:

i) Local anaphors, which are composed of the noun SELF combined with a pronoun determiner (e.g. *himself* in English) or a SE determiner (e.g. *zichzelf* in Dutch). These complex expressions are called SELF anaphors;

ii) Long-distance anaphors, which are subject-oriented and underspecified regarding phi-features (person, number and gender). Although they may preserve person features in many languages (including EP), they always lack number and gender features (e.g. *zich* in Dutch, *seg* in Norwegian, *sé* in Italian, *si* in EP). These simplex expressions are referred to as SE anaphors;

b) Pronouns, projected as full NPs.

[15] For more details on the interpretation of non-reflexive strong pronouns in non-locative PPs, the reader is referred to section 3.1.4. of this thesis.
[16] Cf. section 3.1.5. for more information on the interpretation of the reflexive strong pronoun *si* in EP.
[17] Reinhart & Reuland (1993) do not discuss reciprocal anaphors. Furthermore, this classification of anaphors also does not take into account the case of reflexive clitics (like *se* in EP), which are simple anaphors that are locally bound.

Table 3 presents the values of the lexical anaphoric expressions described above with respect to their reflexivizing function and referential independence (Reinhart & Reuland, 1993: 659):

	SELF	**SE**	**Pronoun**
Reflexivizing function	+	–	–
Referential independence	–	–	+

Table 3: Typology of anaphoric expressions according to Reinhart & Reuland (1993)

The Reflexivity Theory states the following (Reinhart & Reuland, 1993: 663):

a) A predicate is *reflexive* if and only if two of its arguments are coindexed;

b) A predicate (formed of P) is *reflexive-marked* if and only if either P is lexically reflexive or one of P's arguments is a SELF anaphor.

Additionally, these linguists reinterpret principles A and B of Binding Theory as conditions that govern interpretation of reflexive predicates:

Condition A

A reflexive-marked predicate is reflexive.

Condition B

A reflexive predicate is reflexive-marked.

Condition A is applied to syntactic predicates, while Condition B is applied to semantic predicates. Reinhart & Reuland (1993: 663) explain that, according to these conditions, the sentence in (72) is grammatical because *criticize* is a reflexive predicate

that is reflexive-marked by *himself* and its arguments are coindexed. In turn, the example in (73) is ungrammatical because the predicate is reflexive (its arguments are coindexed) but not reflexive-marked by its internal argument (the pronoun *him* is not reflexive). Furthermore, the Condition B of the Reflexivity Theory also captures cases left for Condition (or Principle) C of the Binding Theory. In (74), binding is ruled out for the same reason as in (73): although the referential expression in object position (*Max*) is coindexed with its antecedent (*Max/He*) and a reflexive predicate is formed, there is no reflexive marking in the sentence.

(72) Max_i criticized $himself_i$.

(73) *Max_i criticized him_i.

(74) *Max_i/*He_i criticized Max_i.

(Reinhart & Reuland, 1993: 663)

Reinhart & Reuland (1993: 696) complement their theoretical proposal with the following condition:

General condition on A-chains

A maximal A-chain (α_1, …, α_n) contains exactly one link – α_1 – that is both +R and Case-marked.

It states that a tail of an A-chain must be referentially defective (-R). Anaphors (like *se* in EP and *himself*/*herself* in English) are -R, since they are not able to independently refer to an object in the discourse and their reference is always dependent on a syntactic antecedent. In contrast, non-reflexive pronouns (as *o*/*a* in EP and *him*/*her* in English) are +R and, for this reason, able to refer to an object in the discourse without being dependent on a syntactic antecedent. Coopmans, Baauw & Philip (1999) argue that this condition can be exemplified in contexts of **verbal small**

clause with exceptional case marking (ECM). In (75), the A-chain of the sentence in EP and of the sentence in English contains one element that is +R: the head of the chain *a avó* / *grandma*. Therefore, an A-chain is formed in each language between those DPs and their respective anaphors *se* / *herself* (which are -R). In (76), an A-chain formation is blocked in EP and in English, because each sentence contains two elements that are +R: the referential antecedents *a avó* / *grandma* and the non-reflexive object pronouns *a* / *her*.

(75) A avó$_i$ viu-**se**$_{i/*j}$ dançar. / Grandma$_i$ saw **herself**$_{i/*j}$ dance.

(76) A avó$_i$ viu-**a**$_{*i/j}$ dançar. / Grandma$_i$ saw **her**$_{*i/j}$ dance.

The Condition on A-chains was used by Baauw, Escobar & Philip (1997) and Coopmans, Baauw & Philip (1999) in order to explain the difficulties that Spanish-speaking children face in the interpretation of non-reflexive clitics in the specific context of verbal small clauses with ECM (cf. section 4.1.).

3.1.3. Rule I: Intrasentential Coreference

Grodzinsky & Reinhart (1993), based on Reinhart (1983, 1986), defend that coreference and binding are not governed by the same module of grammar, since children seem to have problems in coreference but not in binding. In order to develop their theoretical proposal, these authors reviewed the first studies of Wexler & Chien (1985) on the acquisition of coreference in English. It was observed that children, in the interpretation of sentences like (77) with a referential antecedent, had an adult-like performance about 50% of the time, that is, they performed around chance level. Children often allowed an incorrect interpretation of coreference between the local subject and the non-reflexive pronoun. This has led to the conclusion that children do not know Condition B of the Binding Theory.

(77) Oscar touches him.

(Grodzinsky & Reinhart, 1993: 69)

However, later studies by Chien & Wexler (1990) discovered a distinction between children's performance on the coreference aspects of Condition B and their performance on its variable binding aspects. In cases like (78) with a quantified antecedent, where variable binding is tested, children disallow coreferential readings, performing like adults.

(78) Every boy touches him.

(Grodzinsky & Reinhart, 1993: 69)

The results from these two studies led to the conclusion that children know Condition B as a condition on variable binding and not on coreference.[18]

Reinhart (1983, 1986) argues that binding conditions only regulate interpretation of bound variables. Hence, coreference is computed separately. In consequence, Grodzinsky & Reinhart (1993: 77-78) assume that coreference is the assignment of identical values to NPs with different syntactic indices, independently of the occurrence of these two NPs in the same sentence or not. The following Rule I, of pragmatic nature, regulates coreference within the domain of the sentence:

Rule I: Intrasentential Coreference

NP A cannot corefer with NP B if replacing A with C, C a variable A-bound by B, yields an indistinguishable interpretation.

(Grodzinsky & Reinhart, 1993: 79)

[18] Recall that only binding can be involved when the antecedent of the pronoun is a quantified expression (cf. section 3.1.1. for more details).

This rule determines whether a pronoun must have an interpretation of bound variable, whose grammatical process occurs in syntax, or an interpretation of coreference, which results from the attribution of a semantic value in the discourse. Accordingly, there is no coreference if the use of a non-reflexive pronoun leads to an indistinguishable interpretation from the use of a bound reflexive pronoun. Binding, which occurs in syntax, is a more economical way of establishing a referential dependency than coreference, which is pragmatic in nature. Following Reinhart (1983), it is assumed that the coreference aspects of condition B require a more complex computation than variable binding.

Rule I states that a non-reflexive pronominal form cannot be coreferential if it can be replaced by a bound reflexive form. To apply Rule I, a listener must maintain two structural representations in memory, one with the interpretation of the pronoun as reflexive and another with an interpretation of the pronoun as non-reflexive. In consequence, children have to evaluate two syntactic structures simultaneously (version with variable binding vs. version with coreference) and verify whether the necessary interpretation in a given context justifies the selection of coreference. Grodzinsky & Reinhart (1993) suggest that, due to limitations on their working memory, children cannot execute all these steps. Thus, they adopt a guessing strategy concerning coreference relations between the pronoun and the local antecedent, leading to a chance level performance. Consequently, children have difficulties in local coreference tasks. In sum, the interpretation problem with non-reflexive pronouns is due to children's inability to execute Rule I. Adults, presumably, are able to deal with this processing load.

Many researchers have proposed explanations based on children's limited processing capacity to implement Rule I for the coreference problems found in the interpretation of non-reflexive forms, especially when these are strong pronouns (cf. section 4.1.).

3.1.4. Binding in prepositional phrases (PPs)

In EP, there is the possibility of non-reflexive strong pronouns to be locally bound in PPs.[19] In the following example, the non-reflexive strong pronoun *ela* can be coreferential with the DP *a Teresa*:

(79) A Teresa$_i$ só fala d**ela**$_{i/j}$.

the Teresa only speaks of-herself/of-her

The predicate of (79) is considered to indicate probable reflexivity. Menuzzi (1999) states that binding in **non-locative PPs** is associated with the *degree of inherent reflexivity* of the predicate and describes this phenomenon with examples from Brazilian Portuguese (BP). This researcher defends that there are predicates which, due to their semantic and/or pragmatic content, admit a coreferential interpretation more naturally than others. Consequently, we can say that the interpretation of strong pronouns in non-locative PPs is subject to semantic and/or pragmatic factors.

So that the coreferential reading is facilitated and reinforced, the non-reflexive strong pronoun *ele*/*ela* may be accompanied by the anaphorizing expressions *mesmo* (same) and *próprio* (self):

(80) A Teresa$_i$ só fala d**ela** [**mesma**/**própria**]$_i$.

the Teresa only speaks about herself

In EP, the reflexive strong form *si* (cf. next section 3.1.5.) can also occur in this context under a coreferential interpretation:

[19] In this section (3.1.4.), the coreferential interpretation is the only one that is being analyzed.

(81) A Teresa$_i$ só fala de **si**$_i$.

the Teresa only speaks of herself

However, Menuzzi (1999) does not study this anaphor (*si*), because it is not frequent in BP.

In turn, English does not allow a non-reflexive pronoun to be locally bound in the PP correspondent to the Portuguese example (79), as we can verify in the sentence below:

(82) Teresa$_i$ speaks only about ***her**$_i$.

According to Menuzzi (1999: 130-131), there is a difference between English and Romance languages in regard to binding in non-locative PPs: in many cases in which locally bound reflexive pronouns in PPs are excluded in English, the corresponding sentences in Romance languages are perfectly acceptable. The following examples from Chomsky (1982: 289) illustrate that in French reflexive pronouns in a PP can be coindexed with a DP antecedent in the same clause (cf. (83)), contrarily to English (cf. (84)):[20]

(83) *Jean* m'a parlé de *lui*.

(84) *John* spoke to me about **him*.

(Chomsky, 1982: 289)

Nevertheless, as Menuzzi (1999: 131) indicates, Zribi-Hertz (1980) specified that the availability of locally bound non-reflexive pronouns within non-locative PPs is not completely free in French. It is strongly related to the degree of inherent reflexivity of

[20] In these examples and the ones that follow throughout the present section 3.1.4., the items in italics are intended to be interpreted as coreferential.

the predicate. Therefore, the more a predicate favors a reflexive interpretation semantically and/or pragmatically, the more likely a locally bound non-reflexive pronoun becomes and, inversely, the less suitable the complex form *lui-même* becomes. This is demonstrated by the examples below (Zribi-Hertz, 1980: 161-164, 1995: 346-352), as presented by Menuzzi (1999: 131):

Obligatory reflexivity

(85) *Victor* a toute l'équipe avec {*lui*/**lui-même*}.

(86) *Victor* has the whole team with {*him*/*himself*}.

Possible reflexivity

(87) *Victor* est content de {*lui*/*lui-même*}.

(88) *Victor* is satisfied with {**him*/*himself*}.

Improbable reflexivity

(89) *Victor* bavarde avec {**lui*/*lui-même*}.

(90) *Victor* chats with {**him*/*himself*}.

Menuzzi (1999: 131) points out that BP displays a similar pattern as French: the locally bound non-reflexive pronouns are possible within non-locative PPs and the choice between a non-reflexive pronoun and the complex form (non-reflexive pronoun + *mesmo*/*próprio*) depends on the degree of inherent reflexivity of the predicate. According to this author, one can distinguish four degrees of reflexivity: obligatory reflexivity, probable reflexivity, possible reflexivity and improbable reflexivity. As Estrela (2006: 64-65; 96) demonstrated (through the application of a written test on binding within PPs to 50 adults, in which they had to make acceptability judgments about a set of sentences), these predictions are also valid for EP. Moreover, the examples presented in BP by Menuzzi (1999: 132) are possible in EP as well. In fact, Estrela (2006) used the

examples given by Menuzzi (1999) to test them in EP. Here are some of those illustrative sentences, with intended coreference between the local subject and the pronoun:

Obligatory reflexivity

(91) *O João* guarda {n*ele*/(?)*n*ele mesmo*} um violento desejo de vingança.

João keeps in-him/in-himself a violent desire for revenge

(92) *O João* tem um apartamento só para {*ele*/??*ele mesmo*}.

João has an apartment only for him/himself

(Menuzzi, 1999: 132)

Probable reflexivity

(93) *A Maria* pensa primeiro {n*ela*/?n*ela mesma*} e depois nos outros.

Maria thinks first in-her/in-herself and after in-the others

(94) A Maria comprou um carro para {*ela*/?*ela mesma*}.

Maria bought a car for her/herself

(Menuzzi, 1999: 132)

Possible reflexivity

(95) *O Paulo* confia {?n*ele*/n*ele mesmo*}.

Paul trusts in-him/in-himself

(96) *O Paulo* sempre trabalhou para {?*ele*/*ele mesmo*}.

Paulo always worked for him/himself

(Menuzzi, 1999: 132)

Improbable reflexivity

(97) *O João* luta contra {**ele*/*ele mesmo*}.

João fights against him/himself

(98) *A Maria* conversa com {**ela*/*ela mesma*} o tempo todo.

Maria talks with her/herself

(Menuzzi, 1999: 132)

The semantic and/or pragmatic nature of the involved predicates can condition the possibility of referential dependencies inside a sentence. Hence, the coreference readings that are obtained with *ele*/*ela* (in relation to a certain potential antecedent) within non-locative PPs is partly related with the semantic and/or pragmatic properties of the involved predicates.

Menuzzi (1999: 132-133) observes that the distribution of non-reflexive and reflexive pronominal forms in English appears to be insensitive to the semantics and/or pragmatics of the predicate, disallowing locally bound non-reflexive pronouns within non-locative PPs (unlike BP, EP and French). As we can verify in the following examples in English, the non-reflexive pronouns are excluded and the reflexives are obligatory in the PPs that correspond to the ones of BP and EP (Menuzzi does not present examples of obligatory reflexivity):

Probable reflexivity

(99) *Mary* thinks first about {**her*/*herself*}, and then about others.

(100) *Mary* bought a car for {**her*/*herself*}.

(Menuzzi, 1999: 133)

Possible reflexivity

(101) *Paul* trusted in {**him*/*himself*}.

(102) *Paul* always worked for {**him*/*himself*}.

(Menuzzi, 1999: 133)

Improbable reflexivity

(103) *John* fights against {**him*/*himself*}.

(104) *Mary* talks to {**her*/*herself*} all the time.

(Menuzzi, 1999: 133)

Nevertheless, not all PPs exclude locally bound non-reflexive pronouns in English. Menuzzi (1999: 133-134) informs that, in accordance with judgments presented by Hestvik (1991), English locally bound non-reflexive pronouns may be an option within **locative PPs**, just like reflexive forms are:

(105) *John* looked behind {*him*/*himself*} (searching for the key of the car).

(106) *Bill* put his bag beside {*him*/*himself*}.

(107) *John* has many friends around {*him*/??*himself*}.

(108) *John* saw a snake near {*him*/??*himself*}.

(Menuzzi, 1999: 134)

As in English, non-reflexive pronouns may be locally bound in contexts of locative PPs either in BP (Menuzzi, 1999: 134) or in EP (Estrela, 2006: 62-63):

(109) *O João* olhou em torno {d*ele*/?d*ele mesmo*} (procurando pela chave).

João looked around him/himself (searching for the key)

(Menuzzi, 1999: 134)

(110) *O João* pôs a bolsa atrás {d*ele*/?d*ele mesmo*}.

João put the bag behind him/himself

(Menuzzi, 1999: 134)

(111) *O João* tem sempre muitos amigos em torno {d*ele*/?d*ele mesmo*}.

João always has many friends around him/himself

(Menuzzi, 1999: 134)

(112) *O João* viu uma cobra perto {d*ele*/?d*ele mesmo*}.

João saw a snake near him/himself

(Menuzzi, 1999: 134)

To summarize these differences concerning binding into PPs between BP (or EP) and English, Menuzzi (1999: 135) proposes the following description:

a) Within **non-locative** PPs:

i) in BP [and EP], the more the predicate favors a reflexive interpretation, the more likely a locally bound [non-reflexive] pronoun is, and the less likely the complex form is;

ii) in English, locally bound [non-reflexive] pronouns are excluded; only reflexives are possible;

b) Within **locative** PPs:

i) in BP [and EP], locally bound [non-reflexive] pronouns are always allowed; the complex forms [non-reflexive pronoun + *mesmo*/*próprio*] are (weakly) disfavored;

ii) in English, locally bound [non-reflexive] pronouns are always allowed; reflexives may be (strongly) disfavored.[21]

Based on the analysis carried out by Estrela (2006) and assuming that the similarities between EP and BP are evident, this proposal can be perfectly applied to the case of EP.

In sum, semantic and/or pragmatic factors may determine referential dependencies within a sentence in Romance languages. The possibility of occurrence of locally bound non-reflexive pronouns in non-locative PPs is not completely free, being related to the degree of inherent reflexivity of the predicate. Thus, the more a predicate favors a semantically and/or pragmatically reflexive interpretation, the more likely a non-reflexive pronoun becomes locally bound and, inversely, the less suitable a complex or reflexive form becomes.

This descriptive generalization is particularly relevant for the first study of the present thesis, in which the interpretation of strong object pronouns within non-locative PPs by preschool children and by adults is tested in EP (cf. chapter 5).

[21] Chomsky (1982: 291; 1986: 167) proposes that in cases like (i), in which the non-reflexive strong pronoun *them* can be coreferential with the local subject antecedent *they*, the locative PP has an implicit subject (cf. (ii)). Haegeman (1994: 230-231, fn. 19) explains that the locative PP *near them* is the predicate phrase of a small clause, whose subject is non-overt (PRO). The subject of the small clause is coindexed with *a snake*. The bracketed small clause is the governing category for the non-reflexive strong pronoun *them*, making it free to be bound by *they* since the latter is outside the binding domain of the former. This author argues that the sentence in (ii) is roughly equivalent to the one in (iii).
(i) They$_i$ saw a snake near them$_i$.
(ii) They$_i$ saw a snake$_j$ [PRO$_j$ near them$_i$].
(iii) They saw a snake which was near them.
(Haegeman, 1994: 230-231, fn. 19)
According to Reinhart & Reuland (1993: 664), locative PPs form their own predicates. This means that the non-reflexive strong pronoun in the PP is not an argument of the verb. Coindexing the non-reflexive pronoun in this position (as argument of the predicate formed by the preposition) with the external argument of the verb (which forms a distinct predicate) does not yield a reflexive predicate, because these two are not coarguments. Thus, Condition B of the Reflexivity Theory is not violated.
Further discussion on this type of theoretical proposals will not be provided, since it is beyond the scope of the purposes of this dissertation. Nevertheless, these analyses do not contemplate the fact that, in EP, the availability of locally bound non-reflexive pronouns within non-locative PPs is associated with the degree of inherent reflexivity of the involved predicates (Menuzzi, 1999; Estrela, 2006). The idea that non-reflexives within non-locative PPs are sensitive to the semantic and/or pragmatic properties of the predicates, which may admit a coreferential reading, will play an important role in the first study of the current investigation (cf. chapter 5).

3.1.5. The specificity of the reflexive strong form *si* in EP

The reflexive strong pronoun *si* only occurs after a preposition. As Brito, Duarte & Matos (2003: 813) describe, *si* behaves as a bound anaphor when it has an antecedent, whether it is a referential DP (cf. (113)) or a quantifier (cf. (114)):

(113) O Rodrigo$_i$ só pensa em **si**$_i$.

the Rodrigo only thinks in himself

(114) Cada um$_i$ cuida de **si**$_i$.

each one cares of himself/herself

The identification of the pronominal form *si* is given by the relation with its antecedent, like other reflexives and reciprocal pronouns.

However, unlike (113), the form *si* in (114) does not present an interpretation of coreference in a strict sense, but rather an interpretation of bound variable due to its quantifier antecedent. Therefore, this sentence presents the following paraphrase “para cada pessoa x, x cuida de x” (“for each person x, x takes care of x”).

The reflexive strong pronoun *si* can be followed, or not, by the anaphorizing expressions *mesmo* (same) and *próprio* (self). Both expressions facilitate and reinforce a coreferential reading.

(115) O Daniel$_i$ acredita em **si** [**mesmo**/**próprio**]$_i$.

the Daniel believes in himself

Brito, Duarte & Matos (2003: 813) inform that *si* can work not only as an anaphor but also as a pronoun (presenting a deictic value), parallel to the 2nd person singular of formal treatment *você* (you):

(116) Esta carta chegou para **si**.

this letter arrived for you

In the following example, *si* can have anaphoric or pronominal value:

(117) A Sofia$_i$ comprou um perfume para **si**$_{i/j}$.

the Sofia bought a perfume for herself / you

Estrela (2006) observes that the degree of acceptability of a coreferential interpretation obtained with the reflexive strong pronoun *si* is also influenced by the semantic and/or pragmatic properties of predicates (cf. section 3.1.4.). In example (118), the use of the reflexive form *si* in an anaphoric reading is strange without the anaphorizing expressions *mesmo* (same) and *próprio* (self). Lobo (2013: 2224) argues that in the absence of these expressions, the preferential interpretation is the one in which the form *si* is deictic, corresponding to *você* (you):

(118) O David fez troça de **si**. (?si = o David; si = você)

the David made fun of himself / you

The introduction of the anaphorizing expressions *mesmo* (same) and *próprio* (self) makes the coreferential reading acceptable:

(119) O David$_i$ fez troça de **si** [**mesmo**/**próprio**]$_i$.

the David made fun of himself

According to Brito, Duarte & Matos (2003: 814), *si* also has the value of long-distance anaphor, that is, of non-locally bound anaphor, subject-oriented:

(120) A Joana$_i$ foi avisada pelo Hugo$_j$ que na turma ninguém gosta de **si**$_{i/*j}$.
the Joana was warned by-the Hugo that in-the class nobody likes of her

In this case, *si* does not refer to the DP *o Hugo*, getting its reference from the subject DP *a Joana* in the main clause. The antecedent of the reflexive strong pronoun *si* is out of the clause that contains the anaphor.

Menuzzi (1999: 335) shows that the reflexive strong form *si* in EP can be long-distance bound by a quantified subject of the higher clause because it does not have gender effects:

(121) Ninguém gostaria que a Ana duvidasse de **si** / d**ele**. (si = ninguém; ele ≠ ninguém)
nobody would-like that the Ana doubted of REFL-STRONG-3SG / of-him

In sentence (121), the reflexive *si* has an interpretation of bound variable since its antecedent is the quantifier *ninguém* (nobody), which is out of the clause containing the strong anaphor. In this particular context, the non-reflexive strong pronoun *ele* cannot alternate with the reflexive strong pronoun *si* and maintain the bound variable reading.

3.1.6. Summary and concluding remarks

Binding Theory (Chomsky, 1982; 1986) consists of three principles of syntactic nature that govern the relations of anaphors (such as reflexives and reciprocals), pronouns (non-reflexives) and R-expressions with regard to their potential antecedents. In turn, Reflexivity Theory (Reinhart & Reuland, 1993) concerns the application of syntactic and/or semantic conditions, based on the information of the

involved predicates, in the interpretation of anaphoric expressions. Additionally, the Condition on A-chains specifies that the tail of an A-chain must be referentially defective (-R). Therefore, an A-chain is formed with reflexive pronouns (which are -R), while an A-chain formation with non-reflexive pronouns (which are +R) is blocked.

Grodzinsky & Reinhart (1993) propose that local coreference interpretation is only allowed if it results in a representation that can be distinguished from the variable binding representation (as stated in Rule I, of pragmatic nature). The authors explain that children have difficulties executing this rule due to their limited processing capacity and are not able to compare the two representations, which is necessary to correctly rule out local coreference with non-reflexive pronouns. This often leads to the incorrect acceptance of a local antecedent for a non-reflexive pronominal form. Adults, presumably, have the ability to cope with this processing load.

In EP, object clitics present a complementary distribution between reflexive and non-reflexive forms, just like it is stated in principles A and B of the Binding Theory. However, this complementarity breaks down with strong object pronouns within PPs. In the case of non-locative PPs, the higher or lower ease with which readings of identical or distinct reference are obtained with the non-reflexive strong pronouns *ele*/*ela* and with the reflexive strong pronoun *si* (regarding a certain potential antecedent) is partly related to the semantic and/or pragmatic properties of the predicates that contain those pronouns (Menuzzi, 1999; Estrela, 2006).

Mastering principles A and B of Binding Theory is relevant for Study One of this dissertation (cf. chapter 5). Here, Portuguese preschool children were tested in the comprehension of reflexive and non-reflexive clitics with respect to a local referential antecedent. In addition, the same children were tested in the interpretation of reflexive and non-reflexive strong pronouns, within non-locative PPs, regarding a local referential antecedent. In this specific case, one must take into account that semantic and/or pragmatic factors partially influence the interpretation of strong object pronouns, especially in the case of non-reflexive strong forms. Consequently, the adults' results constitute the reference for the analysis of children's responses, since we are dealing with non-categorical contexts.

3.2. Interpretation of null and overt subject pronouns in finite complement clauses in EP

In a null subject language like Europen Portuguese (EP), it is possible to alternate phonetically null pronouns with phonetically overt pronouns. The null or overt status of the pronominal forms can condition distinct interpretations, even if they have the same syntactic function of subject.

The interpretative effects described in this section, concerning null and overt pronominal subjects in indicative and subjunctive complement clauses, are specifically important for the second study of this dissertation (cf. chapter 6).

3.2.1. With the indicative mood

When the verb of a finite complement clause is in the **indicative** mood, a **null** embedded pronominal subject is **preferentially** interpreted as having the **same reference** as the subject of the main clause (Brito, 1991):

(122) O Pedro disse que ***pro*** caiu.

the Pedro said that *pro* fell

With the **indicative**, an **overt** embedded pronominal subject is **preferentially** interpreted as having a **distinct reference** from the subject of the matrix clause (Brito, 1991):

(123) O Pedro disse que **ele** caiu.

the Pedro said that he fell

However, as already stated, these interpretations in indicative complement clauses correspond to **preferential readings**. Under certain pragmatic conditions, other

interpretations are possible. The null subject of the embedded clause of example (122) may also have a disjoint reading referring to the 2nd person singular of formal treatment (cf. (124)a) or relating to the 3rd person singular (cf. (124)b). As for sentence (123), the interpretation of coreference may also occur (cf. (125)).

(124) a. O Pedro disse que **você** caiu.

the Pedro said that you fell

b. O Pedro disse que **ele**/**ela** caiu.

the Pedro said that he/she fell

(125) O Pedro disse que **ele próprio** caiu.

the Pedro said that he himself fell

Among the verbs that select finite complement clauses that usually have the indicative mood are declarative verbs (such as *afirmar* – to affirm/state, *contar* – to tell, *declarar* – to declare, *dizer* – to say), epistemic verbs expressing belief and knowledge (like *achar*, *pensar* – to think, *saber* – to know), verbs of perception (like *ouvir* – to hear, *sentir* – to feel*, ver* – to see).

The preferential readings described above are in accordance with the *Avoid Pronoun Principle* (Chomsky, 1982: 65), which is considered to be a conversational principle of not saying more than what is strictly necessary and states that the use of an overt pronoun should be avoided whenever possible. Thus, this syntactic strategy makes the speaker of a null subject language use a null pronoun to express an interpretation of coreference and use a phonetically overt pronoun to denote an interpretation of disjoint reference. The Avoid Pronoun Principle is, therefore, intended to differentiate between preferred and dispreferred readings.

In a similar way, Cardinaletti & Starke (1999: 198-199) propose a principle named *Minimize Structure* (or *Economy of Representations*), through which preference

is always given to the most deficient pronominal form whenever possible. Thus, the choice of a null embedded subject over an overt embedded subject (to express a coreferential interpretation with regard to the matrix subject) is due to the fact that the former is a weak pronoun and the latter is a strong pronoun.

In what concerns indicative complement clauses, Jaeggli (1984), as quoted by Montalbetti (1986: 143), notes that a **stressed** overt pronoun improves the possibility of being coreferential with the subject of the main clause (cf. (126)). However, a stressed overt pronoun has no empty counterpart, that is, there are no stressed null pronouns. Hence, there is no alternation between null and overt forms in this case.

(126) O Pedro disse que **ELE** caiu.

the Pedro said that HE fell

The interpretation of null and overt embedded subject pronouns analyzed so far refers to indicative contexts in which the antecedent is referential.

Montalbetti (1986: 140-142) argues that, when the antecedent of the pronominal form is a quantified expression, the null pronoun presents an interpretation of bound variable but its overt counterpart cannot act as a bound pronoun. Take into account the following examples:

(127) Muitas crianças disseram que ***pro*** adoeceram.

many children said that *pro* got-sick

(128) Muitas crianças disseram que **elas** adoeceram.

many children said that they got-sick

The example (127) is associated with the following paraphrase “para cada criança x, x disse que x adoeceu” (“for each child x, x said that x got sick”) and,

according to Montalbetti (1986: 141-142), it cannot mean that each child of the group said that all the children of the group got sick (which would correspond to the coreferential reading). Only binding can be involved in this case, in which there is no relation of strict coreference between the null embedded subject pronoun and the quantified antecedent.

In turn, the overt embedded subject pronoun in sentence (128) cannot be interpreted as a bound variable, but it can have a coreferential reading in relation to the quantified subject of the main clause. Therefore, it can express the interpretation that each child of the set said that all the members of the set (as a whole) got sick (Montalbetti, 1986: 141-142).

Additionally, both the null pronoun (cf. (127)) and the overt pronoun (cf. (128)) can establish a relation of disjoint (free) reference with the quantified subject of the main clause. Nevertheless, the disjoint reading is the preferred one with the overt form and the dispreferred one with the null form.

An asymmetry between null and overt pronouns is also observed in examples like the following ones:

(129) Ninguém disse que ***pro*** adoeceu.

nobody said that *pro* got-sick

(130) Ninguém disse que **ele** adoeceu.

nobody said that he got-sick

An interpretation of bound variable can only be obtained in (129), where the null pronoun can have either a bound or a free reading. However, the overt pronoun in (130) can solely have a free reading: the coreferential interpretation is not possible in this context, since the quantifier *ninguém* (nobody) is not referential.

Montalbetti (1986: 142) explains that the overt pronouns cannot be bound by a quantifier when the alternation between null and overt forms is available. Furthermore, an overt embedded subject pronoun can be coreferential with a quantified antecedent, depending on its nature.

These interpretative effects proposed by Montalbetti (1986) regarding quantified antecedents are argued to be valid in indicative complement clauses. However, these effects with quantifiers do not apply to the second study of the current investigation, since it only included referential antecedents (subject and object) when testing the interpretation of null and overt embedded subject pronouns in the acquisition of EP (cf. chapter 6).

3.2.2. With the subjunctive mood

When a complement subordinate clause has the **subjunctive** mood selected by volitional verbs (like *querer* – to want) or declarative verbs of order (like *pedir* – to request), the differences of interpretation between the null pronoun and the overt pronoun change in relation to what happens in the indicative.

In this subjunctive context both pronominal forms present, in general, **obviation** effects, that is, the embedded pronominal subject is necessarily **disjoint** in relation to the subject of the main clause (Meireles & Raposo, 1983; Raposo, 1985):

(131) O Pedro quer que ***pro*** salte. / O Pedro pediu que ***pro*** cantasse.
the Pedro wants that *pro* jumps the Pedro requested that *pro* sang

(132) O Pedro quer que **ele** salte. / O Pedro pediu que **ele** cantasse.
the Pedro wants that he jumps the Pedro requested that he sang

The subject of the complement clauses of examples in (131) and in (132) can present the same interpretation of 3rd person singular, in fact the only one possible in

(132). Nevertheless, the null embedded subject of both sentences in (131) can also be associated with the readings referring to the 1st person singular (cf. (133)) and to the 2nd person singular of formal treatment (cf. (134)).

(133) O Pedro quer que **eu** salte. / O Pedro pediu que **eu** cantasse.
the Pedro wants that I jump the Pedro requested that I sang

(134) O Pedro quer que **você** salte. / O Pedro pediu que **você** cantasse.
the Pedro wants that you jump the Pedro requested that you sang

In the set of verbs that select a subjunctive complement clause are also the verbs of expectation (such as *esperar* – to hope), the factive psychological verbs (like *lamentar* – to regret), the causative verbs (such as *deixar* – to let, *mandar* – to order), among others.[22]

Meireles & Raposo (1983) and Raposo (1985) argue that the contrast between indicative complement clauses and subjunctive complement clauses, regarding the interpretation of an embedded subject pronoun, is related to the temporal properties of those clauses. In turn, these temporal properties are determined by the semantic class of the matrix verbs. Accordingly, coreference with the matrix subject is possible in indicative clauses selected by declarative or epistemic verbs, and disjoint reference concerning the main subject is obligatory in subjunctive clauses selected by volitional verbs or declarative verbs of order.

Raposo (1985: 78) explains that with declarative or epistemic verbs selecting the indicative, the time frame of the complement clause is autonomous in relation to the time frame of the matrix clause. This means that the subordinate tense markers

[22] There are verbs (including some epistemic ones) that can select either the indicative or the subjunctive (Ambar & Vasconcelos, 2012: 535). It is the case, for instance, of *acreditar* (to believe), admitir (to admit), *imaginar* (to imagine), *presumir* (to presume/suppose). An illustrative example is presented below:
(i) O Pedro acredita que ele está$_{\text{INDICATIVE}}$ / esteja$_{\text{SUBJUNCTIVE}}$ doente.
the Pedro believes that he is sick

can express a semantic tense which is different from the semantic tense of the matrix clause. In turn, with volitional verbs or declarative verbs of order selecting the subjunctive, the tense markers of the subordinate clause cannot express a time frame which is autonomous in relation to the time frame of the matrix clause. Instead, the time frame of the action or state expressed by the complement clause is a function of the particular semantics of the verb and, in consequence, is generally subsequent to the time frame of the matrix clause (what might be called a *future orientation*).

On account of these observations, Meireles & Raposo (1983) and Raposo (1985) defend an analysis of the subjunctive as anaphoric tense. Declarative or epistemic verbs select indicative complement clauses with an operator [+ TENSE] in Comp position, while volitional verbs or declarative verbs of order select subjunctive complement clauses with [– TENSE].[23] This operator [– T] is anaphoric and needs to be bound by the higher [+ T].[24] Consequently, the binding domain is extended to the higher clause and the dependent nature of the subjunctive (from which the obviation phenomenon is considered to be derived) is explained. As Meireles & Raposo (1983) emphasize, the subject of a clause is bound/free within a TENSED domain.

Ambar & Vasconcelos (2012: 540-541) also propose that the obviation phenomenon (or impossibility of coreference between the matrix subject and the embedded subject), a property of the subjunctive, is derived from the anaphoric nature of Tense. In this case, the binding domain of the embedded clause is assumed to be extended to the matrix clause with [+ T] by necessity of legitimation of the anaphoric tense of the subjunctive with [– T]. Accordingly, the Principle B of the Binding Theory will exclude the possibility of the embedded subject to be bound by the matrix subject, since the subject of the subjunctive clause must be free within a TENSED domain. In the indicative context, the subordinate clause is an autonomous binding domain due to its feature [+ T]. Hence, the Principle B of the Binding Theory does not rule out binding between the embedded subject and the matrix subject, since the latter is outside the binding domain of the former.

[23] Raposo (1985: 104-105, fn. 8) clarifies that the feature presentation [+/– TENSE] was chosen for ease of exposition, having one basic expansion in [+/– PAST] (with [– PAST] = Present or Future).
[24] Raposo (1985: 105, fn. 9) informs that, in this analysis, the complementizer *que* (that) is a filler for [+/– TENSE] in Comp position.

In a similar line, Guéron and Hoekstra (1995: 79) suggest that full clauses contain a Tense chain headed by a Tense Operator (TO). A T-chain consists of a TO, a Tense-position and a verb. The TO, initially proposed to occupy the C-position, is situated in the specifier of CP. The operator determines the value of C, which contains the reference time (R). The Tense node is understood as a pronominal variable and the verb is related to Tense by assigning it an eventuality role (*e*-role), which includes states and events. The authors argue that Tense has two values [+/– PAST]. [– PAST] represents an anaphoric relation, while [+ PAST] has a pronominal nature, being subject to Principle B. Accordingly, [– PAST] situates the eventuality at or within the domain of the speech time and [+ PAST] requires that the eventuality be disjoint from the speech time.

On the one hand, [– PAST] is associated with subjunctive clauses (selected by volitional verbs or declarative verbs of order, for example), in which a pronominal subject must be free in the structure as a whole since only the main clause is TENSED. On the other hand, [+ PAST] is associated with indicative clauses (selected by declarative or epistemic verbs, for instance), in which a pronominal subject must be free in the embedded clause since it (the embedded clause) is TENSED (Meireles & Raposo, 1983).

However, as we can notice in the examples below, there are exceptions to the obviation phenomenon of the embedded subject with the subjunctive. This fact makes Ambar & Vasconcelos (2012: 543) affirm that obviation may not result only from the anaphoric or dependent nature of Tense in subjunctive clauses.

Lobo (2013: 2202) considers that, with verbs such as *lamentar* (to regret), *esperar* (to hope) or *pedir* (to request) which select a subjunctive clause, the possibility of interpreting a **null pronoun** as coreferential (in relation to the main subject) increases substantially for some speakers when the subordinate clause has a stative predicate like *ficar* – to stay (cf. (135)), a modal semi-auxiliary verb like *poder* – can (cf.

(136)), the auxiliary verb *ter* – to have (cf. (137)) or certain temporal-aspectual adverbs as *ainda* – still (cf. (138)).[25]

(135) O Pedro lamenta que ***pro*** fique pouco tempo no Porto. (*pro* ≠ o Pedro; *pro* = o Pedro)
the Pedro regrets that *pro* stays little time in-the Porto

(136) O Pedro lamenta que ***pro*** não possa ir ao concerto. (*pro* ≠ o Pedro; *pro* = o Pedro)
the Pedro regrets that *pro* not can go to-the concert

(137) O Pedro lamenta que ***pro*** tenha perdido o avião. (*pro* ≠ o Pedro; *pro* = o Pedro)
the Pedro regrets that *pro* has lost the plane

(138) O Pedro lamenta que ***pro*** ainda não saiba nadar. (*pro* ≠ o Pedro; *pro* = o Pedro)
the Pedro regrets that *pro* still not knows to-swim

As Lobo (2013: 2202) reports, this phenomenon does not affect the finite complement clauses selected by volitional verbs like *querer* (to want) or by causative verbs, in which coreference with the subject of the main clause is not possible. Thus, in the following sentences, the embedded subject pronoun is interpreted as having a disjoint reference from the matrix subject, whether the subordinate clause has a stative predicate (cf. (139)), a modal/auxiliary verb (cf. (140) and (141)), a temporal-aspectual adverb (cf. (142)), or not (cf. (143)):

[25] Besides these exceptional contexts, there are also speakers who usually accept a coreferential reading between the main subject and the **null pronominal subject** in subjunctive complement clauses selected by factive verbs like *lamentar* (to regret):
(i) O Pedro lamenta que ***pro*** não vá à festa. (*pro* ≠ o Pedro; *pro* = o Pedro)
the Pedro regrets that *pro* not goes to-the party

(139) O Pedro queria que ***pro*** ficasse mais tempo na reunião. (*pro* ≠ o Pedro)

the Pedro wanted that *pro* stays more time at-the meeting

(140) O Pedro queria que ***pro*** pudesse ir à praia. (*pro* ≠ o Pedro)

the Pedro wanted that *pro* could go to-the beach

(141) O Pedro queria que ***pro*** tivesse ido ao teatro. (*pro* ≠ o Pedro)

the Pedro wanted that *pro* had gone to-the theatre

(142) O Pedro queria que ***pro*** ainda tirasse outra foto. (*pro* ≠ o Pedro)

the Pedro wanted that *pro* still took another photo

(143) O Pedro queria que ***pro*** fosse ao cinema. (*pro* ≠ o Pedro)

the Pedro wanted that *pro* went to-the cinema

Ambar & Vasconcelos (2012: 542) refer that Ambar (1988) has observed that coreference between overt pronominal subjects of subjunctive clauses selected by the verb *querer* (to want) and matrix subjects might be possible, like in example (144).[26] However, this coreferential reading is favored by the presence of the adverb *só* (only), which restricts the interpretation of the overt embedded subject pronoun.

(144) A avó quer que só **ela** use o forno. (ela ≠ a avó; ela = a avó)

the grandma wants that only she uses the oven

[26] According to Ambar & Vasconcelos (2012: 542), in cases in which the matrix verbs can select either the indicative or the subjunctive moods in the complement clause, coreference between the null subject pronoun and the main subject seems to be possible when the subjunctive is selected:
(i) pro_i admito que pro_i não consiga chegar a tempo.
(Ambar & Vasconcelos, 2012: 542)

Lobo (2013: 2203-2204) describes that some verbs that select complement clauses with the indicative mood may also select, in certain contexts, complement clauses with the subjunctive mood. One factor that favors the selection of the subjunctive by declarative verbs, epistemic verbs expressing belief and knowledge, and verbs of perception is the presence of **negation in the main clause**. In this case, when the complement clause has the subjunctive, the interpretation of the pronominal subject of the subordinate clause is no different from the one in which the embedded clause has the indicative. Like in the sentences presenting the indicative, in the following examples with the subjunctive, the null pronoun favors the interpretation in which the embedded pronominal subject has the same reference as the main subject, while the overt pronoun favors the interpretation of disjoint reference:[27]

(145) O Pedro não acha que ***pro*** seja teimoso. (*pro* = o Pedro; *pro* ≠ o Pedro)

the Pedro not thinks that *pro* is stubborn

(146) O Pedro não acha que **ele** seja teimoso. (ele ≠ o Pedro; ele = o Pedro)

the Pedro not thinks that he is stubborn

Therefore, the interpretation of embedded subjects in the contexts mentioned above (with negation in the main clause[28]) contrasts with the interpretation of subjects of finite subordinate clauses which necessarily have the subjunctive mood, in which a null pronoun is usually interpreted as not coreferential with the subject of the main clause (Lobo, 2013: 2204). Compare the following sentences:

[27] In examples (145) and (146), the first interpretation that is indicated in parentheses is the preferential one.

[28] When the declarative verb *negar* (to deny), which expresses negation by itself, selects complement clauses with the subjunctive, the null embedded subject pronoun can also be coreferential with the matrix subject:

(i) O Pedro nega que ***pro*** esteja cansado. (pro = o Pedro; pro ≠ o Pedro)

the Pedro denies that *pro* is tired

(147) O Pedro não acha que ***pro*** esteja doente. (*pro* = o Pedro; *pro* ≠ o Pedro)

the Pedro not thinks that *pro* is sick

(148) O Pedro não quer que ***pro*** esteja doente. (*pro* ≠ o Pedro)

the Pedro not wants that *pro* is sick

On the one hand, it is possible to assign to the null subject of the subordinate clause an identical reference to the subject of the main clause in (147). On the other hand, the only interpretation available in (148) is the one where the subject of the main clause and the subject of the subordinate clause have disjoint referents.

In conclusion, different factors are involved in the interpretation of pronominal subjects in finite complement clauses:

a) the null or overt status of the subject pronoun;

b) the semantic type of the verb of the main clause that selects the complement subordinate clause;

c) the indicative or subjunctive mood of the verb in the complement clause;

d) the presence of stative predicates in the subordinate clause;

e) the presence of (semi-)auxiliary verbs (including modals) in the complement subordinate clause;

f) the presence of certain temporal-aspectual adverbs in the subordinate clause;

g) the presence of negation in the main clause.

The predictions made for interpreting null and overt pronominal subjects within indicative complement clauses in EP, which involves preferential readings, are similar to the ones suggested in the Position of Antecedent Hypothesis (Carminati, 2002).

3.2.3. Position of Antecedent Hypothesis

Carminati (2002) investigated the processing of Italian subject pronouns, both the null and the overt pronouns, in intrasentential anaphora. The researcher proposes the *Position of Antecedent Hypothesis*[29], assuming there is a division of labor between the two types of pronouns, with the null pronoun preferring a more prominent antecedent than the overt pronoun. Additionally, Carminati (2002) argues that the prominence of the antecedent is determined by its syntactic position, with the (highest) Spec IP position (the preverbal position of the subject) being the most prominent one. In consequence, this linguist defends that null pronouns are preferentially assigned to a constituent in the (highest) Spec IP (normally, the subject antecedent), while overt pronouns are preferentially assigned to a constituent in a lower syntactic position (normally, a non-subject antecedent).[30]

In the current research, the Position of Antecedent Hypothesis is considered to be active in the preferential interpretations of null and overt subject pronouns in finite complement clauses with the indicative mood in EP, when there are one or two available antecedents in the sentence. Accordingly, the null embedded subject pronoun generally retrieves the subject antecedent, whereas the overt embedded subject pronoun generally retrieves a non-subject antecedent.[31]

[29] This hypothesis is based on the assumption that the canonical position of the subject is the Spec IP, where IP (the Inflectional Phrase) is the phrase containing all verbal inflection, relating to tense and agreement features such as person and number (Carminati, 2002: 43).

[30] Morgado (2011) and Luegi (2012) studied the processing of embedded pronominal subjects in the adult grammar of European Portuguese. In an offline experiment, Morgado (2011) tested the effect of the thematic role of intrasentential antecedents in the interpretation of null and overt subject pronouns in concessive subordinate clauses. The author concluded that the two pronouns are not sensitive to the same factors. The null pronoun always retrieves the syntactically prominent antecedent (the matrix subject) and, therefore, is sensitive to purely syntactic factors. The overt pronoun preferentially retrieves an antecedent that is not semantically prominent, as is the case of the direct object Theme in active sentences and of the subject Theme in passive sentences. Consequently, the overt form is considered to be sensitive to semantic factors (Morgado, 2011: 92-93). In the interpretation of null and overt pronominal subjects in adverbial clauses with the main clause presenting the OVS order, Luegi (2012: 163, 195-196) observed a decrease in the preference to retrieve the Oblique object by the overt pronoun, when the Oblique is in a structurally higher position. This researcher assumes that these results (obtained in an offline questionnaire task) also appear to indicate that the two types of pronouns, null and overt, are sensitive to different factors (Luegi, 2012: 196).

[31] One considers that the overt embedded subject pronoun is preferentially associated with a non-subject antecedent, whether this antecedent is extrasentential (in case there is only a subject antecedent available in the sentence) or intrasentential (in case there are two potential antecedents in the sentence, one in subject position and another in object position).

Both sentences (149) and (150) have two potential antecedents in the matrix clause: one in subject position and another in object position.

(149) O Pedro disse ao avô que ***pro*** emagreceu.

the Pedro said to-the grandpa that *pro* lost-weight

(150) O Pedro disse ao avô que **ele** emagreceu.

the Pedro said to-the grandpa that he lost-weight

Consequently, the null embedded pronominal subject of sentence (149) is preferentially interpreted as being coreferential with the subject of the main clause *o Pedro*. In sentence (150), the overt embedded subject pronoun *ele* is preferentially interpreted as having the same reference as the indirect object of the main clause *o avô*, presenting therefore disjoint reference in relation to the matrix subject *o Pedro*.

In addition, Carminati (2002) points out that the Position of Antecedent Hypothesis is almost invariably applied in the interpretation of null subject pronouns (which are generally associated with a subject antecedent), but the antecedent preferences for overt subject pronouns are more flexible. Therefore, the strategy of generally assigning a non-subject antecedent to overt pronouns may be sometimes disregarded in the adult grammar.

3.2.4. Summary and concluding remarks

In a null subject language like EP, it is possible to alternate phonetically null pronouns with phonetically overt pronouns. The null or overt status of a subject pronoun can determine distinct interpretations.

When the verb of a finite complement clause is in the indicative mood, a null embedded pronominal subject is preferentially interpreted as having the same reference as the subject of the main clause, while an overt embedded pronominal

subject is preferentially interpreted as having a disjoint reference from the subject of the matrix clause (Brito, 1991). However, these interpretations in indicative complement clauses correspond to preferential readings. Under certain pragmatic conditions, other interpretations are possible.

In turn, when a complement subordinate clause has the subjunctive mood selected by volitional verbs (like *querer* – to want) or declarative verbs of order (like *pedir* – to request), both null and overt embedded subject pronouns present, in general, obviation effects. This means that the embedded pronominal subject is generally disjoint in relation to the matrix subject (Meireles & Raposo, 1983; Raposo, 1985). However, Lobo (2013) states that some EP speakers may allow a coreferential reading between the matrix subject and the null subject pronoun of the subjunctive clause selected by the verb *pedir* (along with the matrix verbs *lamentar* and *esperar*) in specific contexts: when the embedded clause has a stative predicate like *ficar* (to stay), a modal semi-auxiliary verb like *poder* (can), the auxiliary verb *ter* (to have) or certain temporal-aspectual adverbs as *ainda* (still).

Meireles & Raposo (1983) and Raposo (1985) argue that the obviation phenomenon, a property of the subjunctive, is derived from the anaphoric nature of Tense. Accordingly, volitional verbs and declarative verbs of order select subjunctive complement clauses with [– TENSE]. In this case, the binding domain of the embedded clause is extended to the main clause with [+ T] by necessity of legitimation of the anaphoric tense of the subjunctive with [– T]. Consequently, the possibility of the embedded subject to be bound to the matrix subject is excluded, since the subject of the subjunctive clause must be free within a TENSED domain.

Considering there are exceptions to the subjunctive obviation, Ambar & Vasconcelos (2012) state that it may not result only from the anaphoric or dependent nature of Tense in subjunctive clauses. We assume that lexical and semantic properties of the matrix verbs, which select the subjunctive, are also considered to be relevant in determining obviation.

The predictions made for interpreting null and overt pronominal subjects within indicative clauses in EP, involving preferential readings, are similar to the ones proposed in the Position of Antecedent Hypothesis (Carminati, 2002). This hypothesis

is argued to be operative in the preferential interpretations of null and overt subject pronouns in indicative complement clauses, when there are one or two intrasentential antecedents. It states that the embedded subject pronouns are assigned to antecedents that occupy specific syntactic positions in the sentence, with the null pronoun preferring a more prominent antecedent than the overt pronoun. Moreover, prominence is attributed to the (highest) Spec IP, occupied by a preverbal subject. In consequence, null pronouns are preferentially associated with a constituent in the (highest) Spec IP (usually, the subject antecedent), whereas overt pronouns are preferentially associated with a constituent in a lower syntactic position (usually, a non-subject antecedent).

The interpretative pattern described for null and overt pronominal subjects in indicative and subjunctive complement clauses is important to evaluate children's performance in Study Two of this dissertation (cf. chapter 6). The adults' results represent the reference for the analysis of children's responses, especially in the indicative context involving non-categorical preferential readings. In this case, the interpretation of subject pronouns in indicative complement clauses is pragmatically constrained and its mastery is considered to require the interface between syntax and discourse pragmatics. In addition, the context of interpretation of null pronominal subjects in subjunctive clauses can also be regarded as non-categorical, since the null subject can be interpreted as 3rd person singular or as 2nd person singular of formal treatment *você* (you). Therefore, children's responses will also be compared to the adults' results in the subjunctive.

4. Crosslinguistic studies on the acquisition of pronominal reference

This chapter makes a review of crosslinguistic studies in the acquisition of pronominal reference by typically developing monolingual children. It is composed of two parts: the first one (cf. section 4.1.) is about the interpretation of strong and clitic pronouns in object position, and the second one (cf. section 4.2.) is about the interpretation of null and overt pronouns in embedded subject position.

It is important to examine the crosslinguistic results found in these reviewed investigations, with the intention of collecting information to formulate experimental hypotheses and predictions for the current research on the acquisition of pronominal objects and subjects in EP. Section 4.1. is directly related to Study One of this dissertation presented in chapter 5, and section 4.2. is directly related to Study Two described in chapter 6.

4.1. Acquisition of strong and clitic pronominal objects

Many crosslinguistic studies have been conducted in order to determine how the acquisition of binding principles regarding accusative object pronouns is made by children. In fact, Guasti (2002: 271) claims that it is one of the most widely investigated areas in language acquisition.

This section reviews some of the main investigations that tested children's interpretation of both reflexive and non-reflexive forms of object pronouns, usually in simple sentences with local (referential and/or quantified) antecedents. These studies include languages with strong object pronouns and with clitic object pronouns. Accordingly, we will discuss the acquisition results obtained in the following languages: English, Italian, Russian, Icelandic, Dutch, Spanish, French, Catalan, Brazilian Portuguese, European Portuguese, Greek, Norwegian, German and Hebrew. In some cases, the researchers also tested the comprehension of clitic pronouns in verbal small clauses with ECM and the interpretation of strong pronouns within clitic doubling constructions and within PPs.

English

Chien & Wexler (1990) have tested the comprehension of reflexive and non-reflexive strong pronouns in the acquisition of English, either with referential or with quantified subjects in simple transitive sentences. In this experiment, the authors used a picture verification task, asking yes/no questions to a group of 177 English-speaking children (between the ages of 2;6 and 7;0) in Orange County, California (Chien & Wexler, 1990: 234, 261).

The 5-year-old children, with 44 participants between the ages of 5 and 6, constituted the age group of reference in this experiment. In consequence, only the results of this group of children will be presented in the following table (Chien & Wexler, 1990: 265, 270, 271, 274).

		5-year-olds	
		Referential subject	**Quantified subject**
Reflexive strong pronouns	*yes*	96.97%	89.39%
	no	92.80%	82.95%
Non-reflexive strong pronouns	*yes*	90.15%	97.93%
	no	49.24%	83.71%

Table 4: Percentage of correct responses divided by type of answer ("yes" or "no") in the group of the 5-year-olds in English

The obtained results indicate that English-speaking children between the ages of 5 and 6 knew that a reflexive pronoun must be locally bound, that is, interpreted as coreferential with its local antecedent, whether it was a definite NP (92.80% of correct "no" answers) or a quantifier (82.95% of correct "no" answers). As Chien & Wexler (1990: 275) point out, these children demonstrated knowledge of Principle A of Binding Theory, which regulates the interpretation of reflexives.

Additionally, children knew that a non-reflexive pronoun must be interpreted as not bound by a local quantified antecedent. Consequently, Chien & Wexler (1990: 275) considered that 5-year-olds also demonstrated knowledge of Principle B, since they ruled out in general the coreferential reading with a quantified NP (83.71% of correct "no" answers). In contrast, these children frequently established an incorrect relation of

coreference between a non-reflexive pronoun and a referential antecedent (only 49.24% of correct "no" answers).

The phenomenon corresponding to children's problems in the interpretation of non-reflexive pronominal forms with a referential antecedent is known as Delay of Principle B Effect (DPBE).

In the results presented by Chien & Wexler (1990), 5-year-old English-speaking children showed a quantificational asymmetry[32] in the comprehension of non-reflexive strong pronouns, with good results when the subject antecedent is quantified and with bad results when the subject antecedent is referential. Accordingly, these children demonstrated mastery of Principle B with quantified antecedents before referential antecedents.

Chien & Wexler (1990) argue that English-speaking children's good performance with quantified antecedents shows they have knowledge of Principle B, which regulates syntactic binding. These linguists attribute children's non-adult behavior with referential antecedents to a late command of the pragmatic principle (which they call Principle P) that blocks coreference between a non-reflexive pronoun and a local referential antecedent. Consequently, children who master Principle B but not the relevant pragmatic rule will successfully reject a local quantified antecedent for non-reflexive pronouns with a bound variable representation, while allowing a local referential antecedent with which they do not rule out the coreference representation for non-reflexives.

In turn, based on the review of studies on the acquisition of English, Grodzinsky & Reinhart (1993: 91) suggest that children know the pragmatic rule that regulates intrasentential coreference (which they designate as Rule I), but have difficulties implementing it due to limitations in their processing capacity.[33] This rule states that a non-reflexive pronoun cannot be coreferential when it can be replaced by a bound element (a reflexive pronoun). Children need to compare and evaluate two syntactic

[32] The expression *quantificational asymmetry* (QA) has been introduced by Elbourne (2005) in order to refer the contrast in the interpretation of non-reflexive pronouns between children's good performance with quantified local subjects and their bad performance with referential local subjects, which was assumed by Chien & Wexler (1990).

[33] Cf. section 3.1.3. for details in the application of Rule I in the processing of non-reflexive object pronouns during the acquisition stage.

structures simultaneously (bound variable representation vs. coreference representation). However, this computation task is too complex for children's working memory and some of them are not able to complete the operation. In sentences with a quantifier as a local antecedent, the pronominal form can only be a bound variable and the bound variable representation with a non-reflexive pronoun is ruled out by Principle B. Therefore, children know both binding and coreference, and the difficulties they encounter in the comprehension of non-reflexive forms are processing problems, which diminish with age.

Italian

McKee (1992: 26) used a set of truth value judgment tasks to compare reflexive pronouns (Condition A) and non-reflexive pronouns (Condition B) with a referential antecedent in Italian and English acquisition.

In this research, 30 Italian-speaking children (from 3;7 to 5;5 years old) were tested in Parma, Italy. These children participated in the Condition A and B experiments (McKee, 1992: 28). In Italian, McKee (1992: 41) observed that the participants gave a correct response 95% of the time with reflexive clitics (Condition A), and 90% of the time with non-reflexive clitics (Condition B).

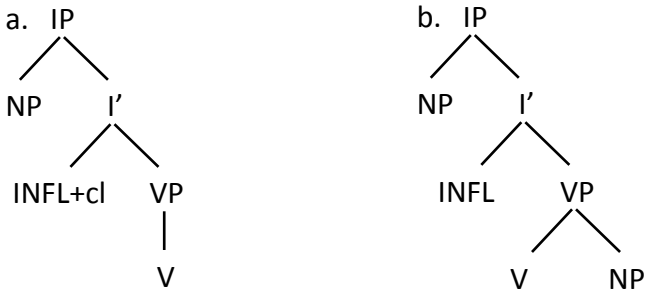
In parallel, 60 English-speaking children (from 2;6 to 5;3 years old) were tested in Tucson, Arizona, USA. One group of 30 children participated in the experiment on Condition A and another group of 30 in the experiment on Condition B (McKee, 1992: 28). In English, McKee (1992: 41) has registered 91% of correct responses with reflexive strong pronouns (Condition A), and 61% of correct responses with non-reflexive strong pronouns (Condition B).

McKee (1992: 41-42) highlights the crosslinguistic difference in which Italian-speaking children show mastery of Condition B, while English-speaking children accepted binding violations with non-reflexive pronouns very often. These English data on Condition B confirms what was found in other studies with English-speaking children as in Chien & Wexler (1990). In contrast, children were successful in the comprehension of reflexive pronouns (Condition A) in both languages.

Additionally, Baauw, Escobar & Philip (1997), Coopmans, Baauw & Philip (1999) and Baauw (2000) report that Berger (1997, 1999) studied the comprehension either of non-reflexive clitics or of non-reflexive strong pronouns in direct object position (with a referential antecedent) by Italian-speaking children. The results of this researcher indicated that children incorrectly accepted coreference at a higher percentage with non-reflexive strong pronouns than with non-reflexive clitics.

McKee (1992) rejects the idea of a pragmatic deficit to explain the comprehension difficulties of English-speaking children with non-reflexives. Based on Varela (1989, 1992), the author argues in favor of different binding domains for clitics and for strong pronouns in children's grammar due to different structural positions:

(151)



(Mckee, 1992: 48)

McKee (1992: 48-49) explains that clitics are in Infl (cf. (151)a), either base generated or resulting from movement. This means clitics are VP external and their governing category is IP, which includes the sentence subject. Accordingly, Italian-speaking children who know condition B will reject ungrammatically bound non-reflexive clitic pronouns, since they will correctly hypothesize that IP is the binding domain of clitics. In turn, strong pronouns remain inside the VP (cf. (151)b) and English-speaking children incorrectly hypothesize that the VP (rather than the IP) is the binding domain of strong pronouns, allowing a coreferential reading between the non-reflexive form and the sentence subject.

McKee (1992: 49) also shows the situation that might exist for anaphors (reflexive pronouns), assuming that the clitic in (151)a and the strong pronoun in

(151)b are anaphors. The clitic's governing category is IP, containing the sentence subject. This means that the clitic anaphor finds an antecedent in its governing category. Concerning the strong anaphors, again, the first hypothesized governing category will be VP. However, unlike for the non-reflexive strong pronoun, the learner cannot use the VP as the strong anaphor's binding domain because it does not have a potential antecedent in that domain. The author explains that, presumably, the strong anaphor is then allowed to look for an antecedent in the next governing category, that is, the IP. Consequently, within the framework of this proposal, Condition A violations either with reflexive clitics or with reflexive strong pronouns would not be expected because the governing category in both cases would include the subject.

Russian

Avrutin & Wexler (1992: 280) applied a truth value judgment task to 16 Russian-speaking children, ranging in age from 4 to 7 years. They all lived in the Greater Boston area (United States of America), but were born in the former Soviet Union. All children acquired Russian as their first language and both parents of each child were monolingual native Russian speakers. The children spent most of their time in a Russian-speaking environment and several of them did not know any English at all at the time the experiment was conducted, since they were tested shortly upon their arrival in the USA.

Avrutin & Wexler (1992: 283) elicited grammatically correct "yes" and "no" responses with reflexive strong pronouns, and only grammatically correct "no" responses with non-reflexive strong pronouns. The table below presents the percentage of correct "no" responses obtained in the comprehension of both types of strong object pronouns with referential and quantified antecedents in Russian (Avrutin & Wexler, 1992: 283).[34]

[34] Avrutin & Wexler (1992: 283) presented all the results with percentage of acceptances ("yes" answers) of strong object pronouns in incorrect contexts by children. However, in Table 5, the results are expressed with the percentage of correct "no" responses.

	Referential antecedent	Quantified antecedent *každyj* (every)	Quantified antecedent *kto* (who)
Reflexive strong pronouns	97%	94%	97%
Non-reflexive strong pronouns	48%	59%	83%

Table 5: Percentage of correct "no" responses in the comprehension of reflexive and non-reflexive pronouns in Russian

The results indicate that Russian-speaking children know Principle A of the Binding Theory, being successful in the comprehension of reflexives with referential and quantified antecedents. In turn, the same children showed difficulties in sentences with non-reflexives when the antecedent was a definite NP or the quantifier *každyj* (every). When the antecedent is the quantifier *kto* (who), children's responses to sentences with non-reflexive pronouns improve regarding the two former cases.

The results of this research in Russian child language presents a clear asymmetry in the comprehension of non-reflexive forms between children's weak performance with the referential antecedent (48%) and their good performance with the quantified antecedent *kto* – who (83%). However, this quantificational asymmetry becomes less evident when the 48% of responses with the referential antecedent is compared to the 59% of responses with the quantified antecedent *každyj* – every.

Avrutin & Wexler (1992) consider that, in the acquisition of Russian, children do not know the pragmatic principle (Principle P) that restricts coreference between a local referential NP antecedent and a non-reflexive. This makes children incorrectly accept coreferential readings in those situations. This proposal is similar to the one suggested by Chien & Wexler (1990) for the difficulties of English-speaking children in the comprehension of non-reflexive forms. Furthermore, Avrutin & Wexler (1992: 291) defend that Russian-speaking children know the syntactic principle (Principle B of the Binding Theory) that governs binding between a local quantified antecedent and a non-reflexive pronoun, as evidenced by the data with the quantifier *kto* – who. In this case, children know that non-reflexives cannot have a local c-commanding antecedent.

This replicates what was found in the acquisition of English for the quantified antecedent *every* (Chien & Wexler, 1990).

Nevertheless, Russian-speaking children often accept coreference between the non-reflexive form and the quantifier *každyj* – every. Avrutin & Wexler (1992) argue that the Russian *každyj* is not exactly parallel to the English *every*, because *každyj* has ambiguous quantificational properties.[35] In this case, one needs to master both the syntactic Principle B (which regulates variable binding) and the pragmatic Principle P (which regulates the interpretation of indices and prohibits coreference between two non-coindexed elements) in order to prevent a coreferential reading with the non-reflexive pronoun. As assumed by the researchers, children do not know Principle P and they may allow coreference in this context.

In turn, Avrutin & Wexler (1992) propose that the lack of comprehension problems in non-reflexive clitic contexts, as was found in the acquisition of Italian by McKee (1992), is related to the fact that clitic pronouns (unlike strong pronouns) are necessarily referentially dependent. Hence, clitics cannot be used deictically and must have a coindexed antecedent. Because binding is involved, coreference is excluded. Thus, Rule I is not required in this case. The coindexation with a local subject antecedent implies a violation of Principle B. As mentioned before, it is assumed that children know

[35] According to Avrutin & Wexler (1992: 273, 296), Russian sentences with the quantified subject *každyj* are ambiguous and can have two distinct interpretations. Consider the following sentence:
(i) Každyj medved' potër ego.
Every bear scrubbed him.
(Avrutin & Wexler, 1992: 273, 296)
On one hand, *každyj* can be interpreted as a universal quantifier and the meaning of the sentence is similar to its translation in English with *every*. In this case, only binding can be involved and a coreference relation between the non-reflexive and the quantified antecedent is ruled out by Principle B. Hence, a coreferential reading is not acceptable for adults.
On the other hand, this sentence has an additional representation that does not include a non-reflexive pronoun bound by a quantifier. In this case, there is a previously specified set of bears and the sentence is true for each specification of the members of this set (roughly, "for this bear, for that one and for that one"). In this additional interpretation, the antecedent of the non-reflexive pronoun is a definite NP. In the adult grammar, for each specification, Principle P requires the coindexation of the non-reflexive form and the antecedent. Thus, this alternative representation of the sentence in (i) is ruled out by Principle B, being unacceptable for adults. However, for children who do not know Principle P, this alternative reading is acceptable because there is nothing to prevent children from taking the non-reflexive pronoun to be contraindexed with the quantifier (Avrutin & Wexler, 1992: 273, 296).
In the test condition with *každyj*, children's performance will depend on which reading they assume (the one as a universal quantifier and the other in which the antecedent of the pronoun is a definite NP). Accordingly, Avrutin & Wexler (1992: 274) predict that Russian-speaking children will sometimes accept coreference in sentences with *každyj*, since its alternative representation is grammatical for them.

the syntactic Principle B. Therefore, children will reject sentences in which the local subject is coreferential with the non-reflexive clitic pronoun (Avrutin & Wexler, 1992: 279).

Icelandic

Sigurjónsdóttir & Hyams (1992: 374) tested the interpretation of the local reflexive pronoun (local anaphor) *sjálfan sig* (himself) and of non-reflexive pronouns concerning referential antecedents.[36] An act-out task and a truth value judgment task were applied to a group of 55 Icelandic-speaking children between the ages of 3;3 and 6;0, and to 10 adult controls in Reykjavík, Iceland. The pronouns occurred in complex sentences, namely in indicative, subjunctive or infinitival complement clauses.[37]

The approximate values shown in Table 6 and in Table 7 are estimated from the graphics presented by Sigurjónsdóttir & Hyams (1992: 382-383).

Table 6 refers to the approximate percentages of participants who correctly chose a local antecedent for the reflexive pronoun *sjálfan sig* and correctly chose a long-distance or extraclausal antecedent for non-reflexive pronouns in the act-out task (Sigurjónsdóttir & Hyams, 1992: 382).

[36] The long-distance anaphor *sig* was also tested by Sigurjónsdóttir & Hyams (1992), but those results will not be considered.

[37] The authors present the following example of a test sentence from the truth value judgment task, using the local anaphor *sjálfan sig*:

(i) Dínó vildi að Batman þurrkaði$_{SUBJUNCTIVE}$ sjálfum sér.
Dino wanted that Batman dried self sig
"Dino wanted Batman to dry himself."
(Sigurjónsdóttir & Hyams, 1992: 377)

Act-out task		
Age group	**Reflexive pronoun *sjálfan sig***	**Non-reflexive pronouns**
3;03 – 4;00	≈ 57%	≈ 90%
4;00 – 4;06	≈ 60%	≈ 100%
4;06 – 5;00	≈ 80%	≈ 66%
5;00 – 5;06	≈ 67%	≈ 80%
5;06 – 6;00	≈ 90%	≈ 89%
Adults	≈ 100%	≈ 100%

Table 6: Approximate percentages of participants who gave correct responses in the act-out task in Icelandic

Table 7 shows the approximate percentages of participants who knew that the reflexive pronoun *sjálfan sig* requires a local antecedent and knew that non-reflexive pronouns require a long-distance or extraclausal antecedent in the truth value judgment task (Sigurjónsdóttir & Hyams, 1992: 383).

Truth value judgment task		
Age group	**Reflexive pronoun *sjálfan sig***	**Non-reflexive pronouns**
3;03 – 4;00	≈ 62%	≈ 18%
4;00 – 4;06	≈ 90%	≈ 11%
4;06 – 5;00	≈ 90%	≈ 32%
5;00 – 5;06	≈ 76%	≈ 20%
5;06 – 6;00	≈ 100%	≈ 44%
Adults	≈ 100%	≈ 100%

Table 7: Approximate percentages of participants who gave correct responses in the truth value judgment task in Icelandic

According to the authors of the study, the results from the act-out task (Table 6) indicate that most of the children seem to perform very well on both reflexive and non-reflexive pronouns (Sigurjónsdóttir & Hyams, 1992: 383).[38] In turn, the results from

[38] Nevertheless, we can observe that, in this task, the two youngest groups of children have a rather weaker performance (about 57% and 60%) with the reflexive pronoun than with the non-reflexive pronoun (about 90% and 100%).

the truth value judgment task (Table 7) are quite different regarding the non-reflexive pronouns, showing that Icelandic children incorrectly accept a local antecedent with these types of object pronominal forms. However, Sigurjónsdóttir & Hyams (1992: 383-384) emphasize that children's good performance with the local anaphor *sjálfan sig* in both tasks was rather stable.

Sigurjónsdóttir & Hyams (1992: 405) suggest that the differences of children's performance with non-reflexive pronouns observed between the two types of tests may be explained under the following assumption: in the act-out task there is only one grammatical reading for the test sentences, while in the judgment task the inaccessibility of the pragmatic Rule I (Grodzinsky & Reinhart, 1993) results, by hypothesis, in a kind of guessing or chance performance when children must make judgments concerning coreference.

The authors take into consideration the Icelandic results from the truth value judgment task and state that they replicate the results of other studies of children acquiring other languages, like English and Russian. Icelandic-speaking children have a good performance with local anaphors but exhibit difficulties with non-reflexive pronouns with regard to referential antecedents (Sigurjónsdóttir & Hyams, 1992: 401). This is reinforced by the researchers' analysis of the acceptance rates of a local antecedent for both reflexive and non-reflexive pronouns for each age group, presented in Table 8 (Sigurjónsdóttir & Hyams, 1992: 402).

Truth value judgment task		
Age group	**Reflexive pronoun *sjálfan sig***	**Non-reflexive pronouns**
3;03 – 4;00	92%	67%
4;00 – 4;06	88%	45%
4;06 – 5;00	93%	43%
5;00 – 5;06	95%	55%
5;06 – 6;00	95%	45%
Adults	98%	2%

Table 8: Acceptance rates of a local antecedent for reflexive and non-reflexive pronouns in the truth value judgment task in Icelandic

Children incorrectly accepted the local antecedent for the non-reflexive pronominal form 43% to 67% of the time, performing roughly at chance. This contrasts with the correct acceptance rate of a local antecedent for the reflexive form *sjálfan sig*, which ranged from 88% to 95%.

Dutch

Philip & Coopmans (1996: 579) applied a picture verification task to 37 Dutch-speaking preschool children from 4;3 to 6;11 years old (mean age: 5;11) in order to test the comprehension of reflexive and non-reflexive **strong pronouns** in sentences with definite (referential) and quantified antecedents. Results concerning grammatically correct "no" responses with reflexive strong pronouns show that children were successful 88% of the time when the antecedent was definite and 92% of the time when the antecedent was a quantifier. Taking into account the grammatically correct "no" responses with non-reflexive strong pronouns, children only reached 34% in the definite antecedent condition and 50% in the quantified antecedent (*iedere* – every) condition, indicating difficulties with these non-reflexive forms in simple transitive sentences (Philip & Coopmans, 1996: 583). In this case, there is a quantificational asymmetry between the results with a definite (referential) antecedent and with a quantified antecedent in the comprehension of Dutch non-reflexive strong pronouns.

The difficulties in the interpretation of non-reflexive forms with definite referential antecedents may be argued to result from an effect of pragmatic or processing factors (Chien & Wexler, 1990; Grodzinsky & Reinhart, 1993).

Philip & Coopmans (1996: 583) observed that Dutch children exhibited low levels of adult-like performance with non-reflexives regarding the quantified antecedent *iedere* (50%), unlike what was reported in some previous studies with quantifiers. This result also contrasts with the 74% of correct responses with the quantifier *every* obtained by English-speaking preschool children, tested by the same researchers in this experiment. Philip & Coopmans (1996: 585-586) propose that the observed comprehension problems in the acquisition of Dutch are due to an incomplete acquisition of a lexical feature which the Dutch *iedere* (the quantifier used in the experiment) has, but which the English *every*

lacks. According to the authors, these two quantifiers present a clear lexical-semantic difference. In addition to being a universal quantifier, *iedere* has the meaning of *any*. Hence, the Dutch *iedere* is lexically ambiguous in a way that English *every* is not. Philip & Coopmans (1996: 586) explain that when Dutch children first learn that *iedere* has the meaning of *any*, besides having the meaning of a universal quantifier, they may not initially know when the *any*-meaning is grammatically and pragmatically licensed. Consequently, some children will sometimes incorrectly assign a widened domain of quantification to *iedere* in the experimental condition with this quantifier, unlike adults.[39]

Spanish

Baauw, Escobar & Philip (1997) applied a picture verification task to 45 Spanish-speaking children (mean age: 5;6) from Madrid and Valladolid, Spain. These authors presented the following results of correct "no" responses in the comprehension of **non-reflexive clitics**:

a) 90% in simple sentences with a referential subject;
b) 90% in simple sentences with a quantified subject;
c) 64% in complex predicate constructions (verbal small clauses).

In turn, Coopmans, Baauw & Philip (1999) showed the results of correct "no" responses in the comprehension of **reflexive clitics** with the same group of Spanish-speaking children[40] and the same methodology previously described:

a) 89% in simple sentences with a referential subject;
b) 82% in simple sentences with a quantified subject;
c) 87% in complex predicate constructions (verbal small clauses).

[39] According to Philip & Coopmans (1996: 586), some Dutch children can sometimes interpret a test sentence like "Is every girl pointing at her?" as meaning "Is any girl pointing at her?". A child assigning such a meaning to the test sentence of the quantified antecedent condition could easily give a non-adult "yes" answer, since it was the case that in other pictures of the experiment there were girls pointing at a mother.

[40] It is presumed that Coopmans, Baauw & Philip (1999) tested the same group of children as Baauw, Escobar & Philip (1997), since the information on both the participants and the results from the comprehension of non-reflexive clitics (in simple sentences with referential and quantified antecedents) is the same.

In a general manner, there are no comprehension difficulties with both reflexive and non-reflexive clitics in the acquisition of Spanish. The exception goes to the non-reflexive clitic pronouns in the complex context of verbal small clauses, in which children have some problems of interpretation.

Padilla (1990) also investigated, through an act-out task, the interpretation of reflexive and non-reflexive clitics in simple sentences with a referential subject by Spanish-speaking children from Puerto Rico. Padilla (1990: 139) observed that children demonstrated knowledge of Principles A and B of Binding Theory, since they were able to apply them correctly for reflexives (anaphors) and non-reflexives (pronominals) in direct object position of simple sentences.

Baauw, Escobar & Philip (1997) and Coopmans, Baauw & Philip (1999) suggest that the absence of interpretation difficulties with non-reflexive clitic pronouns (in contrast with non-reflexive strong pronouns) in simple sentences has to do with the fact that clitics are underspecified for the feature [human]. This means that clitics can have [+/-human] reference. On the other hand, strong pronouns can only refer to [+human] entities.[41] However, both clitics and strong pronouns must be specified for the feature [human] in order for their phi-features (person, number, gender) to be interpretable at the logical form (LF) component (Corver & Delfitto, 1993). Thus, clitics must be bound (which means they are coindexed with an antecedent) either in syntax or in discourse (d-linking) in order to get a value for this feature from the binder. Accordingly, binding provides a specification for the feature [human]. Baauw, Escobar & Philip (1997) and Coopmans, Baauw & Philip (1999) argue that Rule I does not apply to clitics since they can only be bound. In view of the fact that coreference is excluded by binding, Rule I is not invoked in the comprehension of clitics (in simple sentences) by young children.[42]

[41] Cf. section 2.4. of this dissertation, in which the [+/-human] interpretation of clitic and strong pronouns is described according to Cardinaletti & Starke (1999). In the present thesis, it is defended that strong pronouns in EP can refer either to human or to other animate entities.

[42] Recall that when strong pronouns are complements of a preposition in Spanish and EP, they are underspecified for the feature [human], similarly to the case of clitics. This means that strong pronouns within PPs have [+/- human] reference (cf. section 2.4.). Varlokosta (2002) considers that, if the theoretical proposal by Baauw, Escobar & Philip (1997) and Coopmans, Baauw & Philip (1999) on the [human] feature specification of pronominal forms is assumed, children's performance is expected to be close to that of adults with non-reflexive strong pronouns in PP contexts. However, Baauw, Escobar &

However, Spanish-speaking children revealed difficulties in the interpretation of non-reflexive clitics in verbal small clause contexts (64%). Baauw, Escobar & Philip (1997) and Coopmans, Baauw & Philip (1999) resorted to the Condition on A-chains (cf. section 3.1.2.) in order to explain the coreference problems in small clauses with ECM in Spanish. The collected data appear to indicate that children misanalyse non-reflexive pronouns as optionally +R or -R elements. According to these researchers, children's misclassification of non-reflexive forms is due to the exceptional status of 3rd person non-reflexive pronouns, which are always +R in adult grammar. In turn, 1st and 2nd person pronominal forms can either be -R when they form the tail of an A-chain or +R otherwise.[43] Consequently, children seem to overgeneralize the double status of 1st and 2nd person pronouns as elements that are both +R and -R to 3rd person non-reflexive pronouns.[44]

In a first experiment in the acquisition of Spanish, Baauw (2000) studied the interpretation of non-reflexive clitics in simple sentences, of non-reflexive strong pronouns in clitic doubling constructions, and of non-reflexive strong pronouns in non-locative PPs, with regard to a referential subject.[45] The methodology used in this experiment was a picture verification task. Table 9 presents the obtained results (Baauw, 2000: 126).

Philip (1997) suggest that when the referent is human, the non-reflexive strong pronoun can always be analyzed as [+human], which will block the default [+/- human] specification of the pronominal form. In this case, the strong pronoun will be subject to Rule I.

[43] (i) *Me he secado.* (*me* = -R)
I dried myself off.
(ii) *Juan me ha visto.* (*me* = +R)
Juan has seen me.
(Coopmans, Baauw & Philip, 1999)

[44] Escobar & Gavarró (1999) consider that, according to this hypothesis based on the Condition on A-chains, a performance different from that of adults would also be expected with non-reflexives in simple sentences, contrary to fact. These researchers proposed an alternative explanation related to Rule I for the children's comprehension difficulties in small clauses. For details on this alternative hypothesis, the reader is referred to the part dedicated to the acquisition of Catalan in the current section.

[45] In this first experiment, Baauw (2000: 124-125) used the verb + preposition pairs *mirar hacia* (look at), *apuntar hacia* (point at) and *disparar contra* (shoot at) in the non-locative PP condition with non-reflexive strong pronouns in Spanish.

	n	Age range	Non-reflex. clitics in simple sentences	Non-reflex. strong pronouns in clitic doubling constructions	Non-reflex. strong pronouns in non-locative PPs
children	32	4 – 7	91%	83%	43%
adults	13	—	92%	95%	51%

Table 9: Percentage of "no" responses in coreference contexts in Spanish

Children generally rejected the coreferential interpretation either with non-reflexive clitics in simple sentences[46] or with non-reflexive strong pronouns in clitic doubling constructions. The PP contexts are considered to be ambiguous and this fact is reflected either in the children's performance or in the adults' behavior.

In a second experiment in the acquisition of Spanish, Baauw (2000) compared the interpretation between non-reflexive strong pronouns in **non-locative** PPs (with referential and quantified subjects) and non-reflexive strong pronouns in **locative** PPs (with referential and quantified subjects).[47] The author adopted a picture verification task as methodology. Table 10 shows the results of this experiment (Baauw, 2000: 138).

	n	Age range	Non-reflex. strong pronouns in non-locative PPs + referential subject	Non-reflex. strong pronouns in non-locative PPs + quantified subject	Non-reflex. strong pronouns in locative PPs + referential subject	Non-reflex. strong pronouns in locative PPs + quantified subject
children	26	4 – 7	42%	53%	27%	35%
adults	12	—	72%	89%	50%	72%

Table 10: Percentage of "no" responses in coreference contexts in Spanish

[46] Adults scored 92% when interpreting non-reflexive clitics in simple sentences. This percentage obtained by adults may be surprising in such a categorical context (involving grammatically correct and incorrect answers). The author does not explain this result but informs that none of the adults had an academic background (Baauw, 2000: 125).

[47] Baauw (2000: 137) informs that, in this second experiment, the verb + preposition pairs used in the non-locative PP conditions were *mirar hacia* (look at), *apuntar hacia* (point at) and *soñar con* (dream about). The verb + preposition pairs used in the locative PP conditions were *poner la/una X detrás de* (put the/a X behind), *poner la/una X delante de* (put the/a X in front of) and *trazar/(hacer) un círculo alrededor de* (draw a circle around).

Both children and adults had a higher percentage of rejections of the coreferential reading of the Spanish non-reflexive strong pronoun in non-locative PPs than in locative PPs. This percentage of rejections of coreference, by children and adults, was higher with quantified subjects than with referential subjects in both types of PPs (non-locative and locative). In general, children accepted coreference more often than adults.

Baauw (2000: 127) proposes that the lack of interpretation problems with Spanish non-reflexive strong pronouns in clitic doubling constructions is due to the presence of a (non-reflexive) clitic pronoun in these specific syntactic structures.[48] Moreover, Baauw (2000: 139) explains that, in Spanish non-locative PP contexts, children are less sensitive to the semantic/pragmatic properties of the verb + preposition pairs that determine the choice between the use of a non-reflexive strong pronoun or a reflexive strong pronoun, accepting more coreferential readings than adults. Nevertheless, Spanish children show sensitivity to the difference between non-locative and locative PPs. Similarly to adults, they accepted coreference between the non-reflexive strong pronoun and the subject more often when the PP is locative than when it is non-locative.[49]

[48] The theoretical analysis that accounts for this idea will not be under discussion here, because the study of clitic doubling constructions in first language acquisition is outside the purposes of this thesis.

[49] Baauw (2000: 139-140) points out that the adults of the first experiment (results in Table 9) accepted coreferential readings between the local subject and the non-reflexive strong pronoun in the non-locative PP condition much more often than the adults of the second experiment did (results in Table 10) in the similar condition (non-locative PPs + referential subject). The author suggests that three factors may have contributed to this difference in performance. The first (but probably least important) factor has to do with the use of a different verb + preposition pair in each experiment: the first experiment contained *disparar contra* (shoot at), while the second experiment included *soñar con* (dream about). Coreference may be more marginal in the latter case than in the former case. The second factor may be related to the fact that in the first experiment no adult had an academic background, whereas the adults of the second experiment were all undergraduate students of English Language and Literature. Baauw (2000: 139) states that, concerning the second group of adults, their background in language may have made them more sensitive to differences in the acceptance between different constructions, but admits that this is only speculative. The third (and probably most important) factor is the fact that the second experiment tested two kinds of PP constructions: non-locative PPs (which make coreference between the local subject and the non-reflexive pronoun less available) and locative PPs (which allow coreference more easily). The presence of both types of constructions in this experiment may have influenced the control group's sensitivity regarding a lower acceptance of coreference in the non-locative PP condition (Baauw, 2000: 140).

French

Hamann, Kowalski & Philip (1997) studied the comprehension of reflexive and non-reflexive clitics in the acquisition of French. A picture verification task was applied to three groups of French-speaking children. The younger group included 9 children with 3 and 4 years old (from 3;5 to 4;8 and mean age of 4;3), the following age group had 8 children with 5 years old (from 5;3 to 5;11 and mean age of 5;7), and the older group was composed of 16 children with 6 and 7 years old (from 6;0 to 7;3 and mean age of 6;9).

Table 11 presents the results referring to grammatically correct negative responses (Hamann et al., 1997: 213-214).

Age group	Reflexive clitics			Non-reflexive clitics		
	Referential antecedent	Quantified antecedent	Small clause	Referential antecedent	Quantified antecedent	Small clause
3 – 4	74%	74%	70%	78%	70%	48%
5	96%	92%	92%	100%	88%	54%
6 – 7	100%	85%	96%	100%	94%	62%

Table 11: Percentage of correct "no" responses in French

Hamann et al. (1997: 213-214) considered that French-speaking children, in general, showed an adult-like performance with both reflexive and non-reflexive clitics in simple transitive sentences, with referential and quantified antecedents. In complex sentences, with verbal small clauses, children performed well when the clitic was reflexive but had a poor performance when the clitic was non-reflexive.

The conditions of comprehension of reflexive clitics were used as control items. The results obtained in those contexts indicate that French-speaking children know Principle A of the Binding Theory. Additionally, they displayed high levels of adult-like performance in the comprehension of non-reflexive clitics in simple structures. This is attributed to the fact that Rule I does not apply to Romance pronominal object clitics, which do not allow accidental coreference (the possibility of using non-reflexive

pronouns to corefer with a local subject in certain contexts, as is the case of locative PPs).

Nevertheless, children exhibited a weak comprehension of non-reflexive clitic pronouns in complex constructions. Hamann et al. (1997: 214) state that there may be a problem with the lexical acquisition of the referentiality feature associated with the 3rd person pronoun due to the ambiguity of the 1st and 2nd person pronouns (similarly to what was assumed for Spanish by Baauw et al., 1997 and Coopmans et al., 1999). As an alternative, the authors suggest that, because of its base generation as a subject in the lower clause, the pronoun may be reconstructed by the child. This could give rise to an ambiguity where Rule I applies.

Catalan

Escobar & Gavarró (1999) tested the comprehension of clitics, in relation to a referential antecedent, in the acquisition of Catalan. The conditions included in the research were the following:

a) simple sentences with reflexive clitics;
b) simple sentences with non-reflexive clitics;
c) sentences with clitic doubling of a reflexive clitic + reflexive expression;
d) sentences with clitic doubling of a non-reflexive clitic + non-reflexive strong pronoun;
e) verbal small clauses with a reflexive clitic;
f) verbal small clauses with a non-reflexive clitic;
g) sentences with a reflexive expression (composed of a non-reflexive strong pronoun and an anaphorizing element of the type *same*/*self*) within a PP;
h) sentences with a non-reflexive strong pronoun within a PP.

The researchers used a picture verification task with 37 Catalan-speaking children from 3;5 to 6;3 years, with mean age of 5;2. The children were divided into four age groups: 3-, 4-, 5- and 6-year-olds. As a control group, 26 adults were also tested.

Table 12 presents children's results concerning the correct "no" responses obtained in conditions a), b), c), d), e) and f), in which adults scored 100%. All these contexts are considered to be categorical in the sense that they involve grammatically correct and incorrect answers.

Age group	Reflexive clitics	Non-reflex. clitics	Clitic doubling of a reflexive clitic + reflexive expression	Clitic doubling of a non-reflex. clitic + non-reflex. strong pronoun	Verbal small clauses with a reflexive clitic	Verbal small clauses with a non-reflex. clitic
3	100%	86.6%	86.66%	73.3%	76.66%	40%
4	83.3%	85.83%	90%	83.33%	86.66%	32.5%
5	97.5%	84.37%	100%	77.5%	91.25%	32.5%
6	100%	100%	100%	88,33%	100%	73.3%

Table 12: Percentage of correct "no" responses on test conditions from a) to f) in Catalan

In general, Catalan children have no problems in the comprehension of (i) simple sentences with reflexive or non-reflexive clitics, (ii) clitic doubling constructions with reflexive clitics + reflexive strong pronouns, (iii) clitic doubling constructions with non-reflexive clitics + non-reflexive strong pronouns, and (iv) verbal small clauses with a reflexive clitic. The principles of the Binding Theory are obeyed in these contexts, as has been found for other Romance languages (as Italian, Spanish, French). However, younger children (between 3 and 5 years old) show difficulties in verbal small clauses when the clitic is non-reflexive.

Escobar & Gavarró (1999) assume, along with Avrutin & Wexler (1992), Baauw et al. (1997) and Coopmans et al. (1999), that clitics (unlike strong pronouns) are not subject to the pragmatic Rule I. Hence, children's difficulty in applying this rule (based on their limited working memory) does not interfere with the processing of clitics in simple sentences in the acquisition of Catalan.

In turn, Escobar & Gavarró (1999) suggest an analysis related to Rule I for the coreference difficulties found with non-reflexive clitic pronouns in verbal small clause

contexts in Catalan. These authors assume there is an empty pronominal (*pro*), linked to a non-reflexive form, in the small clause of the ECM construction.[50] This *pro* element (which must be specified as fully referential, that is, +R) is subject to Rule I. Hence, if the processing of this rule exceeds the capacity of children's working memory (as argued by Grodzinsky & Reinhart, 1993), there can be problems in the interpretation of non-reflexives in these complex structures. These difficulties are not expected to be found when the empty pronominal is linked to a reflexive form, since anaphors are not subject to Rule I.

Table 13 shows children's results in conditions g) and h), with respect to the interpretation of reflexive and non-reflexive strong pronouns within PPs.

Age group	**Reflexive expression within a PP** ("yes" responses in coreference)	**Reflexive expression within a PP** ("no" responses in disjoint reference)	**Non-reflex. strong pronoun within a PP** ("yes" responses in disjoint reference)	**Non-reflex. strong pronoun within a PP** ("no" responses in coreference)
3	73%	40%	73%	73%
4	90%	67.5%	60%	60%
5	81.25%	73.12%	70%	55%
6	83.33%	83.33%	70%	40%
adults	100%	100%	87%	70%

Table 13: Percentage of "yes" and "no" responses to the PP condition in Catalan

In the comprehension of reflexive expressions within a PP, regarding disjoint reference contexts, there is a developmental effect in children. They begin by rejecting the disjoint reading 40% of the time at 3 years old and tend to progressively get closer to the adults' performance (100%).

Unlike the previous conditions, the PP contexts are ambiguous with non-reflexive strong pronouns. This was reflected in the adults' performance, in which

[50] La nena la veu [[*pro*] ballar]. (Escobar & Gavarró, 1999)
The girl saw her dance.

the coreferential reading of a non-reflexive strong form following a preposition (for which Escobar & Gavarró, 1999 expected a "no" response) was accepted 30% of the time. Taking this aspect into account, it is not surprising that children also accepted coreference with non-reflexive strong pronouns within a PP. As age increases, children tended to deviate from the adults' "no" responses (which correspond to 70% of rejection of coreferential interpretations). However, the group of 3-year-olds, who presented a percentage (73%) of rejection of coreference similar to the adults' percentage (70%), was only composed of three children.

In this case, Escobar & Gavarró (1999) state that children allow a bound reading of the non-reflexive pronoun similarly to what adults do. However, when the non-reflexive within the PP is not coindexed with the subject of the sentence, but rather counterindexed, the breakdown of Rule I should also have an effect on the children's responses, that is, they should respond at chance level when coreference is achieved outside the scope of binding. According to the authors, the combined effect of both coreference and binding being grammatical leads us to expect more than 50% adult-like responses. Accordingly, the relatively low adult-like responses in the PP condition are also a reflection of Rule I breakdown.

Brazilian Portuguese

Grolla (2006) applied a picture verification task to 40 Brazilian Portuguese-speaking children from 3;4 to 6;6 years old in Franca, a town in the state of São Paulo. The author presented the general results for all the participants and not by age group. Sentences with non-reflexive strong pronouns locally bound by DP antecedents were incorrectly accepted as grammatical 44% of the time. When the non-reflexive strong pronoun was locally bound by QP (quantifier phrase) antecedents, children incorrectly accepted the sentences as grammatical 40% of the time. In turn, children had high rates of acceptance of the grammatical sentences involving anaphors (reflexive clitics) either with a DP antecedent or with a QP antecedent, with 95% in both cases.

No quantificational asymmetry was observed in the comprehension of non-reflexive strong pronouns in the acquisition of BP. Thus, children displayed a weak performance with both referential and quantified local antecedents.

Based on Hornstein (2001), Grolla (2006) assumes that structures containing anaphors involve movement in overt syntax and the anaphor is the residue of movement. In addition, according to Hornstein's (2001) proposal, non-reflexive pronouns are analyzed as *elsewhere* elements that can only be inserted in a derivation if movement is not possible. This hypothesis considers that non-reflexive pronouns are not present in the syntactic numeration and their insertion in a derivation is not economical. The application of movement is regarded as more economical than the insertion of non-reflexives.

In (152) we can observe a structure in which the anaphor is the result of movement. Concentrating on the idea that anaphors involve movement, Grolla (2006) considers that the contrast below illustrates the complementarity between (local) anaphors and non-reflexive pronouns (whenever an anaphor is possible, the non-reflexive pronoun is not):

(152) $Bert_i$ admires [t_i himself].

(153) *$Bert_i$ admires him_i.

(Grolla, 2006: 232)

According to this researcher, the structure in (152) involves movement, whereas the one in (153) does not entail movement and contains a non-reflexive pronoun in the place of the anaphor. The structure with the non-reflexive locally bound by the subject *Bert* is not acceptable, but the structure involving movement is. Assuming that non-reflexive pronouns are analyzed as *elsewhere* elements that can only be inserted when movement has failed to apply, Grolla (2006) points out that we can rule out cases like in (153) without the need of Principle B. If a derivation with an anaphor and involving movement is available, the insertion of a non-reflexive pronoun is blocked because it violates economy conditions. Furthermore, Grolla (2006) states

that anaphors need to be close to their antecedents due to movement and this explains the locality requirement on anaphors, without the need of Principle A.

The author defends that this analysis works in the same way in BP:

(154) O Pedro$_i$ se$_i$ admira.

the Pedro himself admires

"Peter admires himself."

(155) *O Pedro$_i$ admira ele$_i$.

the Pedro admires him

(Grolla, 2006: 233)

Assuming that the derivation with the anaphor *se* involves movement and that the non-reflexive pronoun *ele* is an *elsewhere* element that is only used if movement cannot occur, the facts in (154) and in (155) are comparable to what happens in English. In this experiment on the acquisition of BP, the anaphor is a (reflexive) clitic pronoun, but the object pronoun *ele* is a (non-reflexive) strong pronoun.

The analysis discussed here implies that non-reflexive pronouns are inserted post-syntactically whenever the evaluation of convergent syntactic structures is needed, leading to interface operations. A comparison between derivations is necessary to decide if the insertion of a non-reflexive pronoun is licit or not. According to Reinhart (1999, 2004), children have difficulties in the comparison of two syntactic derivations and in the choice of the one that is more economical. In the areas where reference set economy is active, the reference set consists of pairs <d,i> of derivation and interpretation, and it is motivated by interface needs: a given <d,i> pair is blocked if there is a more economical <d,i> pair in the reference set. Following Reinhart (1999, 2004), Grolla (2006) explains that BP-speaking children exhibit coreference problems in simple transitive constructions with non-reflexive strong pronouns because they need to make a comparison between the derivation with a non-reflexive pronominal form and the one with an anaphor (involving movement), which requires a reference set

computation. This operation is problematic for children due to processing constraints, since there is competition between derivations at the interface level. Given that an anaphor (in a construction involving movement and considered as more economical) is possible, the insertion of the non-reflexive pronoun is banned. However, the comparison of alternative structures requires a great effort for children's working memory (still under development) and this can result in a chance level performance, as suggested by Reinhart (1999, 2004).

European Portuguese

Cristóvão (2006, 2007) studied coreference in feminine 3rd person accusative clitics in the acquisition of EP.

The author applied a picture verification task to a group of 38 Portuguese children between 3;6 and 6;3 years old (mean age: 4;8) in Setúbal and in Ferreira do Alentejo, Portugal. Children were divided into three groups: 6 children between 3 and 4 years old, 16 children between 4 and 5 years old, and 16 children between 5 and 6 years and 3 months old (Cristóvão, 2006: 64-65). There were three syntactic contexts in which clitics occurred: a) simple sentences with referential subject; b) simple sentences with quantified subject; c) contexts of verbal small clause with exceptional case marking (ECM). Cristóvão (2006: 63) informs that all sentences were tested with two verbal structures: one with simple verbs, and another in progressive constructions with an auxiliary verb. Table 14 and Table 15 concern the results from all the children together (Cristóvão, 2006: 77).

	Simple Verb					
	Reflexive clitics			**Non-reflexive clitics**		
	Referential subject	**Quantified subject**	**Small clause**	**Referential subject**	**Quantified subject**	**Small clause**
yes	96.5%	94.7%	86.8%	86.8%	88.6%	85.1%
no	83.3%	80.7%	67.6%	70.2%	70.2%	49.1%
total	89.9%	87.7%	77.2%	78.5%	79.4%	67.1%

Table 14: Percentage of correct responses on the comprehension of clitics with simple verbs in EP

	Progressive construction with an auxiliary verb					
	Reflexive clitics			Non-reflexive clitics		
	Referential subject	**Quantified subject**	**Small clause**	**Referential subject**	**Quantified subject**	**Small clause**
yes	97.4%	93.6%	90.4%	93.9%	94.7%	90.4%
no	86%	78.1%	66.7%	84.2%	78.1%	62.3%
total	91.7%	85.9%	78.6%	89.1%	86.4%	76.4%

Table 15: Percentage of correct responses on the comprehension of clitics in progressive constructions with an auxiliary verb in EP

Portuguese children do not have difficulties in the application of Principle A (reflexive clitics) and Principle B (non-reflexive clitics) of Binding Theory. In the case of verbal small clauses, the obtained results indicate problems of coreference in this complex syntactic context.

Cristóvão (2006, 2007) follows Grolla (2006) to account for the fact that non-reflexive strong pronouns (analyzed as *elsewhere* elements) are difficult to interpret. In turn, Cristóvão (2006: 90-91) explains that clitics cannot be *elsewhere* pronouns, because they have a defective nature (Cardinaletti & Starke, 1999) and are inserted in the course of the syntactic derivation. For this reason, clitics do not compete with alternative forms at the interface level. This property prevents them from entering into the computation of reference sets, which is only possible between convergent derivations. Therefore, according to this author, there are no obstacles for children's interpretation of clitics since there is no competition at the interfaces. This fact can justify the absence of coreference difficulties in the comprehension of non-reflexive clitics in simple transitive sentences like the following:

(156) A menina$_i$ penteia-a$_{*i/j}$.

the girl combs-her

(Cristóvão, 2006: 91)

Additionally, Cristóvão (2006, 2007) assumes that the coreference problems observed with non-reflexive clitics in small clauses are due to children's limited capacity to process complex operations. In this case, the author makes reference to the hypothesis suggested by Baauw, Escobar & Philip (1997) and Coopmans, Baauw & Philip (1999) for Spanish, and to the analysis proposed by Escobar & Gavarró (1999) for Catalan. Cristóvão states that, whether we accept the former explanation or the latter one, the context of small clauses is problematic since it involves complex operations (Condition on A-chains or Rule I) that children do not seem to master.

Greek

Varlokosta (2002) investigated if an asymmetry between clitics and strong pronouns is observed in the acquisition of Greek, a language which allows these two types of pronominal forms in object position. The study included three experiments on the interpretation of pronominal forms with a referential antecedent by typically developing Greek children, using truth value judgment tasks.

In Experiment I, 20 Greek-speaking children (from 3;7 to 5;6 years, with mean age of 4;5) were tested. The goal was to verify if there are difficulties of comprehension in the following contexts:

a) sentences with non-reflexive accusative clitics (95% of correct "no" responses);
b) sentences with non-reflexive strong pronouns as complements of verbs (87% of correct "no" responses);
c) sentences with reflexive pronouns, used as control items (87% of correct responses).

Experiment II also involved 20 Greek-speaking children (from 3;10 to 5;9 years, with mean age of 4;6) and tested if there are any interpretation problems with:

a) non-reflexive strong pronouns doubled by non-reflexive clitics (95% of correct "no" responses);
b) non-reflexive strong pronouns in prepositional contexts that do not permit coreference (95% of correct "no" responses).

In Experiment III, 20 Greek-speaking children (from 3;6 to 5;10 years, with mean age of 4;6) were also observed in order to check whether there are comprehension difficulties in more complex structures than the ones tested in Experiment I. Coreference problems with non-reflexive clitics have been reported in verbal small clauses with ECM in Romance languages, involving an infinitival form. However, as Varlokosta (2002) informs, Greek does not have infinitives. In contexts in which other languages use an infinitive, Greek makes use either of a verb form introduced by the particle *na* and inflected for subject-verb agreement, or of a passive participle inflected for gender, number and case (but not for person agreement).[51] In consequence, children were evaluated in the following conditions:

a) non-reflexive clitics in constructions involving the particle *na* (88% of correct "no" responses);
b) non-reflexive strong pronouns in constructions involving the particle *na* (83% of correct "no" responses);
c) non-reflexive clitics in constructions involving a passive participle (40% of correct "no" responses);
d) non-reflexive strong pronouns in constructions involving a passive participle (50% of correct "no" responses).

In a general manner, the results in Greek did not reveal problems in the comprehension of clitics by children. Additionally, the strong pronoun *afton* (of demonstrative nature), used in all experiments, did not cause interpretation difficulties either. In sum, the interpretation of both clitic pronouns and strong pronouns did not cause difficulties for children in simple sentences, in clitic doubling constructions, in prepositional contexts that do not permit coreference and in constructions involving the particle *na* (the exception goes for the constructions involving a passive participle). Consequently, the results obtained with Greek clitics are in accordance with what has been reported in general for Romance clitic contexts. In turn, the results found with

[51] (i) Vlepo ton Yani na thimoni.
see-1SG the John-ACC particle get-angry-3SG-imperfective
"I see John getting angry."
(ii) Vlepo ton Yani na thimomeno.
see-1SG the John-ACC angry-passive participle-MASC-ACC-SG
"I see John angry."
(Varlokosta, 2002)

Greek strong pronouns do not follow the pattern described crosslinguistically. However, the strong pronoun *afton* used in the Greek research has a demonstrative nature, which introduces an extra variable. Varlokosta (2002) attributes the absence of coreference problems in the referred contexts of strong pronouns in Greek to the demonstrative nature of those forms.

In contrast, Greek-speaking children reveal problems of interpretation with non-reflexive clitics and non-reflexive strong pronouns in constructions involving a passive participle. Varlokosta (2002) does not provide an explanation for the interpretation difficulties found in these complex structures.

Norwegian

Hestvik & Philip (1999/2000) have studied the comprehension of non-reflexive and reflexive pronouns with local antecedents (referential and quantificational) in Norwegian. They used a picture verification task in a group of 44 monolingual Norwegian children from 4;5 to 7;4 years old, divided into two age groups: 15 younger children (age range: 4;5 – 5;11) and 29 older children (age range: 6;0 – 7;4). These children were tested in Bergen, Norway (Hestvik & Philip, 1999/2000: 188-189).

These linguists found that Norwegian children displayed adult-like performances in the conditions with grammatically correct "no" responses. In the comprehension of non-reflexive or reflexive pronouns, the group of younger children obtained 91% with referential antecedents and 97% with quantificational antecedents. In turn, the group of older children got 90% with referential antecedents and 99% with quantificational antecedents (Hestvik & Philip, 1999/2000: 196). These results indicate that there is a good comprehension of both non-reflexive and reflexive strong pronouns in the acquisition of Norwegian, contrasting with findings from English (Chien & Wexler, 1990) or from Dutch (Philip & Coopmans, 1996), in which the interpretation of non-reflexives is problematic. Hestvik & Philip (1999/2000: 219) state that the descriptive generalization that arises from these results may correspond to Norwegian children rarely showing semantic identity errors with non-reflexive pronouns, attributable to the inability of implementing Rule I in the domain in which

Principle B applies. Hence, they differ in this respect from English and Dutch children and behave like Italian children. In consequence, these researchers hypothesize that Norwegian strong pronouns are like Italian clitics at the logical form (LF) component, and semantic properties of clitics prevent them from interacting with Rule I in the same way as strong pronouns. However, the authors leave this hypothesis as a speculation (Hestvik & Philip, 1999/2000: 219).

German

Ruigendijk, Friedmann, Novogrodsky & Balaban (2010: 1997) carried out a picture selection task with 44 German-speaking children between 3;3 and 6;3 years old in order to assess their comprehension on reflexive and non-reflexive pronouns (concerning a referential antecedent). Ruigendijk et al. (2010: 1997) have registered the following results:

	% correct responses	
Age group	**Reflexive strong pronouns**	**Non-reflexive strong pronouns**
3;3 – 4;2	74%	79%
4;3 – 6;3	97%	97%

Table 16: Comprehension of reflexive and non-reflexive strong pronouns in German

The authors claim that German children do not have problems comprehending both reflexive and non-reflexive pronouns, which is more evident from the age of 4.

It is admissible to say that German joins Norwegian as exceptions concerning a good performance by children in the interpretation of non-reflexive strong pronouns in simple transitive sentences, unlike other languages with strong object pronouns. Ruigendijk et al. (2010: 2003) explain that in Norwegian and German, a non-reflexive strong pronoun within locative PPs cannot be used to refer to the local subject, only

the reflexive is allowed.[52] It is possible to consider that this property is associated with the grammatical status and functional nature of the non-reflexive strong object pronoun in these two languages. Therefore, strong pronouns in Norwegian and German are not comparable to the ones found in English, in which there is no complementary distribution in locative PPs because non-reflexive strong pronouns can corefer with the local subject (this phenomenon is called *accidental coreference*). In Romance languages, non-reflexive clitic object pronouns do not permit local accidental coreference (Hamann, Kowalski & Philip, 1997: 208). The fact that non-reflexive forms are less available for referring locally in Norwegian and German, as in Romance languages, suggests there is less ambiguous input. Therefore, children may classify non-reflexives and reflexives correctly, since there is no (or at least less) possibility to choose the local antecedent for the non-reflexive pronoun. In consequence, the comparison of two interpretations (variable binding vs. coreference) is not necessary and an adult-like comprehension is expected from a young age (Ruigendijk, Friedmann, Novogrodsky & Balaban, 2010: 2003).

Hebrew

Ruigendijk, Friedmann, Novogrodsky & Balaban (2010: 1997) applied a picture selection task to 54 Hebrew-speaking children between 2;4 and 6;7 years old with the objective of evaluating their comprehension on reflexive and non-reflexive strong pronouns (regarding a referential antecedent). These children were divided into five age groups: 2- (2;4 – 2:11), 3- (3;0 – 3;9), 4- (4;1 – 4;10), 5- (5;0 – 5;10), and 6-year-olds (6;0 – 6;7). Ruigendijk et al. (2010: 1999) have obtained the results presented below:

[52] In Norwegian and German, a non-reflexive strong pronoun within a locative PP cannot be used to refer to the local subject, and only the reflexive form is allowed. This contrasts with what happens in English, in which both the reflexive and the non-reflexive forms are possible to occur in this context:

Norwegian: *Gutten* satte stolen bak *seg*/**ham*.
German: *Der Junge* stellt den Stuhl hinter *sich*/**ihn*.
English: *The boy* puts the chair behind *himself*/*him*.
(Ruigendijk, Friedmann, Novogrodsky & Balaban, 2010: 2003)

	% correct responses	
Age group	**Reflexive strong pronouns**	**Non-reflexive strong pronouns**
2	65%	65%
3	74%	66%
4	93%	68%
5	95%	65%
6	95%	83%

Table 17: Comprehension of reflexive and non-reflexive strong pronouns in Hebrew

The researchers observed that Hebrew-speaking children understand reflexives from age 4, but they only start to show mastery in the interpretation of non-reflexives when they are 6 years old.

Ruigendijk et al. (2010) compared German with Hebrew, and have found different patterns in the comprehension of non-reflexive strong pronouns in these two languages: there are no difficulties in German while there are problems in Hebrew. According to the researchers, this difference can be explained on the basis that German (unlike Hebrew) has less availability for a local coreference interpretation with non-reflexives[53] and, therefore, children do not have to compute coreference against binding. In consequence, children's limited processing capacity does not interfere. They choose the only option they have in the comprehension of non-reflexive forms: binding, which does not allow local antecedents for non-reflexives. In Hebrew, coreference is an option and can be chosen in tasks of comprehension of non-reflexive forms while the computation is still limited (Ruigendijk et al., 2010: 2003).[54]

[53] Non-reflexive strong pronouns within locative PPs can be used to refer to the local subject in Hebrew (similarly to what happens in English), but not in German:

Hebrew: *Ha-yeled* sam et ha-kise **me'axorei acmo*/*me'axorav*.
German: *Der Junge* stellt den Stuhl hinter *sich*/**ihn*.
English: *The boy* puts the chair behind *himself*/*him*.

(Ruigendijk, Friedmann, Novogrodsky & Balaban, 2010: 2003)

[54] Ruigendijk et al. (2010: 2002) assume that children's interpretation problems with non-reflexive strong pronouns result from their limited processing capacity, which does not allow them to compute and compare between the variable binding representation and the coreference representation. Therefore, children cannot execute Rule I (Grodzinsky & Reinhart, 1993). This is reflected in their inability to rule out coreference, leading to the acceptance of a local antecedent for non-reflexives.

4.1.1. Is the pronoun interpretation problem a result of methodological flaws?

Recent studies have questioned the results found in languages with strong pronouns in object position (like English). These studies have suggested that the problems in the interpretation of non-reflexive pronominal forms, phenomenon known as Delay of Principle B Effect (DPBE), are a result of a methodological artifact (particularly when truth value judgment tasks were used).

Having reviewed the research by Chien & Wexler (1990) and also investigations by other authors on the acquisition of English, Elbourne (2005) claims that the alleged difference in the interpretation of non-reflexives between quantified and referential local subjects by children, which this author calls *quantificational asymmetry* (QA), is an experimental artifact. Based on this observation, Elbourne (2005: 363) defends that children from 3 to 6 years old appear not to know the Principle B at all (either with referential or with quantified antecedents) and argues against the QA through the *Salience Hypothesis*. As this author states, children interpret pronouns according to the most salient choice made relevant by the story (or picture) and the question (Elbourne, 2005: 338). In conformity with this perspective, the referents were not equally salient in the stories (or pictures) that accompany the test sentence. Consequently, children may have simply used the strategy of choosing the most salient referent, which may have contributed for the emergence of the QA. However, Elbourne (2005) did not apply experimental tests to children in order to confirm his theoretical proposal.

In turn, Conroy, Takahashi, Lidz & Phillips (2009: 481) argue that the prior findings showing the DPBE and the QA permit extragrammatical explanation (being a result of an artifact of experimentation). Additionally, these authors defend that, once extragrammatical factors are removed, young children show little evidence of difficulties in the interpretation of non-reflexive forms. Conroy et al. (2009: 446) made a review of over 30 previous studies and conducted a series of three experiments (two on the interpretation of non-reflexive pronouns and one on the interpretation of possessive pronouns, in simple sentences) using the truth value judgment task (with stories) in 4- and 5-year-old English-speaking children. In their first experiment, these researchers used a story in which they assume that the potential antecedents of the

non-reflexive pronoun were presented as being equally prominent and, therefore, given an equal treatment. In this case, Conroy et al. (2009: 463) inform that children incorrectly accepted the coreferential interpretation for the non-reflexive form only 11% of the time with a referential local antecedent (89% of correct responses) and incorrectly accepted it 14% of the time with a quantificational local antecedent (86% of correct responses). According to the results of this first experiment, English-speaking children have a good interpretation of non-reflexive pronouns, succeeding in the application of Principle B with both referential and quantified antecedents. In the second experiment, the interpretation of a possessive NP (e.g. *his costume*) was tested, with which the coreferential and the disjoint interpretations are possible. Here, Conroy et al. (2009: 464) report that children accepted coreference 80% of the time with the referential local subject and 73% of the time with the quantificational local subject, indicating that they are not guided by a general preference for disjoint interpretations (confirming the results of the first experiment). In the third experiment, some of the methodological flaws of previous investigations were reintroduced (the central figure in the narrative is the incorrect coreferential antecedent for the non-reflexive pronoun *him* in the referential condition and is the intended disjoint antecedent for *him* in the quantificational condition). If children associate the non-reflexive *him* with the central character in the story, they may judge the test sentence (in relation to a coreferential interpretation) as incorrectly true in the referential condition and as correctly false in the quantificational condition (Conroy et al., 2009: 467).[55] The results consisted in the acceptance of incorrect coreferential readings by children 56% of the time in the referential context but only 16% in the quantificational context. In consequence, these results replicate the DPBE and the QA (Conroy et al., 2009: 468).

However, Hendriks (2014) challenged the results obtained in the first experiment of Conroy, Takahashi, Lidz & Phillips (2009), in which English-speaking children were successful in interpreting non-reflexives either with referential or with

[55] The central figure in one of the narratives of the **third experiment** of Conroy et al. (2009) is *Hiking Smurf*. The test sentences were the following:
(i) *Hiking Smurf* painted *him*. – Referential condition
(ii) *Every dwarf* painted *him*. – Quantificational condition
(Conroy et al., 2009: 467)

quantified antecedents, and considers that the antecedents were not treated in an entirely equal way (contrarily to what was assumed). Hendriks (2014) informs that in the story presented as an example from the first experiment of Conroy et al. (2009) there are two referents relevant for discussion: *Grumpy* (the incorrect coreferential antecedent for the non-reflexive *him*) and *Hiking Smurf* (the intended disjoint antecedent for *him* in both the referential and the quantificational conditions).[56] Conroy et al. (2009: 461) admit that Grumpy is a prominent character in the story and is associated with the most vivid event in the narrative, but Hiking Smurf is the central character in the story. Hendriks (2014) states that if the relative prominence of the two characters has any influence in interpretation, it would lead children in the first experiment of Conroy et al. (2009) to often select the correct disjoint antecedent for the non-reflexive pronoun in both the referential and the quantificational conditions. In addition, Hendriks (2014) states that, although Conroy et al. (2009) found a clear difference in English-speaking children's responses regarding the interpretation of non-reflexive pronouns between the first experiment (with improved methodological materials) and the third experiment (with reintroduction of some of the methodological flaws of earlier studies), they are not able to identify the exact cause of this difference. In fact, Conroy et al. (2009: 466) acknowledge that because the two versions of the story differ in many aspects, it is not possible to determine what exactly causes the differences that might emerge in children's performance. In consequence, Hendriks (2014) points out that their explanation lacks specificity. Accordingly, if it cannot be firmly established that the observed differences in the interpretation of non-reflexives by children between their first experiment and their third experiment are due to a methodological effect induced by the content of the story used in the tasks (rather than to a linguistic effect derived from particular properties of the language involved), the idea of the DPBE as an experimental artifact cannot be supported. Besides, Conroy et al. (2009: 475) admit that there is a "residue" of the DPBE that is not the result of an artifact of experimentation but rather a real effect.

[56] Examples of test sentences in the **first experiment** of Conroy et al. (2009), whose relevant characters were *Grumpy* (prominent character associated with the most vivid event in the narrative) and *Hiking Smurf* (central character in the story) are presented below:
(i) *Grumpy* painted *him*. – Referential condition
(ii) *Every dwarf* painted *him*. – Quantificational condition
(Conroy et al., 2009: 460)

These authors propose that the acceptance of illicit antecedents for non-reflexive pronouns by children consists in their difficulty to inhibit and recover from incorrect initial interpretations during sentence processing (Conroy et al., 2009: 478-480). Hence, as Hendriks (2014) remarks, the task-based explanation of Conroy et al. (2009) requires additional assumptions to account for children's incorrect responses with non-reflexives.

Furthermore, Hartman, Sudo & Wexler (2012) reviewed videos of sample stories from the first experiment of Conroy, Takahashi, Lidz & Phillips (2009), but had no access to the videos from the third experiment. Hartman et al. (2012) found that Conroy et al. (2009) used in their first experiment the reduced form of the pronoun *him* (henceforth written *'m*) in English. In parallel Hartman et al. (2012), using the same methodology applied by Conroy et al. (2009) in their first experiment, conducted similar interpretation tests in the acquisition of English. The only difference was the usage of the full pronoun (*him*) and not of the reduced form (*'m*). The obtained results were different. While in the first experiment of Conroy et al. (2009) English-speaking children incorrectly accepted the coreferential interpretation in 11% of cases, in the replicated experiment by Hartman et al. (2012) English-speaking children accepted the incorrect coreferential interpretation (showing a DPBE effect) in 47.2% of trials[57]. Due to this discrepancy, Hartman et al. (2012) suggest that the results of Conroy et al. (2009) were caused by reduced pronouns and not by their methodological innovations. Hartman et al. (2012) concluded that the clitic pronoun effect extends to English reduced pronouns and the DPBE is a real effect when full pronouns are used.

The fact is that there is evidence for a suggestive pattern with respect to a difference in the interpretation of non-reflexive forms (in simple sentences) between languages with strong object pronouns and languages with clitic object pronouns. Difficulties have been registered in the former case, but not in the latter one. Some studies have actually shown this crosslinguistic difference using the same experimental tasks, like the one carried out by McKee (1992). This researcher found an adult-like

[57] The value of 47.2% was obtained by Hartman et al. (2012) with 18 English-speaking children, between 3;10 and 5;10 years old (mean age: 4;11). Nevertheless, there is information online by Sudo & Hartman (2012) that preliminary results, with 13 children between 4;6 and 5;2 (mean age: 4;11), correspond to 37.5% of acceptance of incorrect coreferential interpretation.

performance in the interpretation of non-reflexives with Italian-speaking children, but not with children acquiring English. In this specific case, Conroy et al. (2009: 480) propose that this crosslinguistic difference may concern cases of local accidental coreference which is available in languages of strong object pronouns as English, but is not permitted in clitic languages like Italian. For English-speaking children, the possibility of using a non-reflexive strong pronoun for local coreference exists in certain contexts (such as locative PPs) and, for this reason, they may incorrectly use non-reflexives to locally corefer outside of those contexts. For Italian-speaking children, the possibility of using a non-reflexive clitic pronoun for local coreference does not exist.

The explanation based on the unavailability of accidental coreference in languages with object clitics, to justify the absence of difficulties in the local interpretation of non-reflexives, is compatible with what Ruigendijk, Friedmann, Novogrodsky & Balaban (2010) argue to be the cause of the lack of comprehension problems with non-reflexive strong pronouns in Norwegian and German. These two languages contrast with the group composed of other languages with strong object pronouns with some interpretation difficulties, like English. Accordingly, non-reflexive strong pronouns may present accidental coreference within locative PPs in English but not in Norwegian and German. In consequence, it is legitimate to admit that the grammatical status and functional nature of strong and clitic pronouns are relevant for their interpretation in object position.

4.1.2. Summary and concluding remarks

Crosslinguistic research on the acquisition of pronominal reference has found that, in a general way, children do not display major difficulties in the comprehension of reflexive forms (anaphors), either in languages with strong object pronouns or in languages with clitic object pronouns. Consequently, it is legitimate to claim that children have knowledge of Principle A of Binding Theory.

In turn, the existence of a general crosslinguistic asymmetry has been described in the interpretation of non-reflexive pronominal forms. On the one hand, coreference

problems (especially when the subject antecedent is referential) have been registered in languages with strong object pronouns. It is the case of English (Chien & Wexler, 1990), Russian (Avrutin & Wexler, 1992), Icelandic (Sigurjónsdóttir, 1992), Dutch (Philip & Coopmans, 1996), Brazilian Portuguese – BP (Grolla, 2006), Hebrew (Ruigendijk, Friedmann, Novogrodsky & Balaban, 2010). In these languages, children often establish an incorrect relation of coreference between a non-reflexive pronoun and a local antecedent, especially in simple sentences like *Grandma combed her*. This phenomenon, corresponding to the observation of problems in the interpretation of non-reflexives by children, is known as Delay of Principle B Effect (DPBE). In spite of that, when the subject antecedent is a quantifier, children exhibit good results with non-reflexives in some of these languages, as in English. On the other hand, no major coreference difficulties have been observed in languages with clitic object pronouns in simple transitive constructions, with both referential and quantified antecedents. This was reported in Italian (McKee, 1992), Spanish (Baauw, Escobar & Philip, 1997; Coopmans, Baauw & Philip, 1999), French (Hamann, Kowalski & Philip, 1997), Catalan (Escobar & Gavarró, 1999), European Portuguese – EP (Cristóvão, 2006, 2007).

Chien & Wexler (1990) and Grodzinsky & Reinhart (1993) claim that the good performance of English-speaking children in the comprehension of non-reflexive strong pronouns with quantified antecedents provides evidence that they demonstrate knowledge of Principle B (syntactic in nature). Chien & Wexler (1990) propose that children's problems in interpreting non-reflexives with referential antecedents are due to a late command of a pragmatic principle (Principle P) ruling the establishment of coreference. Grodzinsky & Reinhart (1993) suggest that children know the relevant pragmatic rule (Rule I) but are not able to implement it due to a limited processing capacity. However, these explanations do not predict an asymmetry between strong pronouns and clitics in the interpretation of non-reflexive forms by children.

Some authors defend that the *grammatical status of object pronouns* (strong or clitic) plays an important role, because it seems to influence children's interpretation of non-reflexive pronominal forms in simple structures. This is reinforced by the fact that BP and EP, two variants of the same language (Portuguese), show a different pattern in the comprehension of non-reflexive forms by children. In the conducted

experiments, there was a weak performance in BP, while there was a good performance in EP. In this case, what distinguished the experiments in these two variants of Portuguese was that the object position was occupied by a strong pronoun in BP (cf. (157)) and by a clitic pronoun in EP (cf. (158)).

(157) A avó$_i$ penteou **ela**$*_{i/j}$.

the grandma combed her-STRONG

(158) A avó$_i$ penteou-**a**$*_{i/j}$.

the grandma combed-her-CL

Avrutin & Wexler (1992) propose that the lack of comprehension problems in non-reflexive clitic contexts is due to the referential dependence of clitic pronouns (unlike strong pronouns). Therefore, clitics cannot be used deictically and must have a coindexed antecedent. Because binding is involved, coreference is excluded. Hence, Rule I is not invoked in clitic contexts and cannot break down in children. In a similar line, Baauw, Escobar & Philip (1997) and Coopmans, Baauw & Philip (1999) consider that the absence of interpretation difficulties with non-reflexive clitics is the result of the underspecification of clitic pronouns for the feature [human]. For this reason, clitics must be bound either in syntax or in discourse to get a value for this feature.

Taking into consideration the pronominal classification of Cardinaletti & Starke (1999), the head (clitic) vs. non-head (strong) status of object pronouns appears to be relevant in language acquisition. Arguably, only strong pronouns are sensitive to the pragmatic Rule I that regulates intrasentential coreference (Grodzinsky & Reinhart, 1993). In turn, clitics are argued to be subject to binding and not to coreference.

Mckee (1992) suggests an explanation based on different binding domains for clitic and strong pronouns in children's grammar due to different structural positions.

Grolla (2006) assumes for BP that the interpretation problems with non-reflexive strong pronouns have a computational nature and, based on Hornstein (2001), considers that non-reflexives are *elsewhere* elements. According to this

analysis, non-reflexive pronominal forms can only be inserted (post-syntactically) if a derivation with an anaphor (involving movement) is not possible. In order to decide if the non-reflexive pronoun is licit or not, children need to compare between a derivation with the non-reflexive and the one with the anaphor. This operation is problematic for children due to processing constraints, since there is competition between derivations at the interface level. According to Reinhart (1999, 2004), the comparison of alternative structures requires a great effort for children's working memory, which may lead to a chance level performance. In turn, Cristóvão (2006, 2007) explains that clitics have a defective nature, being inserted in the course of the syntactic derivation. For this reason, clitics do not compete with alternative forms at the interface level. This fact prevents them from entering into the computation of reference sets, which is only possible between convergent derivations. According to this author, the absence of coreference difficulties in Portuguese children's comprehension of non-reflexive clitics, in simple transitive sentences, comes from the fact that there is no competition at the interfaces.

Some of these explanatory proposals do not seem to account for the good comprehension of non-reflexive strong pronouns by children in Norwegian (Hestvik & Philip, 1999/2000) and in German (Ruigendijk, Friedmann, Novogrodsky & Balaban, 2010). The good results observed in these two languages have been attributed to the fact that local accidental coreference is not allowed with Norwegian and German non-reflexives within locative PPs, unlike other languages with strong pronouns as English. Accordingly, non-reflexive forms are less available to refer locally in Norwegian and German, similarly to what happens in Romance clitic contexts. It is admissible to affirm that this property is associated with the grammatical status and functional nature of strong pronouns in Norwegian and German, and of clitic pronouns in Romance languages. The general lack of difficulties in the interpretation of strong object pronouns by Greek-speaking children is considered to be due to the demonstrative nature of those forms (Varlokosta, 2002).

Although the comprehension of non-reflexive clitic pronouns in simple transitive structures does not cause many difficulties for children, there are comprehension problems with non-reflexive clitics in contexts of verbal small clause

with ECM. For the purpose of explaining why children have a weak performance with non-reflexive clitics in Spanish small clauses, Baauw, Escobar & Philip (1997) and Coopmans, Baauw & Philip (1999) resort to the Condition on A-chains. As an alternative, Escobar & Gavarró (1999) suggest that the difficulties found with non-reflexive clitics in Catalan small clauses involve problems in the mastery of Rule I.

Recent studies have called in question the findings of previous research in languages with strong object pronouns, such as English, stating that the DPBE is a consequence of the applied methodologies.

On the one hand, Elbourne (2005) claims that English-speaking children do not obey Principle B at all, either with a referential or with a quantified antecedent. However, this author makes this statement based on the review of previous investigations on the acquisition of English and did not apply experimental tests.

On the other hand, Conroy, Takahashi, Lidz & Phillips (2009) argue that English-speaking children are successful in the application of Principle B, with both referential and quantified antecedents. These authors come to this conclusion after having made a review of previous research and conducted some experiments in the acquisition of English. However, the claim of English-speaking children's success in the interpretation of non-reflexive strong pronouns made by Conroy et al. (2009) was challenged by Hendriks (2014) and Hartman, Sudo & Wexler (2012). Hendriks (2014) considers that, in one of the experiments of Conroy et al. (2009), the antecedents were not treated in an entirely equal way (contrarily to what was assumed) and that fact may have contributed to the selection of the correct disjoint antecedent for the non-reflexive pronoun. Additionally, Hendriks (2014) notes that, because Conroy et al. (2009) acknowledge that it is not possible to exactly determine if the differences that might emerge in children's performance in the interpretation of non-reflexives are due to a methodological effect induced by the content of the story used in the experiments (rather than to a linguistic effect derived from particular properties of the language involved), the conclusion of the DPBE as an experimental artifact cannot be defended. In turn, Hartman et al. (2012) suggest that the successful interpretation of non-reflexives obtained in one of the experiments of Conroy et al. (2009) were caused by the use of the reduced form *'m* of the English strong object pronoun *him*.

Nevertheless, for the results found by McKee (1992) concerning a good comprehension of non-reflexive clitics by Italian-speaking children and a weak comprehension of non-reflexive strong pronouns by English-speaking children, Conroy et al. (2009) propose that this crosslinguistic difference may be related to the (un)availability of cases of accidental coreference. Accordingly, strong object pronouns allow local accidental coreference in certain contexts (like locative PPs) in English, whereas clitic object pronouns disallow local coreference in Italian. Conroy et al. (2009) admit that this difference between strong and clitic pronouns may affect the way that children access and inhibit potential antecedents during language comprehension.

Although there is still some lack of consensus among researchers in understanding the cause of interpretation difficulties with non-reflexive object pronouns, there is evidence for a crosslinguistic difference based on the categorial status of the pronoun (strong or clitic) used in object position of simple sentences.

Study One of this dissertation (cf. chapter 5) consists in researching the interpretation of clitic and strong pronouns in object position by Portuguese preschool children. First of all, it seeks to confirm the results that Cristóvão obtained in the comprehension of non-reflexive and reflexive clitics in simple sentences in EP. Additionally, it intends to check if children face interpretation difficulties with strong object pronouns in non-locative PPs. Considering the crosslinguistic findings, the first study of the current research was conducted in order to verify if the grammatical status of clitic and strong pronouns is intralinguistically pertinent in EP, particularly in contexts of variation between non-reflexives and reflexives. The obtained results for clitic pronouns (categorical contexts) will be used as control for the ones collected for strong pronouns in non-locative PPs (non-categorical contexts), working as a source of comparison.

4.2. Acquisition of null and overt embedded pronominal subjects

Research has been carried out with the intention of verifying children's knowledge in what concerns the interpretation of null and overt pronominal subjects in *finite complement clauses*, with the *indicative* and the *subjunctive* moods, in different languages. The crosslinguistic results from some of the main studies in this field, with monolingual children, will be discussed in the present section. It begins by comparing null and overt subject pronouns in indicative complement clauses in the acquisition of Italian. It continues by describing the preferences of null and overt subject pronouns in indicative complement clauses, and null subject pronouns in subjunctive complement clauses in EP child language. After that, it explores the interpretation of null subjects of complement clauses, either with the indicative or with the subjunctive, by Spanish-speaking children. Additionally, it also presents the interpretation of overt subject pronouns, either in indicative or in subjunctive complement clauses, by Russian-speaking children.

Italian

Sorace, Serratrice, Filiaci & Baldo (2009) have researched the acceptability of Italian and English pronominal subjects of indicative complement clauses in topic continuity and topic shift contexts by bilingual school-age children, speakers of English-Italian and Spanish-Italian, monolingual school-age children and monolingual adults. Recalling what is described in section 3.2.1., in indicative complement clauses, null subject pronouns preferentially denote topic continuity (coreference regarding the matrix subject) whereas overt subject pronouns preferentially denote topic shift (disjoint reference concerning the matrix subject).

Only the results from the 38 Italian-speaking monolingual children and the 30 Italian-speaking monolingual adults that participated in this research will be under discussion here. Sorace et al. (2009: 466) inform that those children, all attending school already, were divided into a younger group (15 participants from 6;2 to 7;11 years old) and an older group (23 participants from 8;0 to 10;8 years old). The study consisted of a set of acceptability judgement tasks that followed a story based on short animations.

The preferential interpretation of null and overt subject pronouns of complement subordinate clauses in Italian, with the indicative mood and one intrasentential antecedent, were tested in contexts of topic continuity (coreference) and topic shift (disjoint reference). Sorace et al. (2009: 470-471) report that, in the topic continuity condition, younger children (6-7-year-olds) chose significantly more overt pronouns (≈ 30%) than older children (8-10-year-olds; ≈ 14%) and adults (≈ 12%).[58] In turn, older children selected the overt pronoun more than the adults. Consequently, Sorace et al. (2009: 472-473) argue that Italian monolingual children at the ages of 6 and 7 show, in particular, a pattern of overextending the scope of overt subject pronouns to contexts in which a null subject pronoun would be the most appropriate choice, that is, in topic continuity contexts.

The results for the topic shift condition showed no effect of age with respect to the overt pronoun choice, with high preference rates for this form in the three age groups (younger children: ≈ 75%; older children: ≈ 85%; adults: ≈ 82%).

Sorace et al. (2009: 473) state that Italian children's ability to reject pragmatically inappropriate null subject pronouns in topic shift contexts (disjoint reference corresponds to the dispreferred reading with null forms) reaches stability at an earlier stage than the ability to reject pragmatically inappropriate overt subject pronouns in topic continuity contexts (coreference is the dispreferred reading with overt forms). Accordingly, in monolingual development, antecedent preferences for Italian subject pronouns reach adult standards earlier with null forms than with overt forms.

European Portuguese

Costa & Ambulate (2010: 4-6) assume that children's difficulties in comprehending pronominal forms depend on their grammatical status. This is based on the observation that (in simple sentences with a local referential subject) there are coreference problems in languages in which the object position is occupied by strong pronouns, while there are no major difficulties in languages in which that position is

[58] These authors did not show in their paper the exact percentage rates obtained in the tests. The approximate values presented here are estimated from their graphic information (Sorace et al., 2009: 471-472).

occupied by clitic pronouns. The authors hypothesize for EP that it is expected that children exhibit difficulties interpreting strong pronouns, whether it is in object or in embedded subject position, with a referential DP antecedent.

In EP, Ambulate (2008) and Costa & Ambulate (2010) applied a test based on the preferential interpretation of null and overt embedded subject pronouns to a group of 35 children, divided into three age groups: 3-, 4- and 5-year-olds. A control group, composed of 9 adults, was also tested.

Methodologically, children (and the control group) were introduced to two characters (represented by two toy figures) who whispered secrets to the experimenter. After that, the experimenter says what one of the characters told him/her and the child is asked to say who the subject of the action involved was. An example from this preference task is given below:

(159) **SITUATION:** There are two characters involved: Shrek and Noddy.

Shrek whispers a secret into the experimenter's ear. The experimenter says:

*O Shrek disse que **pro** está cansado. Quem é que está cansado? O Shrek ou o Noddy?*

The Shrek said that *pro* is tired. Who is tired? Shrek or Noddy?

Expected response: Shrek

(Costa & Ambulate, 2010: 7)

The test conditions included the following:

a) null subject in an indicative complement clause and with one intrasentential antecedent;
b) null subject in an indicative complement clause and with two intrasentential antecedents;
c) null subject in a subjunctive complement clause and with two intrasentential antecedents;

d) overt subject in an indicative complement clause and with one intrasentential antecedent.[59]

As it is possible to notice, this test is not balanced since conditions b) and c) do not have a counterpart with an overt subject.

The results from conditions a) and b), with the indicative, show that children interpreted null embedded subjects as being preferentially coreferent with the matrix subject. This interpretation is strongly preferred by adults (100%). Nevertheless, the performance in condition a), in which children scored 81-91%, was better than in condition b), in which they scored 63-76% (Ambulate, 2008: 28-29). In condition b), the presence of two potential antecedents in the sentence (a subject antecedent and an object antecedent) might have contributed to these lower results with the null pronoun in this context.

In condition d), also with the indicative (and one intrasentential antecedent), children tended to attribute a coreferential reading to overt pronominal subjects and only preferred the disjoint reading 33-35% of the time (Ambulate, 2008: 28-29). The coreferential interpretation with overt pronouns is dispreferred by adults, who chose the disjoint reading 71% of the time (Ambulate, 2008: 27).[60]

Costa & Ambulate (2010: 10) argue that there is a contrast between null and overt pronominal subjects in indicative complement clauses with one intrasentential antecedent: condition a) vs. condition d). In all age groups, there were low performances with the overt subject (33-35%) and better performances with the null subject (81-91%), in comparison to the adults' responses.

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[59] Ambulate (2008) and Costa & Ambulate (2010) also tested null and overt subjects in coordination contexts (cf. (i)). However, those results will not be considered.

(i) O Noddy viu o Shrek e Ø/ele sorriu.
the Noddy saw the Shrek and Ø/he smiled
(Costa & Ambulate, 2010: 8)

Friedmann & Costa (2010) assume that the null subject in coordinated clauses is not a *pro* but a gap (trace) of a movement dependency. Accordingly, the authors argue that this fact explains that structures of this type, in which null subjects occur in coordination contexts, are also possible in non-*pro*-drop languages. Based on these assumptions, Costa & Ambulate (2010: 10) explain that the bad performance by Portuguese 3-year-olds with null subjects in coordinated clauses with 40% of correct coreference responses (contrasting with the 70% of correct disjoint reference responses with overt subjects) is due to the fact that the empty subject is not a *pro*. The 4- and the 5-year-olds improve their performance, showing better results with the null form (73-75%) than with the overt form (59-60%).

[60] The percentage of preferred disjoint reference responses in the adults' group is indicated as 71% in Ambulate (2008: 27), but as 93% in Costa & Ambulate (2010: 9).

According to Costa & Ambulate (2010: 10), the results from condition c) indicate that inducing disjoint reference with a null pronominal subject in the subjunctive (selected by a declarative verb of order) makes the interpretation harder for children. In this case, their performance was quite low and they only chose the disjoint reading 50-60% of the time.

In consequence, the authors (2010: 10) state that the addition of another possible antecedent (an indirect object antecedent) in the sentence, in condition b), and forcing disjoint reference through the subjunctive, in condition c), raises difficulties in children's interpretation of null subject pronouns.

Costa & Ambulate (2010: 10-11) concluded that the difficulties found with overt strong subject pronouns in EP (associated with the low rates of preference for disjoint readings attributed to overt embedded subjects in the indicative) suggest that the grammatical status of the pronominal form involved (null or overt) is important. Therefore, the authors consider that these results appear to support their hypothesis, according to which it is expected that the interpretation of overt strong pronouns in EP is necessarily more difficult for children. Besides, it seems that there are also problems in specific contexts, in which adding an object antecedent in the sentence and forcing disjoint reference (in subjunctive clauses, selected by a declarative verb of order) with a null subject pronoun make Portuguese children's interpretation more difficult.

The observation of difficulties with null pronominal subjects, in indicative complement clauses and when there are two intrasentential antecedents (a subject and an object antecedents occurring before the null pronoun), needs some clarification. In this specific context, children's preference for coreference decreased. In the test items with the addition of another possible antecedent (an indirect object antecedent) for the null subject pronoun in the indicative context, Ambulate (2008) and Costa & Ambulate (2010) included structures like the following:

(160) O Noddy disse <u>ao Shrek</u> que *pro* tinha fome.

the Noddy said to-the Shrek that *pro* was hungry

(Costa & Ambulate, 2010: 8)

In this case, the difficulties with null pronouns in indicative complement clauses may be due: (i) to the simple presence of two potential antecedents in the sentence; (ii) or to the fact that the matrix object antecedent linearly intervenes in the referential dependency between the preferred matrix subject antecedent and the null embedded subject pronoun (not necessarily in a c-command configuration).

Intervention effects have been found in the comprehension of structures involving wh-movement, as is the case of DP and PP object relative clauses (cf. (161) and (162), respectively). Crosslinguistic studies have reported that children have problems in comprehending object relatives, in which there is an intervening DP subject between the displaced object and its trace (e.g. Friedmann, Belletti & Rizzi, 2009; Adani, 2011; Costa, Lobo & Silva, 2011; Costa, Friedmann, Silva & Yachini, 2014). Two illustrative examples are presented below:

(161) Show me the boy that the mother hugged *t*.

(162) Show me the boy at whom the mother looks *t*.

In these constructions, the intervener c-commands the trace, and intervention is argued to be related to the feature specification of the constituents involved. The higher the feature similarity is between the proper antecedent and the intervener, the more difficult the acquisition becomes. This is confirmed by studies reporting that dissimilarities in grammatical features like number in Italian (Adani, 2011) and gender in Hebrew (Belletti, Friedmann, Brunato & Rizzi, 2012) improved the comprehension of object relatives. However, categorial identity is not relevant for feature similarity: an intervention configuration arises when the categories involved are two DPs, as in nominal object relatives, but also when one is a PP and the other is a DP, as in prepositional object relatives (Costa, Friedmann, Silva & Yachini, 2014).[61]

[61] It is outside the scope of this dissertation to give a more detailed analysis on intervention problems in structures with wh-movement (as is the case of object relative clauses).

Additionally, effects of intervention (in linear terms) have also been observed in the absence of movement, namely in coordination and binding. Friedmann & Costa (2010) observed that, in coordination sentences like (163), Hebrew- and European Portuguese-speaking children had difficulty in establishing the dependency between the empty subject of the second clause and the subject of the first clause when it is crossed by the object of the first clause. These authors assume that the null subject in the coordinated clause is not a *pro* but a trace of a movement dependency, since structures of this type are also possible in non-*pro*-drop languages. In turn, Friedmann, Novogrodsky & Balaban (2010) found evidence, in the acquisition of Hebrew, of comprehension difficulties in sentences in which another DP is placed between the non-reflexive object pronoun and its antecedent (cf. (164)). These structures do not necessarily involve a c-command configuration, and intervention is argued to be based on the linear precedence of the potential antecedent (regarded as the intervener) to the empty category in coordination (Friedmann & Costa, 2010) or to the object pronoun in binding dependencies (Friedmann, Novogrodsky & Balaban, 2010).

(163) The girl kissed the boy and Ø smiled.

(164) The boy said that the penguin washed him.

In view of all this, it becomes necessary to determine if the difficulties with the null pronominal subject in indicative clauses found by Ambulate (2008) and Costa & Ambulate (2010) are due: (i) to the simple presence of two available intrasentential antecedents; (ii) or to the intervention (defined in terms of linearity) of the indirect object antecedent in the referential dependency between the preferred matrix subject antecedent and the null embedded subject pronoun. Study Two of this thesis will try to clarify this issue (cf. chapter 6).

Spanish

Padilla (1990) has studied the interpretation of *null* subject pronouns in complement clauses either with the indicative or with the subjunctive in

Spanish-speaking children. Only null pronouns were tested and, consequently, no comparison is possible with its overt counterpart. This investigation included two experiments (Padilla, 1990: 65-68):

a) An *inflection study* with two intrasentential antecedents, in which the null subject occurs in indicative complement clauses and in subjunctive complement clauses (both selected by the matrix verb *decir* – to say);
b) A *lexical class study* with one intrasentential antecedent, in which the null subject occurs in subjunctive clauses selected either by volitional verbs or by non-volitional (epistemic) verbs. In this study, sentences with the null subject occurring in indicative clauses (selected by epistemic verbs) were also included.

A set of act-out tasks was applied to 80 monolingual Spanish-speaking children from San Juan, Puerto Rico (Padilla, 1990: 71). These children were divided into four groups: 3-, 5-, 7- and 9-year-olds. In this case, there is no data from adults and, for this reason, no comparison can be made between children and adults, especially in the indicative context (which involves non-categorical preferential readings).

In order to analyze children's responses, Padilla (1990: 78) has used a score range from 0 to 2. In this review, his results were adapted to a percentage scale through a rule of three.

In the *inflection study*, Padilla (1990: 100-101) informs that children gave more disjoint reference responses with *decir* (to say) selecting subjunctive complement clauses than with *decir* (to say) selecting indicative complement clauses. This difference was not significant for the 3- (indicative: 65%; subjunctive: 73%) and the 5-year-olds (indicative: 72%; subjunctive: 88%), but was significant for the 7- (indicative: 70%; subjunctive: 97%) and the 9-year-olds (indicative: 74%; subjunctive: 97%). In turn, Padilla (1990: 102-104) indicates that children gave more coreferential responses to sentences with indicative complements than to sentences with subjunctive complements, which was not significant for the 3- (indicative: 33%; subjunctive: 23%) and the 5-year-olds (indicative: 24%; subjunctive: 12%), but significant for the 7- (indicative: 29%; subjunctive: 4%) and for the 9-year-olds (indicative: 24%; subjunctive: 4%). Taking into consideration all these results, Padilla (1990: 144-145) considers that

the differentiation of these structures occurs between the ages of 5 and 7, in which children seem to be able to interpret *decir* + subjunctive as a volitional verb, as opposed to *decir* + indicative as a declarative verb. The following table summarizes the results just described from the inflection study.

Inflection study (with two intrasentential antecedents)				
Age group	**disjoint reference** responses with *decir* (to say) + **indicative**	**disjoint reference** responses with *decir* (to say) + **subjunctive**	**coreferential** responses with *decir* (to say) + **indicative**	**coreferential** responses with *decir* (to say) + **subjunctive**
3	65%	73%	33%	23%
5	72%	88%	24%	12%
7	70%	97%	29%	4%
9	74%	97%	24%	4%

Table 18: Results obtained in the inflection study with Spanish-speaking children (*decir* + indicative/subjunctive)

In the *lexical class study*, Padilla (1990: 111) informs that coreference between the null subject pronoun of the subjunctive clause, selected by volitional verbs[62], and the main subject is considered to be incorrect, since both subjects cannot be coindexed. However, this researcher observed that children do not obey this restriction. The 3- and the 5-year-old groups incorrectly assign a coreferential interpretation to null subjects in subjunctive structures with volitional verbs, respectively, 89% and 80% of the time (Padilla, 1990: 128). These coreferential responses decrease at 7 (39%) and 9 years old (19%). In turn, the disjoint reference responses increase with age: 8% at 3 years old, 17% at 5, 62% at 7 and 80% at 9. All these results appear to indicate that it is between the ages of 5 and 7 that children learn the lexical properties of the main verbs, and associate the disjoint reference reading with subjunctive clauses selected by volitional verbs (Padilla, 1990: 126).

[62] In the set of volitional verbs, Padilla (1990: 68) included verbs of desire (like *querer* – to want and *desear* – to wish/desire) and verbs of command (like *pedir* – to ask/request and *mandar* – to order).

Additionally, children gave more disjoint reference responses to sentences with volitional verbs selecting subjunctive complements than to sentences with non-volitional (epistemic) verbs also selecting subjunctive complements (Padilla, 1990: 114-116). In this case, the results for *disjoint reference* responses were the following: 8% with volitional verbs and 2% with non-volitional verbs for the 3-year-olds; 17% with volitional verbs and with 12% non-volitional verbs for the 5-year-olds; 62% with volitional verbs and 32% with non-volitional verbs for the 7-year-olds; 80% with volitional verbs and 42% with non-volitional verbs for the 9-year-olds. Conversely, more coreferential responses were given to sentences with non-volitional verbs selecting the subjunctive than to sentences with volitional verbs also selecting the subjunctive (Padilla, 1990: 121-122). For these *coreferential* responses, the following results were obtained: 89% with volitional verbs and 97% with non-volitional verbs for the 3-year-olds; 80% with volitional verbs and 84% with non-volitional verbs for the 5-year-olds; 39% with volitional verbs and 68% with non-volitional verbs for the 7-year-olds; 19% with volitional verbs and 59% with non-volitional verbs for the 9-year-olds. No significant differences between the structures were found in the younger groups (ages 3 and 5), but significant differences were found in the older groups (ages 7 and 9). These observations suggest, once again, that between the ages of 5 and 7 children are able to incorporate the lexical properties of the matrix verbs in the grammar and establish the disjoint reference requirement (Padilla, 1990: 144). All these results concerning the lexical class study are organized in the table below.

Lexical class study (with one intrasentential antecedent)				
Age group	**disjoint reference** responses with **volitional** verbs + **subjunctive**	**disjoint reference** responses with **non-volitional** verbs + **subjunctive**	**coreferential** responses with **volitional** verbs + **subjunctive**	**coreferential** responses with **non-volitional** verbs + **subjunctive**
3	8%	2%	89%	97%
5	17%	12%	80%	84%
7	62%	32%	39%	68%
9	80%	42%	19%	59%

Table 19: Results obtained in the lexical class study with Spanish-speaking children (volitional/non-volitional verbs + subjunctive)

In the lexical class study, the results obtained in subjunctive clauses selected by epistemic (non-volitional) verbs were compared to the ones obtained in indicative clauses also selected by epistemic (non-volitional) verbs, which are presented in the following table (Padilla, 1990: 120, 125).

Lexical class study (with one intrasentential antecedent)				
Age group	**disjoint reference** responses with **epistemic** verbs + **indicative**	**disjoint reference** responses with **epistemic** verbs + **subjunctive**	**coreferential** responses with **epistemic** verbs + **indicative**	**coreferential** responses with **epistemic** verbs + **subjunctive**
3	0%	2%	95%	97%
5	5%	12%	93%	84%
7	33%	32%	68%	68%
9	35%	42%	65%	59%

Table 20: Results obtained in the lexical class study with Spanish-speaking children (epistemic verbs + indicative/subjunctive)

Table 20 reveals that the decrease in the amount of coreferential readings for sentences with epistemic verbs selecting indicative complement clauses in the older

groups (composed of the 7- and the 9-year-olds) is paralleled by a decrease in the amount of coreferential readings for sentences with epistemic verbs selecting subjunctive complement clauses, without a significant difference in this comparison (Padilla, 1990: 124). On the other hand, the increase of disjoint reference responses for structures with epistemic verbs selecting indicative clauses at the ages of 7 and 9 is comparable to an increase of disjoint reference responses in structures with epistemic verbs selecting subjunctive clauses, without a significant difference as well. Padilla (1990: 119-120) argues that these results show that Spanish-speaking children are sensitive to the fact that the matrix verbs belong to the same class, and that mood distinctions in the complement clause do not affect binding relations. In this case, the author considers that verbal mood was not a significant factor in determining disjoint reference responses (Padilla, 1990: 129).

With the findings either from the inflection study or from the lexical class study, Padilla (1990: 144-145, 151) concluded that Spanish-speaking children at the ages of 3 and 5 do not know some lexical properties of volitional verbs that select subjunctive clauses: a certain lexical knowledge associated with the matrix verbs (particularly the volitional ones), which is relevant for a correct analysis of complement clauses containing the subjunctive, has not been acquired yet by these children. In consequence, the author states that the expansion of the binding category for the null subject of subjunctive complement clauses in Spanish occurs between the ages of 5 and 7, presumably after lexical properties of the verbs in the main clause are learned.

Russian

In an experiment with Russian-speaking children, Avrutin & Wexler (1999/2000) have researched the interpretation of overt subject pronouns (the only type the authors utilized) in indicative and in subjunctive complement clauses. In both verbal moods, the overt pronoun was tested either with one referential antecedent or with one quantified antecedent (quantifier *kto* – who)[63] in the sentence.

[63] Examples of test sentences with quantified antecedents:
(i) *I znaju kto skazal čto on prygnet.* (overt subject pronoun in a indicative complement clause)
I know who said that he will jump.

A set of truth value judgment tasks were applied to 18 Russian-speaking children from 4;1 to 5;10 years old (mean age: 5;0), who lived in St. Petersburg, Russia (Avrutin & Wexler, 1999/2000: 85). The declarative matrix verb *skazat* (to say) was used in the indicative conditions, and the volitional matrix verb *xotet* (to want) was used in the subjunctive conditions (Avrutin & Wexler, 1999/2000: 86).

In the indicative contexts, either with a referential antecedent or with a quantified antecedent, the overt subject pronoun can be coindexed with the matrix subject (Avrutin & Wexler, 1999/2000: 95). In contrast, the overt subject pronoun of subjunctive clauses cannot be coreferential with the matrix subject (Avrutin & Wexler, 1999/2000: 70, 91).

Avrutin & Wexler (1999/2000: 89-91) reported that:

a) in the indicative conditions (in which the only tested context was grammatical, corresponding to a correct "yes" response), children correctly accepted 80% of coreference when the antecedent was a referential expression, and correctly accepted 50% of coreference when the antecedent was a quantified expression;

b) in the subjunctive conditions (in which the only tested context was **not** grammatical, corresponding to a correct "no" response), children incorrectly accepted 39% of coreferential readings with a referential antecedent, and incorrectly accepted 20% of coreferential readings with a quantified antecedent (giving incorrect "yes" responses in these two cases).

Avrutin & Wexler (1999/2000: 92-93) argue that the comparison between referential and quantified antecedents in the subjunctive structures suggests that children are sensitive to the nature of the antecedent. Children accepted ungrammatical subjunctive sentences with a quantified expression (20%) less than with a referential expression (39%). This is consistent with previous acquisition results on the comprehension of object pronouns (cf. section 4.1. of this dissertation).

(ii) *Ja znaju kto xočet čtoby on prygnul.* (overt subject pronoun in a subjunctive complement clause)
I know who wants that he jumped.
(Avrutin & Wexler, 1999/2000: 87)

The authors admit that, in the indicative structures, the statistically significant difference between 80% of acceptance of coreference with a referential expression and 50% of acceptance of coreference with a quantified expression is an unexpected result (Avrutin & Wexler, 1999/2000: 95-96). These linguists affirm that a null subject pronoun, rather than an overt subject pronoun used in the study, is preferred in an indicative complement clause with a quantifier as an antecedent.[64] Avrutin & Wexler (1999: 96) propose that young Russian children might have this same preference as adults in this context and, hence, their 50% of acceptance of coreferential readings is more understandable.

Avrutin & Wexler (1999/2000: 91) state that the differences of responses between the indicative and the subjunctive conditions, in which children discriminate between grammatical and ungrammatical sentences with both types of antecedents (referential or quantified), are statistically significant. These differences might indicate that children show sensitivity to the obviation effect (indicative-subjunctive distinction). Nevertheless, Avrutin & Wexler (1999/2000: 85, fn. 15) emphasize that this fact does not mean, by itself, the knowledge of obviation in Russian.

In conclusion, Avrutin & Wexler (1999/2000: 100) have noted that sometimes children incorrectly accept a coreferential reading with overt pronominal subjects of subjunctive clauses (selected by a volitional verb) regarding the referential subject antecedent of the main clause, although their performance improves when the subject antecedent is a quantifier. The authors inform that with the quantified antecedent *kto* (who), the deictic use of pronouns is not possible and coindexation is the only way to establish dependency (Avrutin & Wexler, 1999/2000: 83). Hence, they suggest that children's better performance in subjunctive clauses with a quantifier is a demonstration of children's linguistic knowledge on the Russian subjunctive obviation. In turn, Avrutin & Wexler (1999/2000: 95) argue that the higher acceptance of coreference when the antecedent is a referential expression reflects an incorrect use of deixis by children. These researchers defend that Russian-speaking children seem to possess the relevant syntactic knowledge involved in the subjunctive obviation

[64] Avrutin & Wexler (1999/2000: 96) inform that Russian can be characterized as an optionally *pro*-drop language.

phenomenon with volitional matrix verbs, but make mistakes when an interaction between syntactic and discourse-related restrictions is required.

Pronominal subjects in other types of clauses

The interpretative effect concerning an overacceptance of overt embedded subject pronouns in contexts of coreference (dispreferred reading with overt forms), found in indicative complement clauses with one intrasentential antecedent, was also observed in *adverbial* and *juxtaposed clauses*.[65]

Serratrice (2007) applied a picture verification task in order to check the interpretation of intrasentential pronominal anaphora (with subject and object antecedents before the pronoun) and cataphora (with subject and object antecedents after the pronoun) in Italian adverbial clauses by bilingual and monolingual populations. Only the major results from the 13 monolingual Italian school-age children (between 6;11 and 9;11, with mean age of 8;6) and the 13 monolingual Italian adults that participated in the task will be considered. According to Serratrice (2007: 231-232), no significant differences between these groups were observed in the choice of a subject antecedent for null pronouns in the anaphoric condition, but the monolingual children were less inclined than the adults to choose a subject antecedent for null pronouns in the cataphoric condition. In turn, overt pronominal subjects were accepted as coreferential with a subject antecedent more often by the monolingual children than by the adults in both anaphoric and cataphoric conditions. In consequence, what was found with Italian null and overt anaphoric pronouns in indicative complement clauses (Sorace et al., 2009) is confirmed in adverbial clauses (Serratrice, 2007).

Kraš & Stipeć (2013) used a picture selection task to investigate the antecedent preferences of null and overt subject pronouns in Croatian adverbial clauses, with two available intrasentential antecedents, by monolingual children divided into six groups (7-, 8-, 9-, 10-, 11- and 12-year-olds) and by adults. The authors noticed that all children's groups interpreted null subject pronouns in an adult-like way (as being

[65] The results from the interpretation of pronominal subjects in adverbial and juxtaposed clauses will not be analyzed in detail.

coreferential either with the subject or with the object antecedent), with no significant differences between adults and any group of children. In this case, Croatian null subject pronouns seem to be more flexible in their antecedent preference, in contexts in which the pronoun followed its possible antecedents. With the overt pronoun, all groups (including adults) preferred the object antecedent. Nevertheless, children up to the age of 10 preferred this antecedent less strongly than adults. These results are consistent, in a general manner, with the ones in Italian complement and adverbial clauses (Sorace, Serratrice, Filiaci & Baldo, 2009; Serratrice, 2007) and EP complement clauses (Ambulate, 2008; Costa & Ambulate; 2010) with respect to a significant acceptance of a (pragmatically inappropriate) subject antecedent for overt embedded subject pronouns by children when compared to the adults' performance.

Interesting findings were also reported by Shin & Cairns (2009), who have looked at the preferential interpretation of subject pronouns in juxtaposed clauses by Mexican Spanish-speaking school-age monolingual children. This experiment focused on intersentential anaphoric contexts, differently from the intrasentential anaphora analyzed in the other mentioned crosslinguistic studies and in the current research in EP. Nevertheless, the same pattern of results for null and overt pronominal subjects was obtained with children and adults. Shin & Cairns (2009: 156-158) applied a preference task of null and overt third person singular pronominal subjects to 139 children and teenagers (between 6 and 15 years old) and 30 adults in Querétaro, Mexico. Participants were told stories with same-reference (coreference or topic continuity) and switch-reference (disjoint reference or topic shift) contexts. The authors observed that, in same-reference contexts (in which the null subject pronoun is considered to be the most appropriate choice), all groups of children overaccepted overt subject pronouns (41-51%) when compared to the adults' responses (27%). These results were interpreted by Shin & Cairns (2009: 162) as a probable general tendency for redundancy in child language, which continues into adolescence. In consequence, their findings are in accordance with the ones of Sorace et al. (2009) in the sense that children's ability to reject pragmatically inappropriate null subject pronouns in switch-reference contexts reaches stability at an earlier stage than the ability to reject overt subject pronouns in same-reference contexts.

4.2.1. Summary and concluding remarks

Some studies have been developed in order to check children's interpretation of pronominal subjects in complement subordinate clauses. Taking into consideration the results from these crosslinguistic investigations, the *grammatical status of subject pronouns* (null or overt) and the *verbal mood* (indicative or subjunctive) appear to play an influential role in the interpretation of those pronominal forms in finite complement clauses by children. Therefore, it seems possible to observe interpretative patterns with respect to embedded pronominal subjects.

In indicative complement clauses and with only one antecedent in the sentence, Italian and Portuguese monolingual children's interpretation deviates from adults' performance more when the pronoun is an overt form than when the pronoun is a null form (Sorace, Serratrice, Filiaci & Baldo, 2009; Ambulate, 2008; Costa & Ambulate, 2010). Accordingly, it is legitimate to claim that children seem to be less efficient in rejecting the dispreferred reading of coreference with overt subject pronouns than the dispreferred reading of disjoint reference with null subject pronouns. This pattern provides evidence for the pertinence of the asymmetry between weak and strong pronouns (taking into consideration the pronominal classification proposed by Cardinaletti & Starke, 1999) in the interpretation of those forms. In consequence, Costa & Ambulate (2010) argue that the grammatical status of the pronominal form involved (null or overt) is important.

The findings with null and overt anaphoric pronouns in indicative complement clauses are corroborated, in a general manner, by results from adverbial clauses (intrasentential anaphoric contexts) in Italian and Croatian child language, and also in juxtaposed sentences (intersentential anaphoric contexts) in Mexican Spanish-speaking children.

In subjunctive complement clauses (selected by volitional verbs or declarative verbs of order) and with one or two referential antecedents in the sentence, children incorrectly assign coreferential readings to both null and overt subject pronouns. This is observed with null pronouns in EP (Ambulate, 2008; Costa & Ambulate, 2010) and in

Spanish (Padilla, 1990), and with overt pronouns in Russian (Avrutin & Wexler, 1999/2000). Consequently, the subjunctive appears to be a problem by itself. If that is the case, then mood selection (determined by lexical and semantic properties of the matrix verbs) matters in the interpretation of embedded pronominal subjects. However, Avrutin & Wexler (1999/2000) have described that Russian-speaking children's interpretation of overt subject pronouns in subjunctive clauses (selected by a volitional verb) improves when the antecedent is a quantifier. In consequence, these linguists defend that these children seem to know the syntactic properties of the subjunctive mood with volitional matrix verbs, but make mistakes when there is an interaction between the syntactic and the discourse components (as in the case of an incorrect use of deixis). In turn, Padilla (1990) suggests that a certain lexical knowledge, which is relevant for a correct analysis of subjunctive clauses, has not been acquired yet by Spanish-speaking children.

Study Two of this dissertation (cf. chapter 6) consists in analyzing the interpretation of null and overt pronouns in embedded subject position, within indicative and subjunctive complement clauses, by Portuguese preschool children. This experimental study is more extensive and developed than the one previously achieved for EP by Ambulate (2008) and Costa & Ambulate (2010), since it included more test conditions. Taking into consideration the crosslinguistic findings, the second study of the current research in the acquisition of EP was carried out for the purpose of specifying if there is an interpretative asymmetry between null and overt subject pronouns in different embedded contexts (indicative or subjunctive). This study also seeks to verify if children's interpretation of both null and overt pronominal subjects is affected by the type of matrix verb that selects the subjunctive, by the presence of one or two potential antecedents in the sentence, and by the introduction of an object antecedent occurring before the pronoun or after the pronoun.

5. Study One: Interpretation of clitic and strong pronouns in object position in EP

Crosslinguistic research has provided evidence for a general tendency concerning a difference in the interpretation, by children, of non-reflexive forms (in simple constructions) between languages in which the object position is occupied by strong pronouns and languages in which that position is occupied by clitics. There are coreference problems in the first group, but not in the second one. Consequently, some authors (e.g. McKee, 1992; Coopmans, Baauw & Philip, 1999; Cristóvão, 2006, 2007) have hypothesized that the grammatical status of the object pronoun involved (strong or clitic) and its functional nature has importance, since it appears to influence children's performance.

Study One of this dissertation consists in investigating how Portuguese preschool children interpret pronouns:

a) in object position;
b) in terms of their categorial status (clitic and strong) and their type (non-reflexive and reflexive).

Both clitic and strong pronouns can occupy the object position in European Portuguese (EP), although strong forms only occur in prepositional phrases (PPs).

In this study, the intention is to verify if a distinction between clitic and strong pronouns is intralinguistically pertinent in EP, especially in contexts of variation between non-reflexives and reflexives. Furthermore, we aim at exploring the differentiation between binding and coreference as well as trying to define the role of semantics and pragmatics in the interpretation of object pronouns by children.

5.1. Hypotheses and predictions

In this first study of the current research, the results of previous crosslinguistic studies on the acquisition of object pronouns were taken into account. These show a general asymmetry between non-reflexive clitic pronouns and non-reflexive strong pronouns in simple sentences with referential antecedents (cf. section 4.1.).

If acquisition is guided by complexity principles, then clitic forms (which correspond to deficient pronouns according to the terminology of Cardinaletti & Starke, 1999) are acquired before strong forms because they are less complex. Considering that the difficulties of children in interpreting non-reflexive pronominal forms in the mentioned contexts depend on their grammatical status (clitic or strong), we hypothesize that in European Portuguese (EP):

a) Children's performance does not follow the adults' pattern in the interpretation of non-reflexive strong pronouns, while they achieve good results in the comprehension of non-reflexive clitic pronouns;
b) Children have a good performance in the comprehension of reflexive forms (anaphors), whether they are clitic pronouns or strong pronouns.

5.2. Methodology

In order to identify the interpretation that Portuguese children attribute to pronouns with different properties (clitic pronouns, strong pronouns, non-reflexives and reflexives) an experimental study (composed of two acquisition tests) was carefully planned, through a set of **picture verification tasks**. This kind of methodological procedure is a type of truth value judgment task with images (Crain & Thornton, 1998; Gordon, 1996). In this case, a picture is presented to the child and the experimenter poses a question corresponding to a true or a false statement about the situation. Therefore, yes/no questions were used to access children's answers.

Both tests were preceded by a training phase which entailed answering yes/no questions like "Is your name Susana/Marco?", "Are you a girl/boy?", "Is this a computer/mobile phone/watch/pen?", "Is your hair pink/green/brown?".

The first test refers to the comprehension of clitics (categorical contexts, which imply accuracy rates, with correct or incorrect responses). The second one concerns the interpretation of strong pronouns (non-categorical contexts, involving preferred or dispreferred readings). The clitics are in the *accusative* case and the strong forms in the *oblique* case.

All the tested pronominal forms are:

a) in the 3rd person singular;

b) in simple sentences with referential subject antecedents;

c) in progressive constructions with an auxiliary verb (*estar a* + infinitive).

The use of the progressive construction is due to the fact that this structure is the most common form of expressing the present tense in speech.

To minimize the *yes bias* effect (the disposition that children have to answer affirmatively because they do not wish to contradict the researcher), control items with DPs were introduced in both tests. The main goal of these control items consisted in necessarily triggering "no" answers, checking if children paid attention and/or understood the task.

There was always morphological compatibility in number and gender between the referential antecedent and the pronominal form. Furthermore, the two characters present in each picture always shared features of the same grammatical gender.

During the experiment, the researcher identifies the two characters present in the image that is shown to the child. A Puppet (Pinocchio), who is always distracted, produces the interjection "hum" (in English, "hmm"), which denotes thinking or pondering, and also enunciates the two characters from the picture immediately before posing a yes/no question about the image to the child.

With the objective of checking the consistency of the tests, these were also applied to a control group formed by adults, whose answers were confronted with those of the children. No adult knew, in advance, the content or the goal of the tests. The adults have academic degrees or were attending university, working in different domains: Administration; Archaeology; Art History; Banking; Biology; Classical/Modern Languages and Literatures; Dental Medicine; Education; Electrical Engineering; Information Systems and Computer Engineering; Languages, Literatures and Cultures; Language Sciences; Linguistics[66]; Mathematics; Nursing; Real Estate Business; Social Communication; Telecommunications; Tourism; Translation.

[66] From the 40 adults included as a control group in the test of comprehension of clitics and in the test of interpretation of strong pronouns in PPs, four were first year undergraduate students in Language Sciences (offered by the department of Linguistics) and four were studying Linguistics at the postgraduate level, in the research areas of Discourse Analysis and of Lexicology and Lexicography. Their

The tested children, of preschool age, were attending five kindergartens in the metropolitan area of Lisbon: three of them located in the city of Barreiro, one in Quinta do Anjo (in the municipality of Palmela) and another one in Lisbon.

The different tasks were applied individually to the children in a quiet room in the kindergarten, with no time limit imposed. The items from each test were randomized and presented in the same order to all the participants. The answers were registered during the application of the tests.

Both children and adults were monolingual native speakers of EP. Children had no diagnosed language, hearing or speech pathologies.

All the participants included in this first study were recruited and tested by the author of this dissertation.

5.3. Statistical analysis

For the same condition, comparisons between two age groups were based on the standard chi-square (χ^2) test of homogeneity.[67] The chi-square test was also applied in order to compare, in the interpretation of strong object pronouns, the results distributed according to the verbs used. Within each age group, the comparison between two different conditions was done using a paired t-test.

In the present study it has been defined that, when comparing age groups, the null hypothesis (H_0) means establishing that the groups are homogeneous, that is, the proportion of answers of each type is similar from group to group. When comparing different conditions, H_0 expresses that there is homogeneity between types of answers in comparison. Rejecting H_0 states that the observed results are significant enough to

responses were considered to be as spontaneous as those of the other participants tested. From the 60 adults to whom the pretest of interpretation of strong pronouns in PPs was administered, only one was studying Linguistics at the postgraduate level, in the research area of Second Language Acquisition. However, this adult had never worked specifically in the interpretation of pronouns and her answers were assumed to be spontaneous. In this pretest, most of the participants were first year undergraduate students of Languages, Literatures and Cultures (18 adults), and postgraduate students/graduates of Information Systems and Computer Engineering (15 adults).

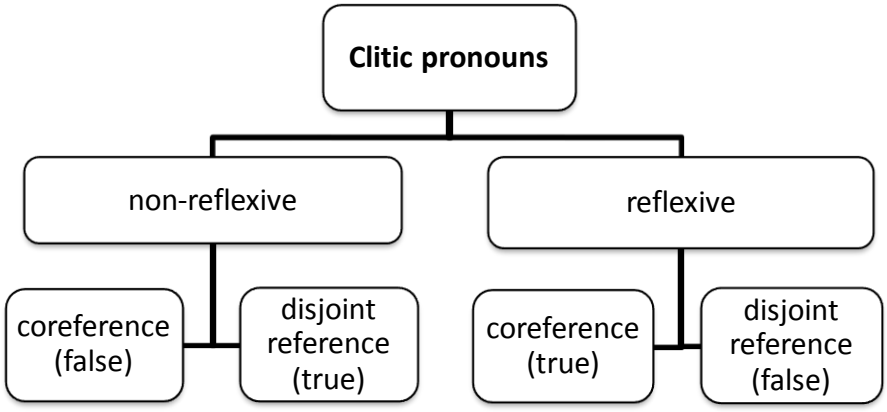
[67] For this case, the chi-square tests were recommended by Prof. Dr. Dinis Pestana from Faculdade de Ciências da Universidade de Lisboa (FCUL).

assess that there is a difference between age groups or between types of answers. In this research, a difference is considered to be significant when $p < 0.05$.[68]

5.4. Test of comprehension of clitics

The test of comprehension of 3rd person singular accusative clitics included the following conditions:

a) Non-reflexive clitics (masculine and feminine) in coreferential contexts (false);
b) Non-reflexive clitics (masculine and feminine) in disjoint reference contexts (true);
c) Reflexive clitics in coreferential contexts (true);
d) Reflexive clitics in disjoint reference contexts (false).



Scheme 2: Test conditions in the comprehension of clitics

The task included 10 test items per condition and 8 control items (using DPs), with 48 questions in total.

[68] Considering the null hypothesis as true, the p-value corresponds to the probability of obtaining the observed data by chance. Hence, the p-value represents the probability of error that is involved in accepting an observed result as valid in relation to the null hypothesis. Results with a low p-value are considered statistically significant. The significance level is the cutoff that one uses to express what is significant, which in this case is 5%. A $p < 0.05$ means that the correspondent difference is significant.

<table>
<tr><td colspan="6">40 test items with clitic pronouns</td></tr>
<tr><td colspan="4">20 non-reflexives (o/a)</td><td colspan="2">20 reflexives (se)</td></tr>
<tr><td colspan="2">10 coreferences (false)</td><td colspan="2">10 disjoint references (true)</td><td rowspan="2">10 coreferences (true)</td><td rowspan="2">10 disjoint references (false)</td></tr>
<tr><td>5 masculines</td><td>5 feminines</td><td>5 masculines</td><td>5 feminines</td></tr>
</table>

Table 21: Structure of the test items of comprehension of clitics

<table>
<tr><td colspan="4">8 control items (DPs)</td></tr>
<tr><td colspan="2">4 “yes” answers</td><td colspan="2">4 “no” answers</td></tr>
<tr><td>2 masculines</td><td>2 feminines</td><td>2 masculines</td><td>2 feminines</td></tr>
</table>

Table 22: Structure of the control items from the test of comprehension of clitics

The verbs used in the tasks were: *abraçar* (to hug), *desenhar* (to draw), *lamber* (to lick), *lavar* (to wash), *limpar* (to clean), *molhar* (to wet), *pentear* (to comb), *pintar* (to paint), *sujar* (to dirty), *secar* (to dry) and *tapar* (to cover).

Four examples of test items[69] are shown in Figure 1:

[69] In the test of comprehension of clitics, the control items (with DPs) included images either with two characters or with three characters (cf. appendix CD):
(i) A grandpa and a boy. The grandpa is wetting **the boy**?
(ii) A player, a pirate and a wizard. The player is dirtying **the pirate**?

	
Non-reflexive clitic (feminine) **Disjoint reference (true)**	**Non-reflexive clitic (masculine)** **Coreference (false)**
Researcher: A fairy and a girl. **Puppet (Pinocchio):** Hmm… A fairy… A girl… *A fada está a sujá-**la**?* the fairy is dirtying-her **Expected interpretation: yes**	**Researcher:** A king and a wizard. **Puppet (Pinocchio):** Hmm… A king… A wizard… *O rei está a lavá-**lo**?* the king is washing-him **Expected interpretation: no**
	
Reflexive clitic **Coreference (true)**	**Reflexive clitic** **Disjoint reference (false)**
Researcher: A princess and a witch. **Puppet (Pinocchio):** Hmm… A princess… A witch… *A princesa está a pintar-**se**?* the princess is painting-herself **Expected interpretation: yes**	**Researcher:** An elephant and a dog. **Puppet (Pinocchio):** Hmm… An elephant … A dog… *O cão está a lamber-**se**?* the dog is licking-himself **Expected interpretation: no**

Figure 1: Examples of items from the test of comprehension of clitics

The task was run on a total of 109 children between 3;4 and 6;6 years old (divided into four age groups), and on 40 adults that composed the control group.[70]

[70] In the test of comprehension of clitics, 13 additional children also completed the task and successfully answered to the control items. However, they were not considered in this analysis because they were not tested in the interpretation of strong pronouns in PPs due to several reasons such as changing schools, sickness or going on vacation with their parents earlier than expected.
Nevertheless, the tendency of the results considering all the children (including the extra participants) that were observed in the comprehension of clitics is similar to the one described here. The reader is referred to Costa, Lobo & Silva (2013) and to Silva (2011, 2014) in order to check this fact.

Test of comprehension of clitics					
Age group	**Age range**	**Mean age**	**Girls**	**Boys**	**Total**
3	3;4 – 3;11	3;8	18	6	24
4	4;0 – 4;11	4;6	15	18	33
5	5;0 – 5;11	5;5	18	13	31
6	6;0 – 6;6	6;2	13	8	21
Adults	18 – 64	31	23	17	40
Total	—	—	87	62	149

Table 23: Description of the participants tested in the comprehension of clitics

All these children successfully rejected all the control items that induced a “no” answer in the test of comprehension of clitics, minimizing the *yes bias* phenomenon.

Only one session of about half an hour was necessary for each child to complete the test of comprehension of clitics (composed of 48 questions). For each of the adults, the application of this test took less than half an hour.

The tables and graphics from the test of comprehension of clitics present **accuracy rates** (percentages of correct answers), since we are dealing with categorical responses.

5.4.1. Results

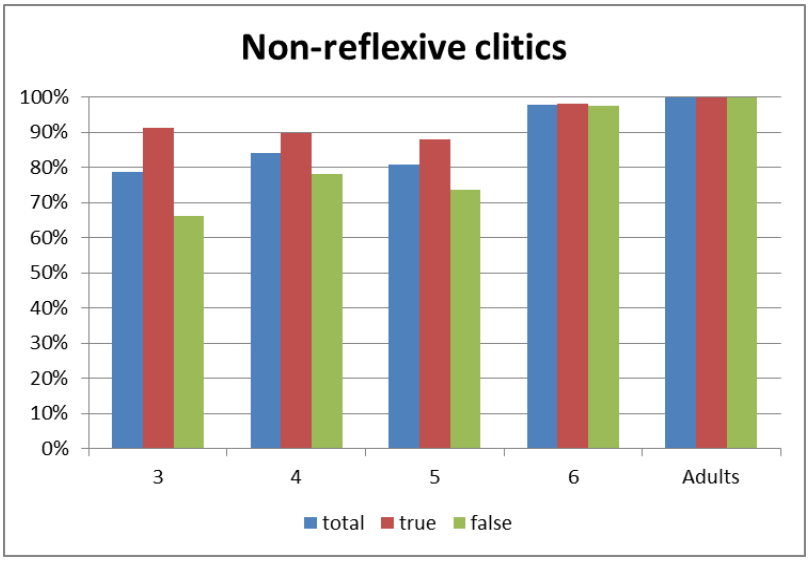
The tables that indicate the statistical test scores and the exact p-values resulting from all the established comparisons are presented in the appendix CD.

Table 24 shows the **accuracy rates** (percentages of correct answers) in the comprehension of non-reflexive and reflexive clitics. We can observe not only the total accuracy rates, but also the rates regarding either the correct true response contexts with a grammatically correct “yes” answer or the correct false response contexts with a grammatically correct “no” answer.

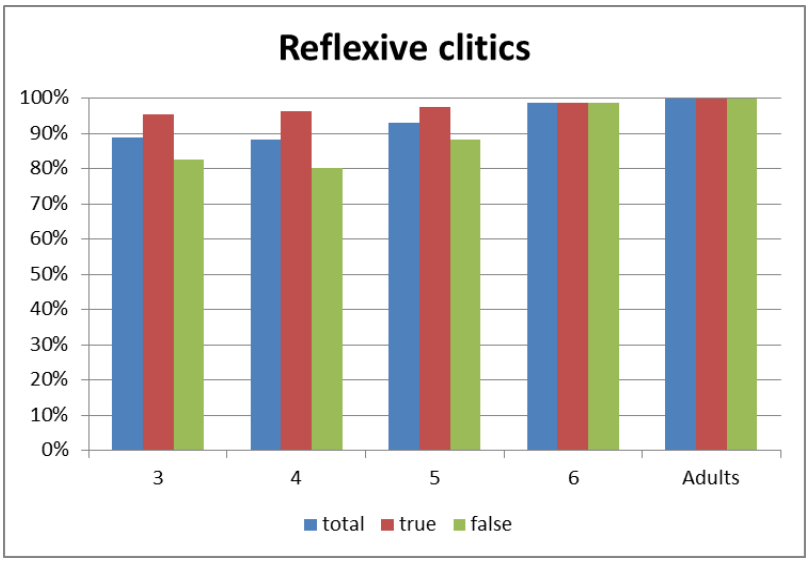
Age group	Non-reflexive clitics			Reflexive clitics		
	total	true	false	total	true	false
3	378/480 **78.75%**	219/240 **91.25%**	159/240 **66.25%**	427/480 **88.96%**	229/240 **95.42%**	198/240 **82.50%**
4	554/660 **83.94%**	296/330 **89.70%**	258/330 **78.18%**	583/660 **88.33%**	318/330 **96.36%**	265/330 **80.30%**
5	501/620 **80.81%**	273/310 **88.06%**	228/310 **73.55%**	576/620 **92.90%**	302/310 **97.42%**	274/310 **88.39%**
6	411/420 **97.86%**	206/210 **98.10%**	205/210 **97.62%**	414/420 **98.57%**	207/210 **98.57%**	207/210 **98.57%**
Adults	800/800 **100.00%**	400/400 **100.00%**	400/400 **100.00%**	800/800 **100.00%**	400/400 **100.00%**	400/400 **100.00%**

Table 24: Results (accuracy rates) from the test of comprehension of clitics

Graphic 1 and Graphic 2 present the results obtained in the comprehension of non-reflexive clitics and reflexive clitics, respectively.



Graphic 1: Accuracy rates for *non-reflexive* clitics



Graphic 2: Accuracy rates for *reflexive* clitics

Graphic 1, with respect to *non-reflexive* clitics, indicates the following evolution of the *total* results: 79% at 3 years old; 84% at 4; 81% at 5; 98% at 6; 100% for the adults. There is a tendency for a slight developmental effect.[71]

Comparing the 3-year-olds with the 4-year-olds, the 5-year-olds with the 6-year-olds and the 6-year-old children with the adults, there is always a growth in the results (Graphic 1). The chi-square tests between these three pairs of groups confirm, in general, this trend ($p < 0.05$ in all the mentioned comparisons). However, there is an exception in the comparison between the group of the 4-year-olds and that of the 5-year-olds, in which there is a mild decrease, although the difference is not significant ($\chi^2 = 1.95$, $p = 0.16$). At the age of 6 years (98%), children are almost at the level of the control group (100%).

Regarding the *correct true response* contexts with a grammatically correct "yes" answer, the series of results were the following: 91% at 3 years old; 90% at 4; 88% at 5; 98% at 6; 100% for the adults (Graphic 1). Concerning the *correct false response* contexts with a grammatically correct "no" answer, the sequence was this: 66% at 3 years old; 78% at 4; 74% at 5; 98% at 6; 100% for the adults (Graphic 1). These data evidently support the tendency of the *total* results of *non-reflexive* clitics.

[71] In the descriptive text of the results, the option is to present the percentages rounded to whole numbers.

In Graphic 2, which refers to *reflexive* clitics, we can verify the following series of the *total* results: 89% at 3 years old; 88% at 4; 93% at 5; 99% at 6; 100% for the adults. There is also a tendency for an effect of development in this case, when comparing the 4-year-olds with the 5-year-olds, the 5-year-olds with the 6-year-olds and the 6-year-olds with the adults. The chi-square tests between these successive pairs offer evidence of this fact ($p < 0.05$). The exception goes for the comparison between the 3 year-olds with 89% and the 4-year-olds with 88% ($\chi^2 = 0.05$, $p = 0.82$), considering that both are at the same level.

With respect to the *correct true response* contexts with a grammatically correct "yes" answer, a very slight growth in the results of *reflexive* clitics is registered in the consecutive age groups: 95% at 3 years old; 96% at 4; 97% at 5; 99% at 6; 100% for the adults (Graphic 2). As for the *correct false response* contexts with a grammatically correct "no" answer, the results reflect the general trend in the comprehension of *reflexive* clitics: 83% at 3 years old; 80% at 4; 88% at 5; 99% at 6; 100% for the adults (Graphic 2).

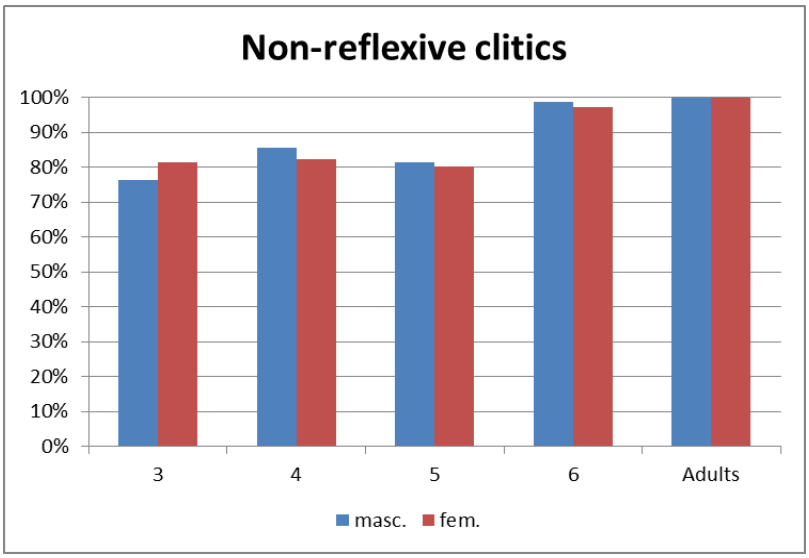
In regard to the *total* results, a better performance with reflexive clitics than with non-reflexive clitics is observed in children's groups (Table 24), but only significant within the groups of the 3-year-olds and of the 5-year-olds (the paired t-tests indicate that $p < 0.05$ when comparing the reflexives with the non-reflexives within each of these two age groups). Nevertheless, non-reflexive clitics do not seem to raise many difficulties for Portuguese children, always showing results above chance level. In fact, these results of comprehension of non-reflexive clitics in the acquisition of EP are better than the ones obtained with non-reflexive strong pronouns in languages like English (taking as reference the data presented by Chien & Wexler, 1990) or Dutch (Philip & Coopmans, 1996). Even at 3 years old, given to the very young age of this group, these Portuguese children, with 79% of *total* results (although with 66% of *correct false* responses) of comprehension of non-reflexive clitics, show accuracy rates that cannot be considered bad. At age 4 (*total*: 84%; *correct false* responses: 78%) and at age 5 (*total*: 81%; *correct false* responses: 74%), they already score good results with non-reflexive clitics. The 6-year-olds (98% either for *total* or for *correct false* responses) are almost at the same level as the adults (100%).

In general, clitic pronouns (non-reflexive and reflexive) are not very problematic for Portuguese children.

Table 25 and Graphic 3 indicate the distribution, per grammatical gender (masculine and feminine), of the results on the comprehension of non-reflexive clitics.

Age group	Non-reflexive clitics	
	masc.	fem.
3	183/240 **76.25%**	195/240 **81.25%**
4	282/330 **85.45%**	272/330 **82.42%**
5	252/310 **81.29%**	249/310 **80.32%**
6	207/210 **98.57%**	204/210 **97.14%**
Adults	400/400 **100.00%**	400/400 **100.00%**

Table 25: Results (accuracy rates) of comprehension of non-reflexive clitics (*o*/*a*) distributed per gender



Graphic 3: Accuracy rates for non-reflexive clitics (*o*/*a*) distributed per gender

In non-reflexive clitics, no comprehension differences between masculine and feminine forms were found in each age group (the paired t-tests show that $p > 0.05$ in all comparisons). Consequently, the grammatical gender seems not to influence children's performance.

The obtained results for clitic pronouns (categorical contexts) will be used as control for the ones collected for strong pronouns in non-locative PPs (non-categorical contexts), working as a source of comparison.

5.5. Interpretation of strong pronouns in PPs

The interpretation of strong pronouns in prepositional phrases (PPs) entailed two stages of research: the first one concerned a pretest applied only to Portuguese adults, and the second one consisted of an acquisition test with images in which Portuguese children and adults participated.

5.5.1. Pretest with adults

Taking into account the characteristics presented by the non-reflexive strong pronouns *ele*/*ela* and the reflexive strong pronoun *si* in prepositional contexts, a written multiple choice pretest on the interpretation of strong pronouns within PPs was applied to a group composed of 60 Portuguese adults (mean age: 28 years old). This had the intention to verify their behavior in regard to these non-categorical contexts according to each verb used. Recall that there are verbs that, by their meaning, accept more naturally a coreferential reading than others with non-reflexive and reflexive strong pronouns in PPs. Consequently, this preliminary test intends to evaluate the performance of adults in the interpretation of strong pronouns in PPs in order to see what is expected from each verb, considering that the inherent semantic and/or pragmatic properties of predicates influence the reading of the pronominal forms in these contexts.

A syntactic dictionary of Portuguese verbs (Busse, 1994) was consulted in order to make the selection of the appropriate verbs. Attention was given to the fact that the

verbs should be understood by children as well as drawable, since the selected verbs would be subsequently included in the acquisition test with images on the interpretation of strong pronouns in PPs.

Therefore, the 10 verbs that were chosen to be included in this pretest are the following: *acenar* (to wave), *apontar* (to point), *bater* (to hit), *colar* (to glue), *derramar* (to spill), *disparar* (to shoot), *entornar* (to spill), *martelar* (to hammer), *olhar* (to look) and *sorrir* (to smile). Only 3rd person singular forms of strong pronouns within PPs were used.

The table below presents the structure of the pretest on the interpretation assigned to non-reflexive and reflexive strong pronouns by adults:

<table>
<tr><td colspan="3">40 test items with strong pronouns in PPs</td></tr>
<tr><td colspan="2">20 non-reflexives (ela, ele)</td><td>20 reflexives (si)</td></tr>
<tr><td colspan="2">Verbs acenar, apontar, bater, colar, derramar, disparar, entornar, martelar, olhar, sorrir</td><td>Verbs acenar, apontar, bater, colar, derramar, disparar, entornar, martelar, olhar, sorrir</td></tr>
<tr><td colspan="2">2 items
(for each verb)</td><td rowspan="2">2 items
(for each verb)</td></tr>
<tr><td>1 masculine</td><td>1 feminine</td></tr>
</table>

Table 26: Structure of the items from the pretest

Examples of three test items are shown below:

Para cada um dos contextos que se seguem, escolha a alternativa que considere mais adequada (assinalando-a com uma cruz).
For each of the following contexts, choose the alternative that you think is the most suited one (by marking it with a cross).

A avó está em frente a uma menina e a um espelho. A avó está a acenar para ela.
Grandma is in front of a girl and a mirror. Grandma is waving to her.
Tendo em consideração a situação descrita, o pronome ***ela*** *refere-se:*
Considering the situation above, the pronoun *her* refers:
À avó ☐
To the grandma
À menina ☐
To the girl
A qualquer uma delas ☐
To either of them
A nenhuma delas ☐ *(Especifique)* _____
To none of them (Specify)

O pirata e o feiticeiro estão ao pé um do outro. O pirata está a bater nele.
The pirate and the wizard are next to each other. The pirate is hitting in him.
Tendo em consideração a situação descrita, o pronome ***ele*** *refere-se:*
Considering the situation above, the pronoun *him* refers:
Ao pirata ☐
To the pirate
Ao feiticeiro ☐
To the wizard
A qualquer um deles ☐
To either of them
A nenhum deles ☐ *(Especifique)* _____
To none of them (Specify)

A menina está em frente à bailarina e a um espelho. A menina está a olhar para si.
The girl is in front of the ballerina and a mirror. The girl is looking at herself.
Tendo em consideração a situação descrita, o pronome ***si*** *refere-se:*
Considering the situation above, the pronoun *herself* refers:
À menina ☐
To the girl
À bailarina ☐
To the ballerina
A qualquer uma delas ☐
To either of them
A nenhuma delas ☐ *(Especifique)* _____
To none of them (Specify)

The last response option, available for all the strong pronouns (non-reflexive and reflexive), is particularly due to the possibility that the adults may interpret the reflexive strong form *si* as the 2nd person singular of formal treatment *você* (you).

The test items were randomized and presented in the same order to all the adults.

5.5.1.1. Results

The next table refers to the results of the pretest for non-reflexive pronouns (*ele*/*ela*). Each line of the table shows the number and the correspondent percentage of each type of response (coreference, disjoint reference, both or other interpretation) for each one of the verbs used. A total of 120 answers were obtained per verb.

Pretest								
Verb	**Non-reflexive strong pronouns**							
	coreference		**disjoint ref.**		**both**		**other**	
acenar	4	3.33%	78	65.00%	35	29.17%	3	2.50%
apontar	7	5.83%	91	75.83%	22	18.33%	0	0.00%
bater	0	0.00%	93	77.50%	27	22.50%	0	0.00%
colar	4	3.33%	74	61.67%	40	33.33%	2	1.67%
derramar	5	4.17%	71	59.17%	44	36.67%	0	0.00%
disparar	2	1.67%	99	82.50%	19	15.83%	0	0.00%
entornar	14	11.67%	63	52.50%	43	35.83%	0	0.00%
martelar	10	8.33%	78	65.00%	28	23.33%	4	3.33%
olhar	8	6.67%	64	53.33%	44	36.67%	4	3.33%
sorrir	3	2.50%	76	63.33%	37	30.83%	4	3.33%

Table 27: Responses (in number and percentage) for the interpretation attributed to non-reflexive strong pronouns (*ele*/*ela*)

The results of the pretest for reflexive pronouns (*si*) are presented in the table below. Each line of the table indicates the number and the respective percentage of each type of response (coreference, disjoint reference, both, 2nd person singular of formal treatment *você* or other interpretation) for each one of the verbs used. A total of 120 answers were obtained per verb.

Pretest										
Verb	**Reflexive strong pronouns**									
	coreference		**disjoint ref.**		**both**		***você***		**other**	
acenar	99	82.50%	8	6.67%	5	4.17%	6	5.00%	2	1.67%
apontar	97	80.83%	8	6.67%	3	2.50%	12	10.00%	0	0.00%
bater	103	85.83%	6	5.00%	3	2.50%	7	5.83%	1	0.83%
colar	108	90.00%	3	2.50%	2	1.67%	7	5.83%	0	0.00%
derramar	107	89.17%	3	2.50%	6	5.00%	4	3.33%	0	0.00%
disparar	101	84.17%	9	7.50%	4	3.33%	6	5.00%	0	0.00%
entornar	104	86.67%	5	4.17%	6	5.00%	5	4.17%	0	0.00%
martelar	104	86.67%	6	5.00%	2	1.67%	5	4.17%	3	2.50%
olhar	102	85.00%	5	4.17%	4	3.33%	7	5.83%	2	1.67%
sorrir	101	84.17%	6	5.00%	5	4.17%	6	5.00%	2	1.67%

Table 28: Responses (in number and percentage) for the interpretation attributed to reflexive strong pronouns (*si*)

The following table shows the results, **in percentages**, of the **preferential responses** for each verb employed and concerning either the non-reflexive (*ele*/*ela*) or the reflexive (*si*) pronouns, with the five highest five values of each column emphasized in bold.

Pretest		
Verb	**Non-reflexive strong pronouns**	**Reflexive strong pronouns**
	disjoint ref.	**coreference**
acenar	**65.00%**	82.50%
apontar	**75.83%**	80.83%
bater	**77.50%**	**85.83%**
colar	61.67%	**90.00%**
derramar	59.17%	**89.17%**
disparar	**82.50%**	84.17%
entornar	52.50%	**86.67%**
martelar	**65.00%**	**86.67%**
olhar	53.33%	85.00%
sorrir	63.33%	84.17%

Table 29: Percentages of the preferential responses per verb and type of strong pronoun

The results of the pretest with adults were **not** categorical, especially for the non-reflexive strong pronouns *ele*/*ela*. In the non-reflexive strong pronouns, the verb *disparar* had the highest percentage (82.50%) of the preferential response of disjoint reference. It was followed by the verbs *bater* (77.50%), *apontar* (75.83%), *acenar* (65.00%) and *martelar* (65.00%).

In the reflexive strong pronouns, the highest percentage of the preferential response of coreference was scored by the verb *colar* (90.00%), followed by the verbs *derramar* (89.17%), *entornar* (86.67%), *martelar* (86.67%) and *bater* (85.83%).

In the acquisition test about the interpretation of strong pronouns in PPs, the verbs *colar*, *derramar* and *entornar* (included in the pretest that was administered to 60 adults) were removed because it is not clear whether the PPs work as complements of the verb or as adjuncts:

(165) a. *A menina colou um autocolante (n**ela**).*

the girl glued a sticker (on-her)

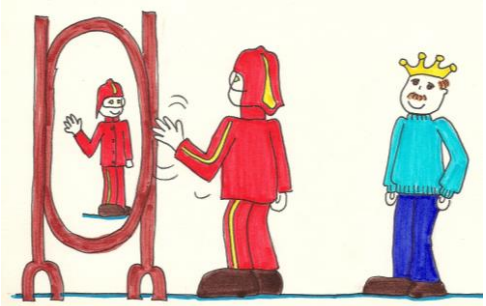
b. *O rapaz derramou leite (em cima d**ele**).*

the boy spilled milk (on him)

c. *A avó entornou sumo (em cima de **si**).*

the grandma spilled juice (on herself)

The application of an additional preliminary test (using images) on the interpretation of strong pronouns within PPs to 16 adults showed that the items and their respective pictures involving the verbs *acenar* (to wave), *olhar* (to look) and *sorrir* (to smile) caused interpretation problems due to the presence of the reflection of one of the characters in a mirror. Hence, not having worked, these items were removed from the test of interpretation of strong pronominal forms.



*Um bombeiro e um rei. O bombeiro está a acenar para **ele** / **si**.*
A fireman and a king. The fireman is waving at him / himself.

Figure 2: Example of a removed item with strong pronouns in PPs

After this important methodological stage with only adults, the verbs *apontar* (to point), *bater* (to hit), *disparar* (to shoot) and *martelar* (to hammer) were selected

to be included in the final version of the acquisition test concerning the interpretation of strong pronouns in PPs, which was applied to both children and adults. Lastly, the verb *tocar* (to touch) was added to the list of verbs to be used in the acquisition test, which is described in the next section (cf. 5.5.2.).

5.5.2. Test of interpretation of strong pronouns in PPs

In this acquisition test, a picture verification task with yes/no questions was used in order to verify the **acceptance** of interpretation of coreference or of disjoint reference with each type of strong pronouns in non-locative PPs: non-reflexives and reflexives. This helped us to know whether the child admitted or not a specific interpretation for a given structure.

However, the contexts of interpretation for strong pronouns are not categorical and involve preferred or dispreferred readings, particularly for non-reflexive strong forms. In consequence, the adults' interpretation functions as the reference when analyzing the children's performance.

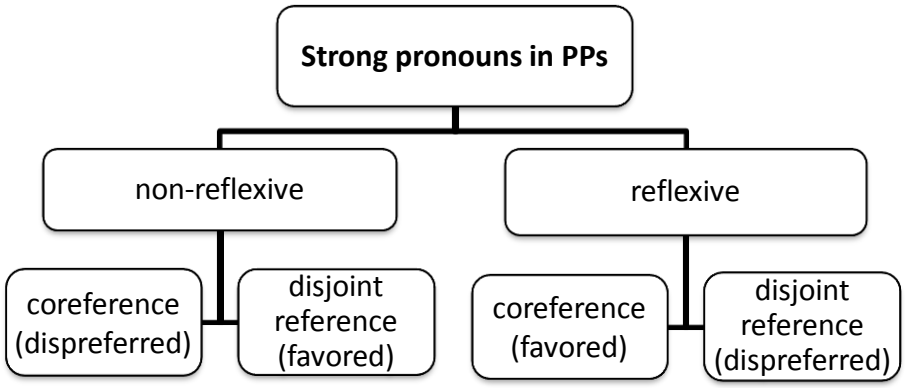
Verbs that favored an interpretation of disjoint reference with the non-reflexive pronominal forms *ele*/*ela* were selected, since there are predicates which admit more easily a reflexive reading from a semantic and/or pragmatic point of view (Menuzzi, 1999; Estrela, 2006). For this reason, in the test of interpretation of strong pronouns in non-locative PPs, the test items were distributed according to the 5 chosen verbs. These 5 verbs and their respective prepositions were: *apontar para* (to point at), *bater em* (to hit (in)), *disparar contra* (to shoot against), *martelar em* (to hammer (in)) and *tocar em* (to touch (in)).

The test conditions of interpretation of 3rd person singular forms of strong pronouns within PPs are presented below:

a) Non-reflexive strong pronouns (masculine and feminine) within PPs in coreferential contexts (dispreferred by adults);
b) Non-reflexive strong pronouns (masculine and feminine) within PPs in disjoint reference contexts (favored by adults);

c) Reflexive strong pronouns within PPs in coreferential contexts (favored by adults);

d) Reflexive strong pronouns within PPs in disjoint reference contexts (dispreferred by adults).



Scheme 3: Test conditions in the interpretation of strong pronouns in PPs

The task contained 30 test items per condition as well as 24 control items (using DPs), with 144 questions in total.

120 test items with strong pronouns in PPs					
60 non-reflexives (*ele*/*ela*)				60 reflexives (*si*)	
Verbs *apontar*, *bater*, *disparar*, *martelar*, *tocar*				Verbs *apontar*, *bater*, *disparar*, *martelar*, *tocar*	
6 coreferences (for each verb)		6 disjoint references (for each verb)		6 coreferences (for each verb)	6 disjoint references (for each verb)
3 masculines	3 feminines	3 masculines	3 feminines		

Table 30: Structure of the test items of interpretation of strong pronouns in PPs

24 control items (DPs)			
12 “yes” answers		12 “no” answers	
6 masculines	6 feminines	6 masculines	6 feminines

Table 31: Structure of the control items from the test of interpretation of strong pronouns in PPs

In Figure 3, there are four examples of test items[72]:

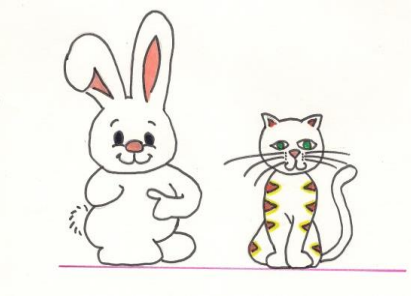
	
non-reflexive strong pronoun (feminine) **disjoint reference**	**non-reflexive strong pronoun (feminine)** **coreference**
Researcher: A fairy and a witch. **Puppet (Pinocchio):** Hmm… A fairy… A witch… *A fada está a martelar n**ela**?* the fairy is hammering on-her **Expected interpretation: yes**	**Researcher:** A ballerina and a grandma. **Puppet (Pinocchio):** Hmm… A ballerina … A grandma… *A bailarina está a disparar contra **ela**?* the ballerina is firing against her **Expected interpretation: no**
	
reflexive strong pronoun **disjoint reference**	**reflexive strong pronoun** **coreference**
Researcher: A wizard and a clown. **Puppet (Pinocchio):** Hmm… A rabbit… A cat… *O feiticeiro está a tocar em **si**?* the wizard is touching in himself **Expected interpretation: no**	**Researcher:** A rabbit and a cat. **Puppet (Pinocchio):** Hmm… A rabbit… A cat… *O coelho está a apontar para **si**?* the rabbit is pointing at himself **Expected interpretation: yes**

Figure 3: Examples of items from the test of interpretation of strong pronouns in PPs

This test was applied to 109 children between 3;4 and 6;6 years old (divided into four age groups), and to 40 adults (the control group). The participants to whom

[72] In the test of interpretation of strong pronouns in PPs, the control items (with DPs) contained pictures not only with two characters but also with three characters (cf. appendix CD):
(i) An indian and a dog. The indian is pointing at **the dog**?
(ii) A ballerina, a grandma and a fairy. The ballerina is pointing at **the fairy**?

the test of interpretation of strong pronouns in PPs was applied were the **same** in each age group as the ones that were included in the test of comprehension of clitics. Therefore, the analysis of both tests took into consideration the same children and adults.[73]

Test of interpretation of strong pronouns in PPs					
Age group	**Age range**	**Mean age**	**Girls**	**Boys**	**Total**
3	3;4 – 3;11	3;8	18	6	24
4	4;0 – 4;11	4;6	15	18	33
5	5;0 – 5;11	5;5	18	13	31
6	6;0 – 6;6	6;2	13	8	21
Adults	18 – 64	31	23	17	40
Total	—	—	87	62	149

Table 32: Description of the participants tested in the interpretation of strong pronouns in PPs

All these children successfully rejected all the control items that triggered a "no" answer in the test of interpretation of strong pronouns in PPs, minimizing the *yes bias* effect.

Several sessions were necessary to apply all the 144 questions from the test of interpretation of strong pronouns in PPs to each child. For each of the adults, the application of this test took about an hour.

The tables and graphics from the test of interpretation of strong pronouns in PPs show **acceptance rates** (percentages of "yes" answers) because the contexts are not categorical (involving preferred or dispreferred readings). In this case, the adults' performance was the reference for the analysis of children's results.

[73] One additional child of 6 years old and 10 more adults completed the task with strong pronouns in PPs and successfully answered to the control items, but were not tested in the comprehension of clitics. The reader is referred to Costa, Lobo & Silva (2013) and Silva (2011, 2014) for the results that also take into account these extra participants. The tendency of the results is similar to the one reported here.

5.5.2.1. Results

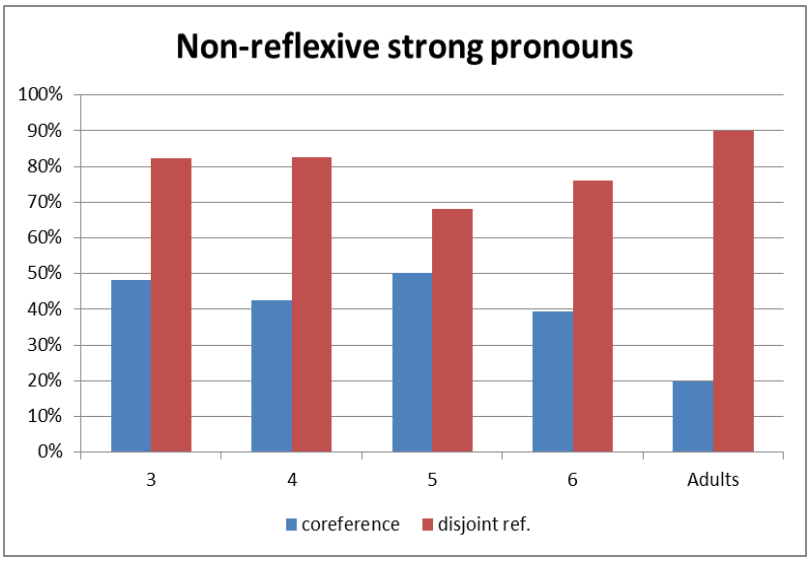
The statistical test scores and the exact p-values resulting from all the established comparisons are organized in tables included in the appendix CD.

Table 33 indicates the **acceptance rates** (percentages of "yes" answers) of non-reflexive and reflexive strong pronouns in coreference and in disjoint reference contexts.

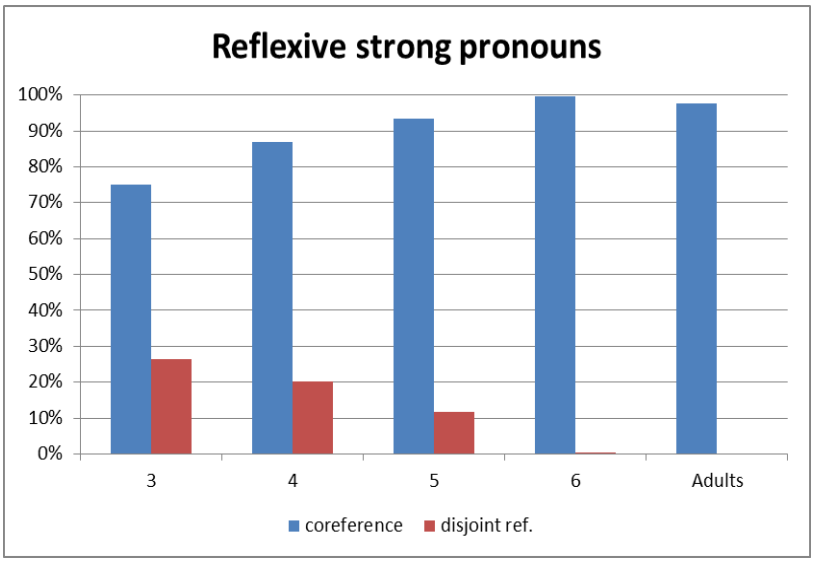
Age group	Non-reflexive strong pronouns		Reflexive strong pronouns	
	coreference	**disjoint ref.**	**coreference**	**disjoint ref.**
3	348/720 **48.33%**	593/720 **82.36%**	540/720 **75.00%**	190/720 **26.39%**
4	422/990 **42.63%**	818/990 **82.63%**	861/990 **86.97%**	201/990 **20.30%**
5	467/930 **50.22%**	633/930 **68.06%**	868/930 **93.33%**	109/930 **11.72%**
6	249/630 **39.52%**	480/630 **76.19%**	628/630 **99.68%**	1/630 **0.16%**
Adults	238/1200 **19.83%**	1081/1200 **90.08%**	1173/1200 **97.75%**	0/1200 **0.00%**

Table 33: Results (acceptance rates) from the test of interpretation of strong pronouns in PPs

Graphic 4 and Graphic 5 reveal the results concerning the interpretation of non-reflexive strong pronouns and reflexive strong pronouns, respectively.



Graphic 4: Acceptance rates for *non-reflexive* strong pronouns



Graphic 5: Acceptance rates for *reflexive* strong pronouns

Regarding the non-reflexive strong pronouns *ele*/*ela* (Graphic 4), a developmental effect among the children was not observed in both contexts of coreference and of disjoint reference.[74]

With the non-reflexives in the context of coreference (dispreferred by adults – Graphic 4), children at the age of 3 had an acceptance rate of 48%, which decreased at

[74] In the discussion of the results, the percentages are usually rounded to whole numbers.

4 years old (43%); $\chi 2 = 5.26$, $p = 0.02$ between these two age groups. This rate increased to 50% at the age of 5 ($\chi 2 = 10.80$, $p = 0.001$ between the 4-year-olds and the 5-year-olds), but diminished again to 40% at 6 years old ($\chi 2 = 16.86$, $p < 0.0001$ for the 5-year-olds vs. the 6-year-olds). It was verified that $p < 0.05$ in the comparison of each age group of children with the adults, showing that there was a significant difference between the acceptance rate of coreference of each one of the children's groups and the control group. In fact, adults had an acceptance rate that is not low (20%), but those of children were significantly higher, quite distant from the adults' performance.

As for the non-reflexive strong pronouns in the context of disjoint reference (favored by adults – Graphic 4), the rates of acceptance began high at the ages of 3 and 4 years with 82% and 83% respectively ($\chi 2 = 0.01$, $p = 0.94$ between both age groups); these percentages were far from that of adults, which was superior with 90% ($p < 0.0001$ for each of these two groups vs. adults). There was a considerable decrease of this rate at the age of 5 (68%) in relation to the group of the 4-year-olds and to the adults' group ($p < 0.0001$ in both comparisons). By the age of 6 years old, a slight increase in this percentage (76%) occurred ($\chi 2 = 11.74$, $p = 0.0006$ between the 5-year-olds and the 6-year-olds) but it is inferior to those of the 3- and the 4-year-olds and, therefore, to that of adults ($\chi 2 = 62.49$, $p < 0.0001$ for the 6-year-olds vs. adults).

With respect to the interpretation of the reflexive strong form *si* (Graphic 5), there was an effect of development in the acceptance rates of both coreference and disjoint reference. In the context of coreference with the reflexive *si* (Graphic 5), a progression occurred from 3 to 6 years old ($p < 0.05$ in the comparison between the successive pairs). The percentage of acceptance of the coreferential reading by the 6-year-old children (99.68%) was slightly superior to that by the adults (97.75%). We may assume, by hypothesis, that the possibility of *si* working as a pronoun with deictic value and corresponding to the 2nd person singular of formal treatment *você* (you) was made available to some of the adults of the control group. In consequence, these adults rejected the reflexive form *si* in some coreferential contexts.

As children's age increased, the acceptance rate of disjoint reference with the reflexive strong pronouns (Graphic 5) decreased from 3 to 6 years old ($p < 0.05$ when

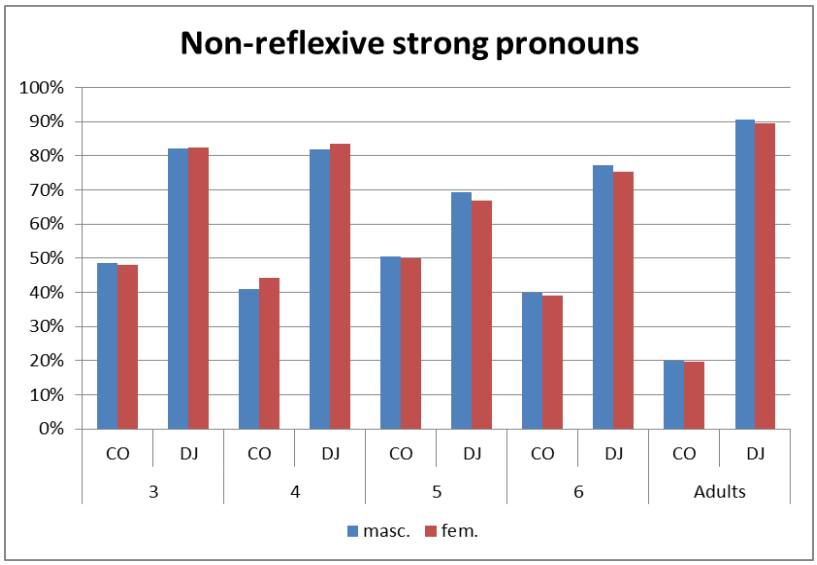
comparing the consecutive pairs of children's groups). At the age of 6 years, with 0.16%, children were already at the same level as the adults, who scored 0% ($\chi 2 = 0.11$, $p = 0.74$ for the 6-year-olds vs. adults).

On account of all this, it is coherent to claim that children performed more adult-like with reflexive strong pronouns than with non-reflexive strong pronouns. With reflexive forms, children tended to progressively get closer to adults in the acceptance of coreference and at 6 years old they almost reach 100%. With reflexives in the disjoint reference context, their acceptance rates gradually decreased and at the age of 6 they were already at the adults' level (Graphic 5). On the other hand, all the children's groups exhibited a performance that was still distant from the adults' behavior in both coreference and disjoint reference contexts with non-reflexive strong pronouns (Graphic 4).

Table 34 and Graphic 6 show the results of the interpretation of non-reflexive strong pronouns distributed per grammatical gender (masculine and feminine), in contexts of coreference (CO) and of disjoint reference (DJ).

Age group	**Non-reflexive strong pronouns**		
	Context	**masc.**	**fem.**
3	CO	175/360 **48.61%**	173/360 **48.06%**
	DJ	296/360 **82.22%**	297/360 **82.50%**
4	CO	203/495 **41.01%**	219/495 **44.24%**
	DJ	405/495 **81.82%**	413/495 **83.43%**
5	CO	235/465 **50.54%**	232/465 **49.89%**
	DJ	322/465 **69.25%**	311/465 **66.88%**
6	CO	126/315 **40.00%**	123/315 **39.05%**
	DJ	243/315 **77.14%**	237/315 **75.24%**
Adults	CO	120/600 **20.00%**	118/600 **19.67%**
	DJ	544/600 **90.67%**	537/600 **89.50%**

Table 34: Results (acceptance rates) of interpretation of non-reflexive strong pronouns (*ele*/*ela*) distributed per gender



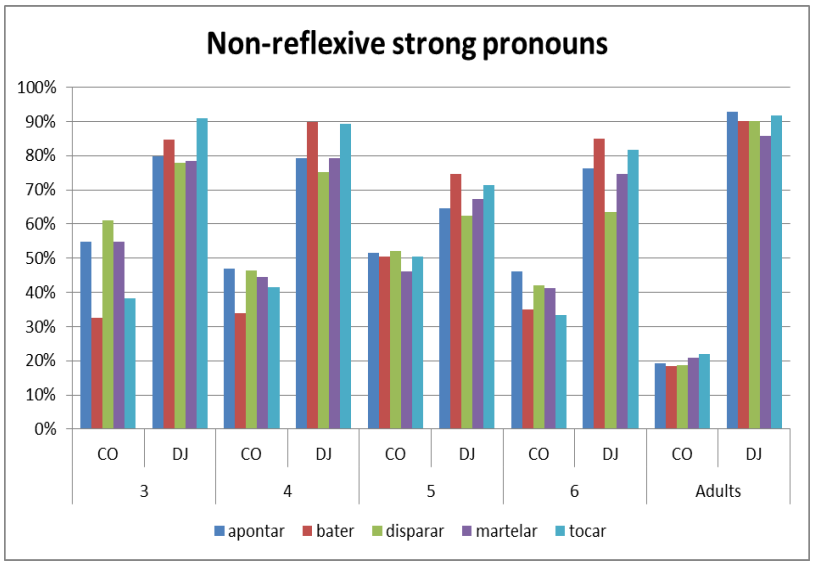
Graphic 6: Acceptance rates for non-reflexive strong pronouns (*ele*/*ela*) distributed per gender

The variation between masculine and feminine forms of non-reflexive strong pronouns did not originate differences in the acceptance rates of coreference or of disjoint reference, regardless of the age group ($p > 0.05$ in all pairs of comparisons for each age group). Accordingly, the grammatical gender appears not to play an important role in children's interpretation of non-reflexive strong pronouns.

Table 35 and Graphic 7 refer to the results obtained in the interpretation of non-reflexive and reflexive strong pronouns, in contexts of coreference (CO) and disjoint reference (DJ), distributed according to the verbs used in the test.

Age group	Context	Non-reflexive strong pronouns				
		Verb				
		apontar (to point)	*bater* (to hit)	*disparar* (to shoot)	*martelar* (to hammer)	*tocar* (to touch)
3	CO	79/144 **54.86%**	47/144 **32.64%**	88/144 **61.11%**	79/144 **54.86%**	55/144 **38.19%**
	DJ	115/144 **79.86%**	122/144 **84.72%**	112/144 **77.78%**	113/144 **78.47%**	131/144 **90.97%**
4	CO	93/198 **46.97%**	67/198 **33.84%**	92/198 **46.46%**	88/198 **44.44%**	82/198 **41.41%**
	DJ	157/198 **79.29%**	178/198 **89.90%**	149/198 **75.25%**	157/198 **79.29%**	177/198 **89.39%**
5	CO	96/186 **51.61%**	94/186 **50.54%**	97/186 **52.15%**	86/186 **46.24%**	94/186 **50.54%**
	DJ	120/186 **64.52%**	139/186 **74.73%**	116/186 **62.37%**	125/186 **67.20%**	133/186 **71.51%**
6	CO	58/126 **46.03%**	44/126 **34.92%**	53/126 **42.06%**	52/126 **41.27%**	42/126 **33.33%**
	DJ	96/126 **76.19%**	107/126 **84.92%**	80/126 **63.49%**	94/126 **74.60%**	103/126 **81.75%**
Adults	CO	46/240 **19.17%**	44/240 **18.33%**	45/240 **18.75%**	50/240 **20.83%**	53/240 **22.08%**
	DJ	223/240 **92.92%**	216/240 **90.00%**	216/240 **90.00%**	206/240 **85.83%**	220/240 **91.67%**

Table 35: Results (acceptance rates) from the test of interpretation of *non-reflexive* strong pronouns distributed per verb



Graphic 7: Acceptance rates for *non-reflexive* strong pronouns distributed per verb

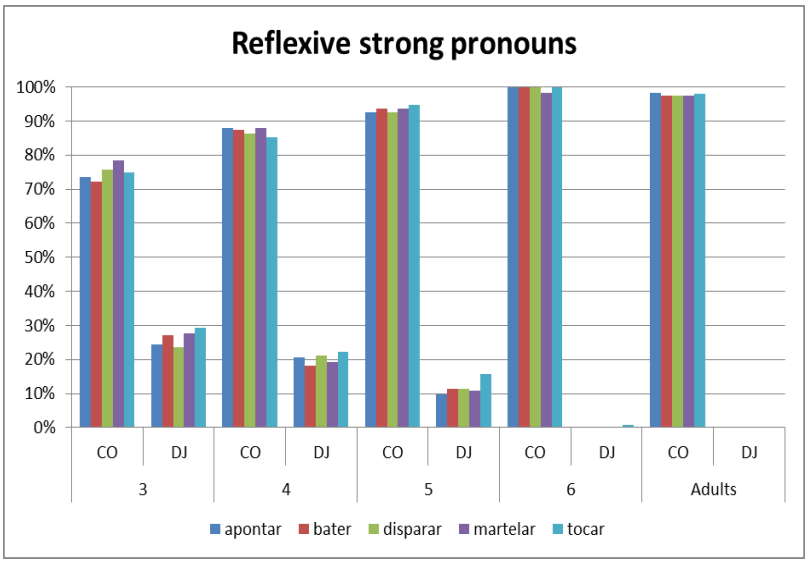
In the interpretation, by children, of the non-reflexive strong pronouns *ele*/*ela*, the verbs *bater* (to hit) and *tocar* (to touch) stood out. Graphic 7 shows that, in a general way, these two verbs had the lowest acceptance of coreference while having the highest acceptance of disjoint reference.

In the adults' group, among the tested verbs, no significant difference occurred in the interpretations of non-reflexive strong pronouns in both coreference ($\chi 2 = 1.50$, $p = 0.83$) and disjoint reference ($\chi 2 = 7.69$, $p = 0.10$). These results can be explained by the fact that the selected verbs favored disjoint reference with the non-reflexive strong pronouns *ele*/*ela*.

Table 36 and Graphic 8 display the results of the interpretation of non-reflexive and reflexive strong pronouns, in contexts of coreference (CO) and disjoint reference (DJ), distributed per verb.

Age group	**Reflexive strong pronouns**					
	Context	**Verb**				
		apontar (to point)	*bater* (to hit)	*disparar* (to shoot)	*martelar* (to hammer)	*tocar* (to touch)
3	CO	106/144 **73.61%**	104/144 **72.22%**	109/144 **75.69%**	113/144 **78.47%**	108/144 **75.00%**
	DJ	35/144 **24.31%**	39/144 **27.08%**	34/144 **23.61%**	40/144 **27.78%**	42/144 **29.17%**
4	CO	174/198 **87.88%**	173/198 **87.37%**	171/198 **86.36%**	174/198 **87.88%**	169/198 **85.35%**
	DJ	41/198 **20.71%**	36/198 **18.18%**	42/198 **21.21%**	38/198 **19.19%**	44/198 **22.22%**
5	CO	172/186 **92.47%**	174/186 **93.55%**	172/186 **92.47%**	174/186 **93.55%**	176/186 **94.62%**
	DJ	18/186 **9.68%**	21/186 **11.29%**	21/186 **11.29%**	20/186 **10.75%**	29/186 **15.59%**
6	CO	126/126 **100.00%**	126/126 **100.00%**	126/126 **100.00%**	124/126 **98.41%**	126/126 **100.00%**
	DJ	0/126 **0.00%**	0/126 **0.00%**	0/126 **0.00%**	0/126 **0.00%**	1/126 **0.79%**
Adults	CO	236/240 **98.33%**	234/240 **97.50%**	234/240 **97.50%**	234/240 **97.50%**	235/240 **97.92%**
	DJ	0/240 **0.00%**	0/240 **0.00%**	0/240 **0.00%**	0/240 **0.00%**	0/240 **0.00%**

Table 36: Results (acceptance rates) from the test of interpretation of *reflexive* strong pronouns distributed per verb



Graphic 8: Acceptance rates for *reflexive* strong pronouns distributed per verb

The type of verb used in this test did not affect the interpretation of the reflexive strong pronoun *si* by both children and adults (the chi-square tests indicated $p > 0.05$ in all cases).

Table 37 compares the acceptance of coreferential readings for non-reflexive forms of clitics (*o*/*a*) and of strong pronouns (*ele*/*ela*), dispreferred by adults. In turn, Table 38 compares the acceptance rates of disjoint readings for reflexive forms of clitics (*se*) and of strong pronouns (*si*), strongly disfavored by adults.[75]

Age group	Clitics	Strong pronouns
3	33.75%	48.33%
4	21.82%	42.63%
5	26.45%	50.22%
6	2.38%	39.52%
Adults	0%	19.83%

Table 37: Coreferential readings with *non-reflexive* forms (pronouns)

[75] These tables only provide the percentages of responses in the referred contexts. However, the appendix CD includes the exact number of responses (as well as the respective percentages).

Age group	Clitics	Strong pronouns
3	17.50%	26.39%
4	19.70%	20.30%
5	11.61%	11.72%
6	1.43%	0.16%
Adults	0%	0%

Table 38: Disjoint readings with *reflexive* forms (anaphors)

The results in Table 37 and Table 38 show that the acceptance rates of the disfavored readings were always superior with non-reflexive forms than with the reflexive ones (anaphors), independently of their status as clitics or strong pronouns.

P-values were calculated through paired t-tests for the comparison of the acceptance rates within the same age group between coreferential interpretations with non-reflexives and disjoint interpretations with reflexives, concerning both clitics and strong pronouns. In the comprehension of clitics, there was a significant difference within the groups of the 3- and of the 5-year-olds ($t(23) = 2.26$, $p = 0.03$, and $t(30) = 2.60$, $p = 0.01$, respectively). In the interpretation of strong pronouns, the difference of dispreferred readings between non-reflexives and reflexives was significant in each age group ($p < 0.05$), except in the 3-year-olds ($t(23) = 2.04$, $p = 0.0527$). Although this difference between the two conditions (22%) was not statistically significant in the age group of 3 (as indicated), it is still worth consideration. Moreover, the obtained p-value is very close to the significance level.

In view of all this, it is admissible to say that the difference between clitics and strong pronouns is not the single explanatory factor for the difficulties of children, since it appears to affect more significantly non-reflexive forms than reflexives. This fact suggests that probably coreference, rather than binding (which is relevant for anaphors), is a problematic aspect for children.

5.6. General discussion

As already referred, the comprehension of clitic object pronouns was analyzed through accuracy rates (percentages of correct answers). However, the interpretation of strong object pronouns was evaluated through acceptance rates (percentages of "yes" answers). For this reason, the adults' performance was the reference for the analysis of children's results in these last indicated contexts of interpretation.

The 3rd person singular object pronouns were tested in simple sentences with referential subject antecedents.

The results obtained in the **first study** indicate that, although Portuguese children began by having worse results than adults in the comprehension of non-reflexive and reflexive clitics, their performance tended to gradually get closer to the adults' behavior. At the age of 6 years, they were almost at the level of the control group. Hence, there was evidence of a developmental effect. However, 3- and 5-year-old children had a slightly better performance with reflexive clitics (*se*) than with non-reflexive clitics (*o*/*a*). In spite of that, non-reflexive clitics were not considered very problematic for Portuguese children. In the interpretation of non-reflexive strong pronouns (*ele*/*ela*) in prepositional contexts, children were less restrictive than adults in regard to the acceptance of the dispreferred reading of coreference.[76] The interpretation of strong pronouns in non-locative PPs is highly related to the semantic and/or pragmatic properties of the involved predicates (Menuzzi, 1999; Estrela, 2006). Therefore, verbs that favored the disjoint reading with the non-reflexive forms *ele*/*ela* were selected for the test. However, children's acceptance rates of coreference with non-reflexive strong pronouns (dispreferred reading) were always significantly superior to the adults' acceptance rates. Besides, among the children, the percentages of acceptance either of coreference or of disjoint reference oscillated among the age groups. As for the context of reflexive strong forms (*si*), children tended to gradually interpret the way adults did, accepting less and less

[76] This is similar to what was found for Catalan (Escobar & Gavarró, 1999) and for Spanish (Baauw, 2000), in which children accepted, in general, coreferential readings with non-reflexive strong pronouns in PPs more often than adults.

disjoint readings. Besides, their acceptance rates of coreference with the reflexive strong pronouns were always very high.

No differences emerged between masculine and feminine forms in the interpretation of both non-reflexive clitics and non-reflexive strong pronouns. In consequence, the grammatical feature of gender appears not to affect children's performance.

The conditions for testing the interpretation of clitics and strong pronouns had the same pragmatic setting. Despite this fact, different results concerning non-reflexive forms were obtained by children when compared to the ones obtained by adults. Children's interpretation with non-reflexive clitics got closer to the adults' interpretation, whereas children's performance with non-reflexive strong pronouns exhibited a deviation from the adults' performance. Therefore, we can conclude that pragmatics alone is not able to account for the difficulties in the interpretation of pronouns by children (confirming Mckee, 1992; Costa & Ambulate, 2010).

In sum, the observed Portuguese children did not have major difficulties with clitics, presenting a good comprehension with both reflexive and non-reflexive forms (confirming the conclusions of Cristóvão, 2006, 2007 for EP, and what has been found for other clitic languages). They also showed a good performance with reflexive strong pronouns with respect to the acceptance of coreference and to the rejection of disjoint reference (at the age of 6, children were already leveled in relation to the adults' behavior in this last aspect). In turn, their results concerning both coreferential and disjoint readings deviated from the adults' responses in the interpretation of non-reflexive strong pronouns, even at 6 years old.

The grammatical status of object pronouns (clitic or strong) appears to be intralinguistically relevant in EP, but it is not the only explanatory factor of children's interpretation. The results indicate that, in a general manner, the acquisition of reflexive forms (anaphors) is better than the one of non-reflexive forms. This fact reinforces the idea that coreference, instead of binding (which is pertinent when interpreting anaphors), is a source of difficulties for children.

On the one hand, the comprehension of reflexive forms (anaphors) did not raise major problems for children, regardless of their categorial status (clitic or strong); these findings confirm hypothesis b) of section 5.1. On the other hand, in the interpretation of non-reflexive forms, children's performance got close to the adults' behavior with clitic object pronouns while it deviated with strong object pronouns (in prepositional contexts); these results are in accordance with hypothesis a) of section 5.1. We argue that this difference between non-reflexive clitics and non-reflexive strong pronouns in children's interpretation comes from the different ways that these pronominal forms are licensed.

The non-reflexive clitic pronouns *o*/*a* must be licensed in syntax: clitics are related to inflection, since they surface where Infl is hosted. Whether we assume that clitics are generated as heads of their own functional projection (e.g. Sportiche, 1995) or generated in an argumental position and then moved to a functional projection (e.g. Duarte & Matos, 2000 for EP), they must enter the syntactic derivation in a specific functional domain. According to Cristóvão (2006, 2007), the fact that clitics are not inserted late in the derivation prevents them from competing with alternative forms at the interface level. This means that children's limited processing capacity (Reinhart, 1999, 2004) is not challenged in this case, because there is no need for them to compute and compare convergent derivations when clitics are involved. Consequently, no major problems emerge in children's comprehension of non-reflexive clitic pronouns.

The non-reflexive strong pronouns *ele*/*ela* in non-locative PPs are licensed post-syntactically. Their interpretation in those contexts is partially determined by semantic and/or pragmatic factors of the predicates used (Menuzzi, 1999; Estrela, 2006). There are predicates which, due to their semantic and/or pragmatic content, may allow coreference between a local antecedent and a non-reflexive strong form. Although the selected verbs from the interpretation test favored disjoint readings with these forms, children significantly accepted coreference. The post-syntactic acceptance or rejection of the coreferential interpretation with non-reflexive strong pronouns in non-locative PPs implies the interaction between syntax and other components of grammar, like semantics and/or pragmatics. This means that one needs

to evaluate whether the semantic and/or pragmatic properties of the predicate of the sentence favor or not a coreferential reading between the non-reflexive strong pronoun and the local subject. This post-syntactic operation, at the interface level, requires the construction of a comparison set in order to decide whether the interpretation of coreference is semantically and/or pragmatically adequate with the non-reflexives *ele*/*ela* in a non-locative PP. Therefore, one needs to hold in memory two convergent syntactic derivations (one with the non-reflexive strong pronoun and another with a reflexive form) at the same time, compare them and verify if the coreference interpretation in the given context (depending on the predicate) is acceptable with the non-reflexive strong form. However, the execution of all these steps constitutes a heavy burden for the children's limited working memory (which is not as developed as that of adults, according to Reinhart, 1999, 2004). This is reflected in their deviating interpretation of non-reflexive strong pronouns with respect to the adults' performance.

Furthermore, the fact that the coreferential and disjoint readings with the non-reflexive strong pronouns *ele*/*ela* in non-locative PPs are partially dependent on lexical knowledge can also explain that their mastery takes some time to be acquired. Children have to determine for each verb the type of semantic and/or pragmatic properties associated with it. The acquisition of this lexical variation presumably takes time.

Accordingly, it seems possible to admit the hypothesis that Costa & Ambulate (2010) formulated, according to which it is expected that the interpretation of strong pronouns in EP is necessarily more difficult for children. In the current research, we assume that children display difficulties in the acquisition of strong object pronouns at the interface level, namely in the establishment of post-syntactic coreference relations (in which semantic and/or pragmatic factors intervene).

There is evidence to affirm that Portuguese children demonstrate knowledge of Principle A of Binding Theory, since they have a good performance with local anaphors (regardless of their clitic or strong status). Portuguese children also know Principle B, having good results comprehending non-reflexive clitic pronouns.

6. Study Two: Interpretation of null and overt pronouns in embedded subject position in EP

Crosslinguistic research has shown that in the interpretation of null and overt subject pronouns in complement clauses with the indicative mood and only one intrasentential antecedent (involving preferential readings), monolingual children's performance differs from the adults' behavior more when the pronoun is an overt form than when the pronoun is a null form (Sorace, Serratrice, Filiaci & Baldo, 2009; Ambulate, 2008; Costa & Ambulate, 2010). This provides further confirmation for the relevance of the asymmetry between deficient and strong pronouns (Cardinaletti & Starke, 1999) in the interpretation of those forms. Furthermore, in complement clauses with the subjunctive mood (selected by volitional verbs or declarative verbs of order) and referential antecedents in the sentence, children incorrectly attribute coreferential readings to both null and overt subject pronouns (Padilla, 1990; Avrutin & Wexler, 1999/2000; Ambulate, 2008; Costa & Ambulate, 2010).

Study Two of this dissertation was conducted in order to analyze the behavior of typically developing Portuguese children regarding the interpretation of pronouns:

a) in embedded subject position;
b) in terms of their categorical status (null and overt);
c) in finite complement clauses with the indicative and subjunctive moods.

The main goal of this study is to determine if there is an interpretative asymmetry between both types of subject pronouns (null or overt) in the acquisition of European Portuguese (EP), trying to contribute to a better understanding on how children establish anaphoric relations with those forms in different embedded contexts (indicative or subjunctive). This study also intends to check if children's performance is affected by the type of matrix verb that selects the subjunctive, by the presence of one or two available antecedents in the sentence, and by the introduction of an object antecedent before the pronoun or after the pronoun.

6.1. Hypotheses and predictions

In view of the results obtained in previous crosslinguistic studies on the acquisition of embedded subject pronouns (cf. section 4.2.) and following the terminology of Cardinaletti & Starke (1999), we assume that null pronominal subjects correspond to weak deficient pronouns, contrasting with overt strong pronouns. Consequently, we consider that the grammatical status of pronouns (null or overt) is relevant for their interpretation (similarly to what was admitted in the previous study – cf. chapter 5). If acquisition is guided by complexity principles, then null forms (deficient pronouns) are acquired before strong forms because they are less complex. In addition, the subjunctive obviation is considered to be more difficult for children, since it involves not only syntactic knowledge of the anaphoric nature of Tense (Meireles & Raposo, 1983; Raposo, 1985), but also lexical and semantic knowledge of the matrix verbs (Padilla, 1990). Eventual difficulties with the null pronominal subject, in indicative complement clauses and with two potential antecedents in the sentence, may result from linear interventions effects (also reported in binding dependencies involving object pronouns by Friedmann, Novogrodsky & Balaban, 2010). In this case, the matrix object antecedent (occurring before the null pronoun) may be regarded as a linearly intervening constituent in the referential dependency between the preferred matrix subject antecedent and the null embedded subject pronoun. Hence, in this second study of the present investigation, the following hypotheses are formulated for European Portuguese (EP):

a) In indicative complement clauses (with referential antecedents in the sentence), we predict that children display a performance close to the adults' behavior when interpreting null embedded pronominal subjects (especially when there is only one intrasentential antecedent – the matrix subject), but they deviate from the adults in the interpretation of overt embedded pronominal subjects;
b) The prediction regarding the interpretation of pronominal subjects in subjunctive complement clauses (with referential antecedents in the sentence) is that both the null and the overt pronouns are problematic for

children, with an overacceptance of coreference in relation to the matrix subject;

c) If the type of matrix verb that selects the subjunctive clauses has an effect in the interpretation of null and overt subjects, differences in children's performance are predicted when only the matrix verb differs in the same context. In this case, the prediction is that children accept less coreferential readings with the volitional verb *querer* than with the declarative verb of order *pedir*. Assuming that with the volitional verb *querer* there is no (or at least hardly any) exceptions to the obviation phenomenon of the embedded subject with the subjunctive (cf. section 3.2.2.), we can consider that *querer* is more categorical in determining subjunctive obviation than the declarative verb of order *pedir*;

d) If children's interpretation of embedded subject pronouns in the *indicative* is influenced by the addition of another potential antecedent (the matrix indirect object antecedent) *before the pronoun*, we expect that they increase the acceptance of the dispreferred disjoint reference with null subject pronouns while they decrease the acceptance of the dispreferred coreference with overt subject pronouns. In the first case, we assume that the matrix indirect object linearly intervenes in the referential dependency between the null pronoun and its preferred matrix subject antecedent. In the second case, we assume that the presence of the object antecedent in the sentence makes the pragmatically appropriate antecedent more accessible for the overt pronoun;

e) If children's interpretation of embedded subject pronouns in the *subjunctive* is influenced by the addition of another potential antecedent (the matrix indirect object antecedent) *before the pronoun*, we expect that they get closer to the adults' responses with both null and overt subject pronouns, increasing their disjoint readings and decreasing their coreferential readings. Here, we assume that the presence of the object antecedent in the sentence makes the legitimate antecedent more accessible (by preceding the pronoun);

f) If the introduction of another possible antecedent (the matrix indirect object antecedent) *after the pronoun* affects children's interpretation in the *indicative*, they will increase the acceptance of the dispreferred disjoint reference with null subject pronouns and also increase the acceptance of the dispreferred coreference with overt subject pronouns. In the first case, we argue that the simple presence of two potential antecedents (a subject and an object) in the sentence may increase the flexibility of readings for null pronouns by children. In the second case, we argue that the pragmatically appropriate object antecedent for the overt pronoun may be less accessible by occurring after the pronoun, in sentence final position.

g) If the introduction of another possible antecedent (the matrix indirect object antecedent) *after the pronoun* affects children's interpretation in the *subjunctive*, they will still have difficulties and overaccept coreference with both null and overt subject pronouns. Here, the fact that the legitimate object antecedent occurs after the pronoun, in sentence final position, may make it less accessible for children.

6.2. Methodology

The current experimental study is more extensive and developed than the one previously achieved for EP (Ambulate, 2008; Costa & Ambulate, 2010). Accordingly, the contexts of interpretation of subject pronouns in finite complement clauses had the purpose of controlling the following variables:

a) null subject pronoun vs. overt subject pronoun;
b) coreference vs. disjoint reference;
c) indicative mood vs. subjunctive mood;
d) type of matrix verb that selects the subjunctive (volitional verb *querer* – to want vs. declarative verb of order *pedir* – to request);[77]

[77] These two matrix verbs, used to select subjunctive complement clauses, present semantic and syntactic differences. Semantically, *querer* is a volitional verb and *pedir* is a declarative verb of order. From a syntactic point of view, *querer* is a verb with two arguments, while *pedir* is a verb with three arguments. Additionally, the volitional verb *querer* can also occur in control structures (with a PRO subject of a non-inflected infinitive complement clause).

e) presence of one or two potential antecedents in the sentence (subject antecedent vs. subject + object antecedents);
f) introduction of an object antecedent before the pronoun (following the matrix verb) vs. after the pronoun (in sentence final position).

These variables were distributed over different acquisition tests, which only included referential antecedents (subject and object).[78] All the tested subject pronouns are in the 3rd person singular.

The interpretation of null and overt pronominal subjects in indicative and subjunctive complement clauses was experimented in a pretest and in four tests (A1, A2, B and C).

The pretest and the four tests differed in the possible referential antecedents for the (null or overt) embedded subject pronoun. Accordingly, the pretest, test A1 and test A2 had only one intrasentential antecedent (the subject antecedent before the pronoun) and the alternative was an extrasentential antecedent (a non-subject antecedent). Test B and test C had two available antecedents in the sentence: subject antecedent and indirect object antecedent before the pronoun in test B; subject antecedent before the pronoun and indirect object antecedent after the pronoun in test C.

The pretest, test A1, test B and test C contained both indicative and subjunctive clauses. The exception goes to test A2 that included only subjunctive clauses (which replicates the subjunctive context of test A1 with a different matrix verb), because the correspondent indicative context was already considered in test A1.

The indicative mood was always selected by the declarative verb *dizer* (to say) in the pretest and in the tests A1, B and C. The subjunctive mood was selected by the volitional verb *querer* (to want) in the pretest and in the test A1, and by the declarative verb of order *pedir* (to request) in tests A2, B and C.

The pretest contained transitive or copulative/predicative verbs selecting an object (direct or prepositional) or a predicative expression in the embedded clauses,

[78] The interpretation effects that Montalbetti (1986) describes for null and overt subjects in indicative complement clauses with quantified antecedents do not apply in this case.

while the tests A1, A2, B and C included intransitive verbs (with no objects) in the embedded clauses.

Subsequently, a description is given for each of the applied tests as well as illustrative sentences.

Pretest – Null and overt embedded subjects in the indicative (matrix verb *dizer* – to say) and in the subjunctive (matrix verb *querer* – to want) with one antecedent in the sentence (subject antecedent before the pronoun). Embedded clause with a transitive or a copulative/predicative verb.

*O príncipe disse que **pro**/**ele** comprou um relógio.* **(Indicative)**
the prince said that *pro*/he bought a clock
*O príncipe quer que **pro**/**ele** faça um desenho.* **(Subjunctive)**
the prince wants that *pro*/he makes a drawing

Test A1 – Null and overt embedded subjects in the indicative (matrix verb *dizer* – to say) and in the subjunctive (matrix verb *querer* – to want) with one antecedent in the sentence (subject antecedent before the pronoun). Embedded clause with an intransitive verb.

*O bombeiro disse que **pro**/**ele** adormeceu.* **(Indicative)**
the fireman said that *pro*/he fell-asleep.
*O príncipe quer que **pro**/**ele** salte.* **(Subjunctive)**
the prince wants that *pro*/he jumps

Test A2 – Null and overt embedded subjects only in the subjunctive (matrix verb *pedir* – to request) with one antecedent in the sentence (subject antecedent before the pronoun). Embedded clause with an intransitive verb.

*O bombeiro pediu que **pro**/**ele** cantasse.* **(Subjunctive)**
the fireman requested that *pro*/he sang

Test B – Null and overt embedded subjects in the indicative (matrix verb *dizer* – to say) and in the subjunctive (matrix verb *pedir* – to request) with two available antecedents in the sentence (subject antecedent and object antecedent before the pronoun). Embedded clause with an intransitive verb.

*O bombeiro disse <u>ao avô</u> que **pro**/**ele** emagreceu.* **(Indicative)**
the fireman said to-the grandpa that *pro*/he lost-weight
*O bombeiro pediu <u>ao avô</u> que **pro**/**ele** saltasse.* **(Subjunctive)**
the fireman requested to-the grandpa that *pro*/he jumped

Test C – Null and overt embedded subjects in the indicative (matrix verb *dizer* – to say) and in the subjunctive (matrix verb *pedir* – to request) with two available antecedents in the sentence (subject antecedent before the pronoun and object antecedent after the pronoun). Embedded clause with an intransitive verb.

*O príncipe disse que **pro**/**ele** desmaiou <u>ao avô</u>.* **(Indicative)**
the prince said that *pro*/he fainted to-the grandpa
*O príncipe pediu que **pro**/**ele** dançasse <u>ao avô</u>.* **(Subjunctive)**
the prince requested that *pro*/he danced to-the grandpa

As already mentioned, although the pretest, test A1 and test A2 included only one antecedent in the sentence (the subject of the main clause), there is another potential extrasentential antecedent (a non-subject antecedent) that is also introduced in the beginning of the task and is always visually available.

The difference between tests B and C will enable us to verify if the linear position of the indirect object antecedent in the sentence, before the pronoun (following the matrix verb – test B) or after the pronoun (in sentence final position – test C), has an influent role in the interpretation of embedded pronominal subjects. Furthermore, this difference will also clarify if eventual difficulties with the null pronominal subject in indicative clauses are due: (i) to the linear intervention of a constituent (the matrix object antecedent before the pronoun) in the referential dependency between the null subject pronoun and its preferred matrix subject antecedent; (ii) or to the simple presence of two available antecedents (subject antecedent before the pronoun and object antecedent after the pronoun) in the sentence for the null subject pronoun, increasing the flexibility of readings by children.

The methodology consisted of a set of **truth value judgment tasks** (Crain & Thornton, 1998; Gordon, 1996), using yes/no questions in order to obtain the child's answer. In each task, there was a short animated representation with two toy figures (previously introduced to the participant) in order to provide the adequate context for the interpretation of the embedded pronominal subjects. After the short animated representation, a Puppet (Pinocchio), who was usually distracted, produced the interjection "hum" (in English, "hmm") to denote thinking or pondering and always mentioned the two characters (corresponding to the two toy figures) contextually present in the test. This happened immediately before the yes/no test question was posed to the child by the Puppet (Pinocchio). The goal was to make the participant aware of both characters (always visually available), taking them both into consideration as potential antecedents when interpreting the embedded subject

pronoun. This allows us to know whether the child (or the adult) admits or not a specific interpretation for the linguistic structure which is being studied.[79]

Before the application of the acquisition tests, there was a training phase in which children were asked to answer yes/no questions like "Is your name Alice/Ricardo?", "Are you a girl/boy?", "Is this a chair/pencil/bicycle/mobile phone?", "Is your hair yellow/blue/brown?".

In Ambulate (2008) and Costa & Ambulate (2009), the adopted method did not completely exclude the possibility of the child having other interpretations for the same sentence and choosing a preferential reading. In turn, the truth value judgment task applied in the present research allows testing whether the child has or not certain grammatical restrictions by checking if both the coreferential and the disjoint reference interpretations are available or not.[80]

The test conditions for the interpretation of embedded subject pronouns either in the indicative (selected by the verb *dizer*) or in the subjunctive (selected by the verbs *querer* and *pedir*) were the following:

a) Coreferential reading between the null embedded subject and the matrix subject;

b) Disjoint reference reading between the null embedded subject and the matrix subject;

c) Coreferential reading between the overt embedded subject and the matrix subject;

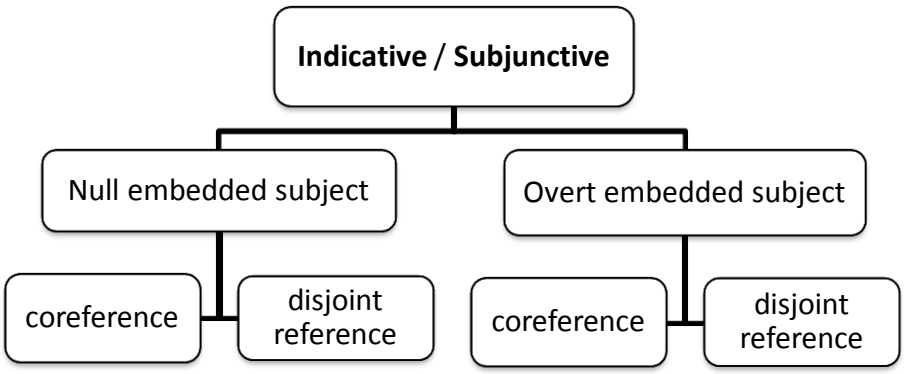
d) Disjoint reference reading between the overt embedded subject and the matrix subject.

Accordingly, in each of the verbal moods (indicative and subjunctive), the interpretation of null and overt embedded pronominal subjects was tested in contexts

[79] Examples of test items are presented in each section that refers respectively to the Pretest, Test A1, Test A2, Test B and Test C of this second study. The full tests of interpretation of embedded subject pronouns in EP are included in the appendix CD.

[80] Nevertheless, if the acceptance rate of one of the readings (coreference or disjoint reference) for the embedded subject pronoun is higher than the other, it is admissible to speak about *preference* patterns.

of coreference and of disjoint reference with respect to the matrix subject. This is illustrated by the scheme presented below.



Scheme 4: Test conditions in the indicative and in the subjunctive moods

The next table indicates, in the referred conditions, the expected interpretation of null and overt embedded pronominal subjects (in relation to the matrix subject) according to the adult grammar of EP.[81]

	Null embedded subject		**Overt embedded subject**	
	Coreference	**Disjoint reference**	**Coreference**	**Disjoint reference**
Indicative (matrix verb *dizer*)	preferred	dispreferred	dispreferred	preferred
Subjunctive (matrix verbs *querer* and *pedir*)	false with the matrix verb *querer* / strongly dispreferred with the matrix verb *pedir*	true with 3rd person singular (or false with interpretation of 2nd person singular of formal treatment *você* – you)	false	true

Table 39: Expected interpretation for the test conditions in the adult grammar of EP

[81] Lobo (2013: 2202) reports that some EP speakers may allow coreference with the null pronominal subject of subjunctive clauses selected by the verb *pedir* in specific contexts (cf. section 3.2.2.): when the embedded clause has a stative predicate like *ficar* (to stay), a modal semi-auxiliary verb like *poder* (can), the auxiliary verb *ter* (to have) or certain temporal-aspectual adverbs as *ainda* (still). However, in the current research, we did **not** test the interpretation of null subject pronouns of subjunctive clauses with the matrix verb *pedir* in the mentioned exceptional contexts. In the absence of what triggers these exceptions (only accepted by some EP speakers), the null pronoun is generally disjoint in relation to the matrix subject when the verb *pedir* selects the subjunctive. In section 6.1. of hypotheses and predictions, we assume that the volitional verb *querer* is more categorical in determining subjunctive obviation than the declarative verb of order *pedir*.

The comparison between different contexts will establish if there is an interpretative asymmetry between null subject pronouns and overt subject pronouns in indicative and subjunctive complement clauses.

As mentioned before (cf. 3.2.1 of this dissertation), regarding indicative complement clauses, an overt pronoun with contrastive stress improves the possibility of coreference (Montalbetti, 1986: 143). Therefore, emphatic stress or any other intonational clues were avoided when asking questions with the overt pronoun *ele* (he).

Concerning the pretest and the tests A1, B and C, each one of them included 30 questions in total, corresponding to 24 test items (three items per condition in both indicative and subjunctive moods) and to six control items with embedded subject DPs. These control items were used in order to minimize children's tendency to give affirmative answers because they do not wish to contradict the researcher (known as *yes bias* effect). The main purpose was to necessarily trigger "no" answers, checking if children paid attention and/or understood the task.

In turn, test A2 contained 16 questions in total, which corresponded to 12 test items (three items per condition, only in the subjunctive mood) and to four control items with embedded subject DPs.

12 test items in the indicative				12 test items in the subjunctive			
6 null embedded subjects		6 overt embedded subjects		6 null embedded subjects		6 overt embedded subjects	
3 coreferences	3 disjoint references	3 coreferences	3 disjoint references	3 coreferences	3 disjoint references	3 coreferences	3 disjoint references

Table 40: Structure of the test items

6 control items (DPs) – Pretest / Tests A1, B and C		4 control items (DPs) – Test A2	
3 "yes" answers	3 "no" answers	2 "yes" answers	2 "no" answers

Table 41: Structure of the control items

All the control items involved indicative (matrix verb *dizer*) and subjunctive (matrix verbs *querer* and *pedir*) complement clauses with embedded subject DPs with one intrasentential antecedent, and embedded predicate containing an object (direct or prepositional) selected by transitive verbs. Some examples are presented below:

(166) O Príncipe disse que **o Bombeiro** recebeu uma carta?

the Prince said that the Fireman received a letter

(167) O Bombeiro quer que **o Príncipe** abra a porta?

the Fireman wants that the Prince opens the door

(168) O Bombeiro pediu que **o Avô** tocasse piano?

the Fireman requested that the Grandpa played piano

The tests were also applied to a control group composed of 28 adults in order to verify their consistency and for comparison with the children's responses. None of these adults had previous knowledge of the content or of the aim of the tests. They have an academic degree or were attending university courses at the time of the experimental study, working in several professional areas: Administration; Anthropology; Archaeology; Art History; Classical/Modern Languages and Literatures; Dental Medicine; Education; Electrical Engineering; Human Resources; Information Systems and Computer Engineering; Linguistics[82]; Mathematics; Social Communication; Sociology; Telecommunications; Tourism.

[82] From the 28 adults tested, four were studying Linguistics at the postgraduate level but had never worked specifically in the interpretation of pronouns. In fact, their areas of research were diversified: Discourse Analysis, Lexicology and Lexicography, Phonology. Their responses were considered to be as spontaneous as those of the other adults tested.

The various items from each test were randomized and presented in the same order to all the participants. No time limit was imposed to the inquired children when the different tasks were individually applied to them. Their answers were registered during the application of the tests. Each one of these tests was administered to children in one session of about half an hour. As for the adults, the application of each test took less than half an hour.

The tested children, of preschool age, were attending three kindergartens in the city of Barreiro, located in the metropolitan area of Lisbon. Both children and adults were monolingual native speakers of EP.

All the participants involved in this second study were recruited and tested by the author of this dissertation.

The tables and graphics presented in this chapter indicate values that result from an analysis of **acceptance rates** (percentages of "yes" answers) in relation to each of the subject pronouns, null or overt, in contexts of coreference and of disjoint reference. We are dealing with non-categorical readings (preferred or dispreferred), not only in the indicative but also in the subjunctive with the null subject.[83] In consequence, the adults' performance is the reference for the analysis of children's results.

For the pretest and for the tests A1, B and C, two pairs of graphics are presented: the first pair always refers to the results of the indicative and the second pair concerns the results of the subjunctive. For the test A2, only one pair of graphics is shown regarding the results of the subjunctive.

6.3. Statistical analysis

The statistical analysis adopted in study two is similar to what was done in study one (cf. section 5.3.).

[83] As previously described, a null subject of a subjunctive clause (selected by the verbs *querer* and *pedir*) presents a reading of disjoint reference in relation to the matrix subject. In the tested contexts of subjunctive, the null subject can be interpreted as 3rd person singular (one of the characters used in the task) or as 2nd person singular of formal treatment *você* (you). Accordingly, the participant will give a "yes" or a "no" answer in the disjoint reference context, depending on the interpretation of 3rd person singular or 2nd person singular respectively.

For the same condition, comparisons between two age groups were based on the standard chi-square (χ^2) test of homogeneity. In this case, the null hypothesis (H_0) means establishing that the groups are homogeneous, that is, the proportion of answers of each type is similar from group to group.

Within the same age group, the comparison between two different conditions was done through a t-test.[84] A paired t-test was used when the age group was composed of the same participants in both conditions. An unpaired t-test was applied when the age group was composed of different participants (it was the specific case of the comparison between the pretest and test A1). For these t-tests, H_0 expresses that there is homogeneity between types of answers in comparison.

Rejecting H_0 states that the observed results are significant enough to assess that there is a difference between age groups or between types of answers. In this research, a difference is considered to be significant when $p < 0.05$.[85]

6.4. Pretest

The pretest analyzed the interpretation of null and overt embedded pronominal subjects in the indicative (matrix verb *dizer* – to say) and in the subjunctive (matrix verb *querer* – to want) with one antecedent in the sentence (subject antecedent before the pronoun). The embedded clause contained a transitive or a copulative/predicative verb selecting an object (direct or prepositional) or a predicative expression.

[84] ANOVA tests (applicable to compare variables regarding three or more independent samples) were not considered because each required comparison was essentially between two different conditions but within the same age group. In this case, running ANOVA tests would mean that all the conditions (of interpretation of subject pronouns) would be compared simultaneously. This would involve comparisons that are not specifically relevant for what was at issue. For this reason, we decided in favor of applying t-tests. The intention was to determine if there was a significant difference in the acceptance rates obtained in each one of the appropriate pairs of conditions in comparison. This option was confirmed by a specialist in Applied Mathematics and Biostatistics.

[85] The p-value means the probability that the results are obtained by chance, considering the null hypothesis as true. Thus, the probability of error that is involved in accepting an observed result as valid, in relation to the null hypothesis, is indicated by the p-value. When this p-value is low, then the correspondent results are considered statistically significant. The significance level is the cutoff that one uses to express what is significant, which is 5% in this research. If $p < 0.05$, then we can say that the correspondent difference is significant.

(169) O príncipe disse que ***pro***/**ele** comprou um relógio. **(Indicative)**

the prince said that *pro*/he bought a clock

(170) O príncipe quer que ***pro***/**ele** faça um desenho. **(Subjunctive)**

the prince wants that *pro*/he makes a drawing

Figure 4: Characters used in the Pretest

		Pretest	
		Indicative	**Subjunctive**
Null pronoun	**Coreference**	**Prince:** I ate a chocolate! **Puppet (Pinocchio):** Hmm... The Prince... The Grandpa... *O Príncipe disse que **pro** comeu um chocolate?* the Prince said that *pro* ate a chocolate **Expected interpretation: yes**	**Prince:** I want to play football! **Puppet (Pinocchio):** Hmm... The Prince... The Grandpa... *O Príncipe quer que **pro** jogue futebol?* the Prince wants that *pro* plays football **Expected interpretation: no**
	Disjoint reference	**Prince:** Grandpa is tired! **Puppet (Pinocchio):** Hmm... The Prince... The Grandpa... *O Príncipe disse que **pro** está cansado?* the Prince said that *pro* is tired **Expected interpretation: no**	**Grandpa:** Hey Prince, drink water! **Puppet (Pinocchio):** Hmm... The Grandpa... The Prince... *O Avô quer que **pro** beba água?* the Grandpa wants that *pro* drinks water **Expected interpretation: yes**
Overt pronoun	**Coreference**	**Prince:** I bought a watch! **Puppet (Pinocchio):** Hmm... The Prince... The Grandpa... *O Príncipe disse que **ele** comprou um relógio?* the Prince said that he bought a watch **Expected interpretation: no**	**Prince:** I want to do a drawing! **Puppet (Pinocchio):** Hmm... The Prince... The Grandpa... *O Príncipe quer que **ele** faça um desenho?* the Prince wants that he does a drawing **Expected interpretation: no**
	Disjoint reference	**Grandpa:** The Prince has a fever! **Puppet (Pinocchio):** Hmm... The Grandpa... The Prince... *O Avô disse que **ele** tem febre?* the Grandpa said that he has a fever **Expected interpretation: yes**	**Grandpa:** Hey Prince, sing a song! **Puppet (Pinocchio):** Hmm... The Grandpa... The Prince... *O Avô quer que **ele** cante uma canção?* the Grandpa wants that he sings a song **Expected interpretation: yes**

Table 42: Examples of items organized by condition from the Pretest

The pretest was administered to a group of 66 children between 3;1 and 6;2 years old (divided into four age groups), and to 28 adults (the control group).

Pretest					
Age group	**Age range**	**Mean age**	**Girls**	**Boys**	**Total**
3	3;1 – 3;10	3;6	7	8	15
4	4;0 – 4,11	4;6	6	8	14
5	5;0 – 5;11	5;5	11	15	26
6	6;0 – 6;2	6;1	7	4	11
Adults	20 – 64	31	16	12	28
Total	—	—	47	47	94

Table 43: Description of the participants in the Pretest

All these children successfully rejected the control items that triggered a "no" answer in the pretest, minimizing the *yes bias* phenomenon.

6.4.1. Results

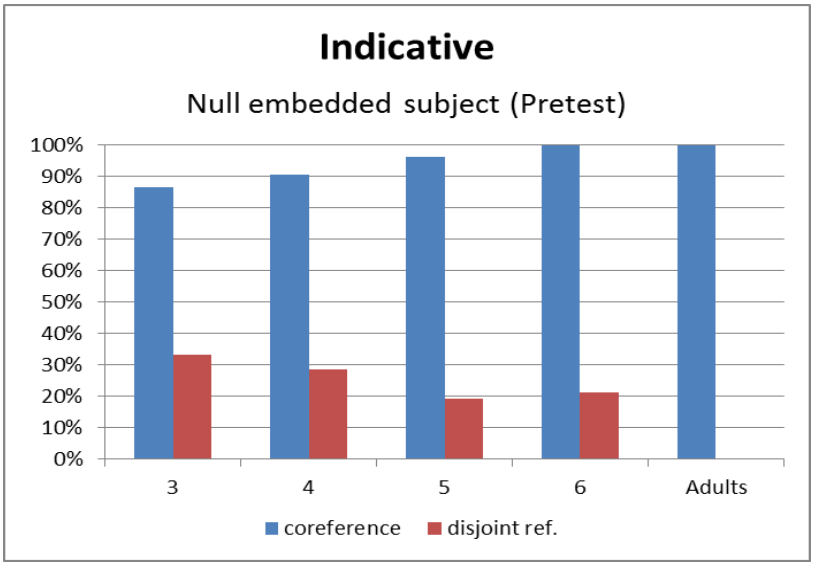
The appendix CD contains the statistical test scores and the exact p-values resulting from all the established comparisons.

Table 44 presents the **acceptance rates** (percentages of "yes" answers) of interpretation of null and overt embedded pronominal subjects, with one intrasentential antecedent (subject antecedent before the pronoun), in contexts of coreference (coref.) and of disjoint reference (disj. ref.) in relation to the matrix subject. The complement subordinate clauses had the indicative selected by the verb *dizer* (to say) and the subjunctive selected by the verb *querer* (to want). The embedded predicate contained a transitive or a copulative/predicative verb selecting an object (direct or prepositional) or a predicative expression (**Pretest**).

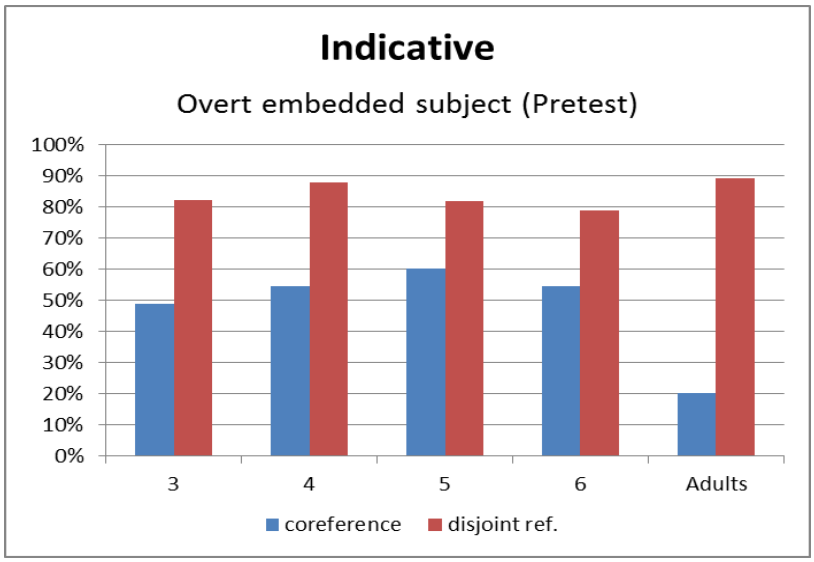
	Pretest							
	Indicative				Subjunctive			
	Null subject		Overt subject		Null subject		Overt subject	
Age	**coref.**	**disj. ref.**	**coref.**	**disj. ref.**	**coref.**	**disj. ref.**	**coref.**	**disj. ref.**
3	39/45 **86.67%**	15/45 **33.33%**	22/45 **48.89%**	37/45 **82.22%**	26/45 **57.78%**	34/45 **75.56%**	23/45 **51.11%**	39/45 **86.67%**
4	38/42 **90.48%**	12/42 **28.57%**	23/42 **54.76%**	37/42 **88.10%**	20/42 **47.62%**	31/42 **73.81%**	13/42 **30.95%**	37/42 **88.10%**
5	75/78 **96.15%**	15/78 **19.23%**	47/78 **60.26%**	64/78 **82.05%**	52/78 **66.67%**	60/78 **76.92%**	22/78 **28.21%**	70/78 **89.74%**
6	33/33 **100.00%**	7/33 **21.21%**	18/33 **54.55%**	26/33 **78.79%**	21/33 **63.64%**	23/33 **69.70%**	14/33 **42.42%**	26/33 **78.79%**
Adults	84/84 **100.00%**	0/84 **0.00%**	17/84 **20.24%**	75/84 **89.29%**	4/84 **4.76%**	53/84 **63.10%**	3/84 **3.57%**	83/84 **98.81%**

Table 44: Results (acceptance rates) from the Pretest

Graphic 9 and Graphic 10 display the results obtained in *indicative* complement clauses (**Pretest**).



Graphic 9: Acceptance rates for the *null* embedded subject in the *indicative* (**Pretest**)



Graphic 10: Acceptance rates for the *overt* embedded subject in the *indicative* (**Pretest**)

In the indicative and in relation to the null embedded subject (Graphic 9), adults clearly rejected disjoint reference (0%) and attributed the preferred interpretation to coreference (with 100% of acceptance).[86]

Children's results show, concerning null subjects in the context of coreference (Graphic 9), a successive growth of the acceptance rate (although not statistically significant): 87% for the 3-year-olds; 90% at the age of 4 ($\chi 2 = 0.05$, $p = 0.83$ between these two groups); 96% for the 5-year-olds ($\chi 2 = 0.74$, $p = 0.39$ between the 4-year-old group and this one) and reaching 100% at the age of 6 ($\chi 2 =$, $p = 0.62$ between the 5-year-old and the 6-year-old groups). At 6 years old, children's responses are already leveled in relation to the adults' performance, obtaining also 100% of acceptance of coreferential readings with null subjects in the indicative.

With respect to the null subject in the context of disjoint reference (Graphic 9), children got an acceptance rate of 33% when they are 3 years old, which diminished successively to 29% at the age of 4 ($\chi 2 = 0.06$, $p = 0.80$ between these two younger groups) and to 19% at 5 years old ($\chi 2 = 0.88$, $p = 0.35$ between the 4-year-old group and the 5-years olds). However, it increased to 21% for the 6-years-olds ($\chi 2 = 0$, $p = 1$

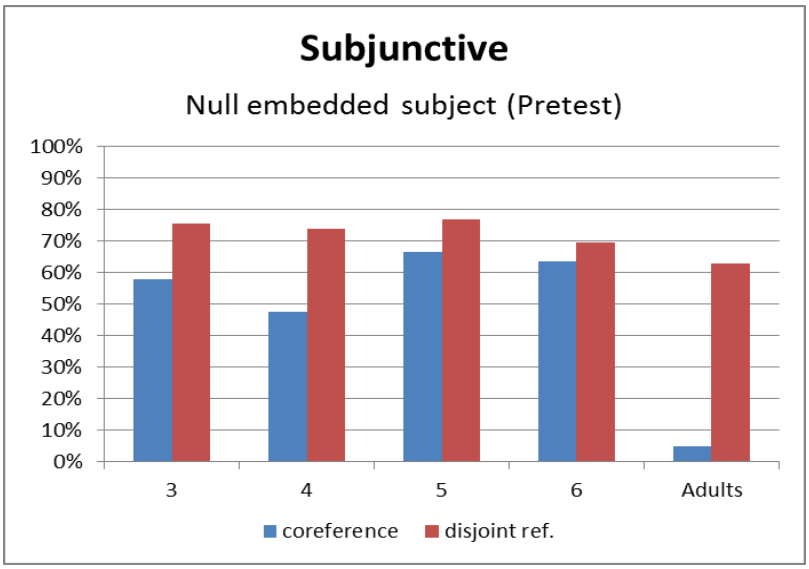
[86] In the descriptive text of the results from the Pretest, the option is to show the percentages rounded to whole numbers.

between the 5-year-old group and this one). Children at the age of 6 are still significantly distant from the adults' performance, who scored 0% of acceptance of disjoint readings with the null pronoun ($\chi 2 = 15.37$, $p = 0.0001$).

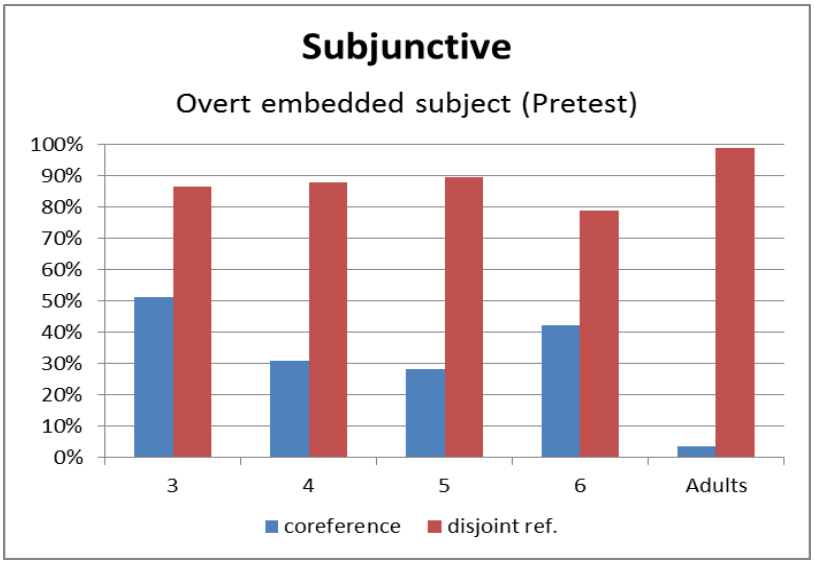
In the indicative and with the overt embedded subject (Graphic 10), some adults accepted coreference (20% of acceptance), but their preferred interpretation was disjoint reference (89% of acceptance). Like adults, children also had high acceptance rates of the preferred reading of disjoint reference with overt forms, but they accepted much more coreference than adults. Among the children, there was no effect of development in this case. Children, in the context of coreference, presented the following evolution of the acceptance rate with overt forms (Graphic 10): 49% at the age of 3 years, growing to 55% for the 4-year-olds, increasing again to 60% at 5 years old and diminishing to 55% at the age of 6 years. Comparing the 6-year-olds with the adults, a significant difference was obtained in the acceptance of the dispreferred reading of coreference with overt pronouns ($\chi 2 = 11.71$, $p = 0.0006$).

Regarding the overt subject in the context of disjoint reference (Graphic 10), children showed an acceptance rate of 82% at the age of 3 years, increasing to 88% at the age of 4, but diminishing successively to 82% at 5 years old and to 79% for the 6-years-olds. Although there was a percentage difference of 10% between the 6-year-old children (79%) and the adults (89%) in this context, the chi-square test indicated that this difference is not statistically significant ($\chi 2 = 1.41$, $p = 0.23$).

Graphic 11 and Graphic 12 reveal the results in *subjunctive* complement clauses (**Pretest**).



Graphic 11: Acceptance rates for the *null* embedded subject in the *subjunctive* (**Pretest**)



Graphic 12: Acceptance rates for the *overt* embedded subject in the *subjunctive* (**Pretest**)

In the subjunctive with the null embedded subject (Graphic 11), only a few adults accepted coreference (5%), clearly preferring disjoint reference (63% of acceptance). In turn, children distributed their interpretation for the null subject between coreference and disjoint reference, although they preferred the disjoint reading with higher acceptance rates in this case. There was no effect of development

among the children's groups. Among the children, in the context of coreference, the evolution of the acceptance rate with null forms (Graphic 11) was the following: 58% at the age of 3 years, diminishing to 48% for the 4-year-olds ($\chi 2 = 0.54$, $p = 0.46$ between these two age groups), growing to 67% at 5 years old ($\chi 2 = 3.37$, $p = 0.07$ between the groups of 4-year-old and 5-years old) and decreasing to 64% at the age of 6 years ($\chi 2 = 0.01$, $p = 0.93$ between the 5-year-old group and this one). There was always a $p < 0.0001$ in the comparison of each one of the children's groups with the control group, concerning the acceptance of coreference with null pronouns in subjunctive clauses. This means that the difference between the responses of children and those of adults was statistically significant in this context.

With respect to the null embedded subject in the context of disjoint reference (Graphic 11), the 3-year-olds began with an acceptance rate of 76%, which decreased to 74% at the age of 4 years, growing to 77% for the 5-years-olds and diminishing again to 70% at the age of 6 years. Although adults had a lower acceptance of the disjoint reading (63%) than children, the chi-square tests indicated that there was no significant statistical difference in the comparison between each of the children's groups and the control group regarding their performances in the context of disjoint reference with null subjects in the subjunctive ($p > 0.05$ in all cases). This lower percentage of the adults may be associated with the probable availability of their alternative interpretation of the null pronoun as the 2nd person singular of formal treatment *você* (you).

In the subjunctive with the overt embedded subject (Graphic 12), adults also clearly preferred disjoint reference (with 99% of acceptance) and rarely accepted coreference (4%). In this context, children also accepted disjoint reference more than coreference, but there was no effect of development. Children, in the context of coreference (Graphic 12), had an acceptance rate of 51% at the age of 3 years, which decreased to 31% for the 4-year-olds, diminishing again to 28% at 5 years old and increasing to 42% at the age of 6 years. When comparing each one of the children's groups and the control group, there was always a $p < 0.0001$ that shows there was a statistically significant difference in this context between children and adults.

In regard to the overt subjects in the context of disjoint reference (Graphic 12), the 3-year-olds had an acceptance rate of 87%, which grew to 88% at the age of 4 years, rising to 90% for the 5-years-olds, but diminishing to 79% at the age of 6 years. The statistical comparison between each one of the children's groups and the control group in this context always provided a $p < 0.05$. This means that there was a statistically significant difference, regarding the acceptance of disjoint readings in the subjunctive, between children and adults.

Discussion of the results from the Pretest

With the indicative, both adults and children accepted the preferred interpretation of coreference with the null embedded subject through very high percentages (87-100%). Nevertheless, children also accepted the dispreferred reading of disjoint reference with null pronouns in the indicative (19-33%), with superior percentages than the control group (0%). Regarding the overt embedded subject in the indicative context, the difference between children and adults was more evident. On the one hand, adults preferred disjoint reference (with 89% of acceptance) and only allowed the dispreferred coreferential reading 20% of the time. On the other hand, children (who also preferred disjoint reference for overt forms with 79-88% of acceptance) accepted the pragmatically inappropriate coreference with much higher percentages (49-60%) than adults. Regarding children's responses in the indicative, the acceptance of the dispreferred reading of coreference with overt pronouns was always higher than the acceptance of the dispreferred reading of disjoint reference with null pronouns. This observation seems to suggest that children perform less adult-like with overt subject pronouns. The comparison between the acceptance rates of the dispreferred interpretations with overt and null pronouns in the indicative provided a statistically significant difference in the 5-year-olds ($t(25) = -3.54$, $p = 0.002$) and in the 6-year-olds ($t(10) = -2.47$, $p = 0.03$). Furthermore, in each children's group, the preferred interpretation of coreference with null subjects was always slightly more accepted than the preferred interpretation of disjoint reference with overt subjects. This difference was statistically significant in the two oldest groups of children: the 5-year-olds ($t(25) = 2.19$, $p = 0.04$) and the 6-year-olds ($t(10) = 2.28$, $p = 0.046$).

With the subjunctive (selected by the volitional verb *querer* – to want), there was a preference for disjoint reference (with superior acceptance rates of disjoint readings than of coreferential readings), regardless of the subject being null or overt. However, children accepted coreference much more than adults, especially when the subject was null.

There is evidence to claim that children showed sensitivity to the distinction between the indicative selected by the verb *dizer* and the subjunctive selected by the verb *querer*, particularly with the null pronoun. In the context of interpretation of the null embedded subject, each group of children displayed higher rates of acceptance of disjoint reference in subjunctive clauses (in which the null form is necessarily disjoint) than in indicative clauses (in which coreference is the preferred reading and disjoint reference is the dispreferred one). A paired t-test showed that $p < 0.05$ in each comparison. In addition, the percentages of acceptance of coreference decreased in the subjunctive context in comparison to the ones in the indicative for the null subject pronoun ($p < 0.05$ for each comparison inside each age group, using a paired t-test).

In the context of interpretation of the overt embedded subject, the 4-, 5- and 6-year-old children accepted coreference in the subjunctive (in which *ele* is necessarily disjoint), but at a lower percentage than the one obtained in the indicative (in which *ele* is preferentially disjoint). Within the specific case of the 5-year-old group, the comparison between the indicative and the subjunctive, regarding the overt embedded subject pronoun in the coreference context, provided a statistically significant difference using a paired t-test ($t(25) = 4.56$, $p = 0.0001$).

6.5. Tests of interpretation of null and overt embedded pronominal subjects

Unlike the pretest, which contained transitive or copulative/predicative verbs selecting an object (direct or prepositional) or a predicative expression in the embedded clauses, the tests A1, A2, B and C included intransitive verbs (with no objects) in the embedded clauses.

These four tests differed in the possible antecedents for the (null or overt) embedded subject pronoun. In tests A1 and A2, there was only one antecedent in the sentence (the subject antecedent before the pronoun) and the alternative was an extrasentential antecedent (a non-subject antecedent). In tests B and C, there were two available antecedents in the sentence: subject antecedent and indirect object antecedent before the pronoun in test B; subject antecedent before the pronoun and indirect object antecedent after the pronoun in test C.

Tests A1, B and C contained both indicative and subjunctive clauses. Test A2 included only subjunctive clauses (replicating the subjunctive context of test A1 with a different matrix verb), since the correspondent indicative context was already considered in test A1.

The indicative complement clauses were always selected by the declarative verb *dizer* (to say) in the tests A1, B and C. The subjunctive complement clauses were selected by the volitional verb *querer* (to want) in the test A1 and by the declarative verb of order *pedir* (to request) in tests A2, B and C.

The participants (children and adults) of these four tests were the **same** in each age group. Tests A1, A2, B and C of interpretation of null and overt embedded pronominal subjects were applied to 84 children between 3;1 and 6;4 years old (divided into four age groups), and to 28 adults who constituted the control group.[87]

[87] In this second study, 8 additional children participated in test A1, another 4 children participated in test A2, and 3 more children in tests B and C. All of them successfully answered to the control items from the respective acquisition test. However, those extra participants were not considered in the current analysis because they were not observed in all these four tests of interpretation of embedded pronominal subjects due to several reasons such as changing schools, sickness or going on vacation with their parents earlier than expected. Therefore, the current analysis of the results only considered the same participants that completed all the four tests (A1, A2, B and C). The reader is referred to Costa,

Tests A1, A2, B and C					
Age group	**Age range**	**Mean age**	**Girls**	**Boys**	**Total**
3	3;1 – 3;11	3;7	10	11	21
4	4;0 – 4;11	4;6	10	12	22
5	5;0 – 5;11	5;5	12	16	28
6	6;0 – 6;4	6;1	7	6	13
Adults	20 – 64	31	16	12	28
Total	—	—	55	57	112

Table 45: Description of the participants in Tests A1, A2, B and C

All these children successfully rejected the control items that induced a "no" answer in each test of interpretation of null and overt embedded pronominal subjects (tests A1, A2, B and C), minimizing the *yes bias* effect.

6.5.1. Test A1

Test A1 examined the interpretation of null and overt embedded pronominal subjects in the indicative (matrix verb *dizer* – to say) and in the subjunctive (matrix verb *querer* – to want) with one antecedent in the sentence (subject antecedent before the pronoun). The embedded clause included an intransitive verb (with no objects).

(171) O bombeiro disse que ***pro***/**ele** adormeceu. **(Indicative)**

the fireman said that *pro*/he fell-asleep

(172) O príncipe quer que ***pro***/**ele** salte. **(Subjunctive)**

the prince wants that *pro*/he jumps

Lobo & Silva (2013) and Silva (2012, 2014) to verify that the tendency of the results regarding all the participants tested (including the extra children) was similar to the one described here.

Figure 5: Characters used in Test A1

		Test A1	
		Indicative	**Subjunctive**
Null pronoun	**Coreference**	**Prince:** I sneezed! **Puppet (Pinocchio):** Hmm… The Prince… The Fireman… *O Príncipe disse que **pro** espirrou?* the Prince said that *pro* sneezed **Expected interpretation: yes**	**Prince:** I want to rest! **Puppet (Pinocchio):** Hmm… The Prince… The Fireman… *O Príncipe quer que **pro** descanse?* the Prince wants that *pro* rests **Expected interpretation: no**
	Disjoint reference	**Fireman:** The Prince fell asleep! **Puppet (Pinocchio):** Hmm… The Fireman… The Prince… *O Bombeiro disse que **pro** adormeceu?* the Fireman said that *pro* fell asleep **Expected interpretation: no**	**Prince:** Hey Fireman, jump! **Puppet (Pinocchio):** Hmm… The Prince… The Fireman… *O Príncipe quer que **pro** salte?* the Prince wants that *pro* jumps **Expected interpretation: yes**
Overt pronoun	**Coreference**	**Fireman:** I gained weight! **Puppet (Pinocchio):** Hmm… The Fireman… The Prince… *O Bombeiro disse que **ele** engordou?* the Fireman said that he gained weight **Expected interpretation: no**	**Fireman:** I want to dance! **Puppet (Pinocchio):** Hmm… The Fireman… The Prince… *O Bombeiro quer que **ele** dance?* the Fireman wants that he dances **Expected interpretation: no**
	Disjoint reference	**Prince:** The Fireman cried! **Puppet (Pinocchio):** Hmm… The Prince… The Fireman… *O Príncipe disse que **ele** chorou?* the Prince said that he cried **Expected interpretation: yes**	**Fireman:** Hey Prince, sing! **Puppet (Pinocchio):** Hmm… The Fireman… The Prince… *O Bombeiro quer que **ele** cante?* the Fireman wants that he sings **Expected interpretation: yes**

Table 46: Examples of items organized by condition from Test A1

6.5.1.1. Results

The tables that indicate the statistical test scores and the exact p-values resulting from all the established comparisons are presented in the appendix CD.

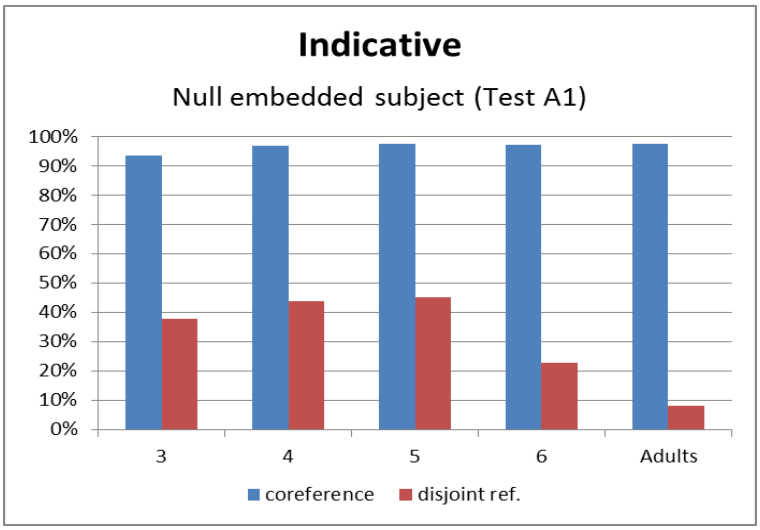
Table 47 shows the **acceptance rates** (percentages of "yes" answers) of interpretation of null and overt embedded pronominal subjects, with one

intrasentential antecedent (subject antecedent before the pronoun), in contexts of coreference (coref.) and of disjoint reference (disj. ref.) in relation to the matrix subject. The complement subordinate clauses had the indicative selected by the verb *dizer* (to say) and the subjunctive selected by the verb *querer* (to want). The embedded predicate included an intransitive verb, with no objects (**Test A1**).

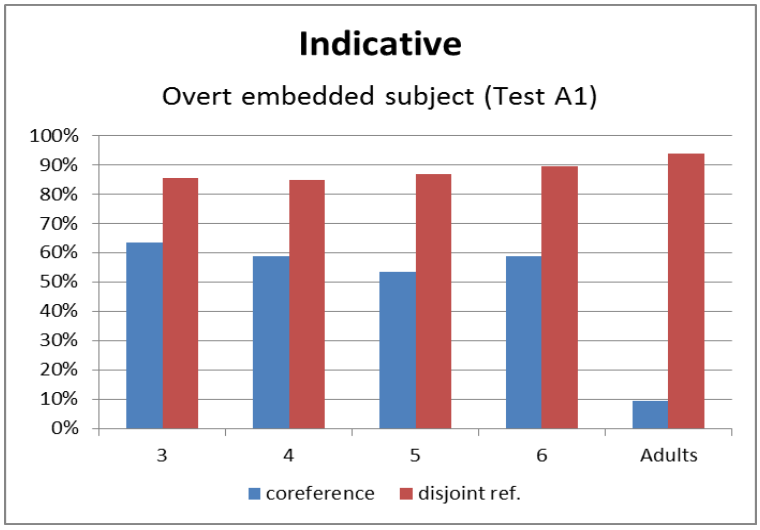
	Test A1							
	Indicative				**Subjunctive**			
	Null subject		**Overt subject**		**Null subject**		**Overt subject**	
Age	**coref.**	**disj. ref.**	**coref.**	**disj. ref.**	**coref.**	**disj. ref.**	**coref.**	**disj. ref.**
3	59/63 **93.65%**	24/63 **38.10%**	40/63 **63.49%**	54/63 **85.71%**	39/63 **61.90%**	48/63 **76.19%**	26/63 **41.27%**	56/63 **88.89%**
4	64/66 **96.97%**	29/66 **43.94%**	39/66 **59.09%**	56/66 **84.85%**	38/66 **57.58%**	45/66 **68.18%**	24/66 **36.36%**	51/66 **77.27%**
5	82/84 **97.62%**	38/84 **45.24%**	45/84 **53.57%**	73/84 **86.90%**	38/84 **45.24%**	64/84 **76.19%**	22/84 **26.19%**	72/84 **85.71%**
6	38/39 **97.44%**	9/39 **23.08%**	23/39 **58.97%**	35/39 **89.74%**	19/39 **48.72%**	25/39 **64.10%**	11/39 **28.21%**	38/39 **97.44%**
Adults	82/84 **97.62%**	7/84 **8.33%**	8/84 **9.52%**	79/84 **94.05%**	0/84 **0.00%**	53/84 **63.10%**	0/84 **0.00%**	83/84 **98.81%**

Table 47: Results (acceptance rates) from Test A1

Graphic 13 and Graphic 14 refer to the results obtained in *indicative* complement clauses (**Test A1**).



Graphic 13: Acceptance rates for the *null* embedded subject in the *indicative* (**Test A1**)



Graphic 14: Acceptance rates for the *overt* embedded subject in the *indicative* (**Test A1**)

In what concerns the null embedded subject in the preferred context of coreference (Graphic 13), children reached the following values in regard to the acceptance rates: 94% at 3 years old; 97% at 4; 98% at 5; 97% at 6.[88] In this context, the adults' acceptance rate was 98% ($p > 0.05$, provided by chi-square tests, in all

[88] The descriptive text of the results from Test A1 indicates the percentages rounded to whole numbers.

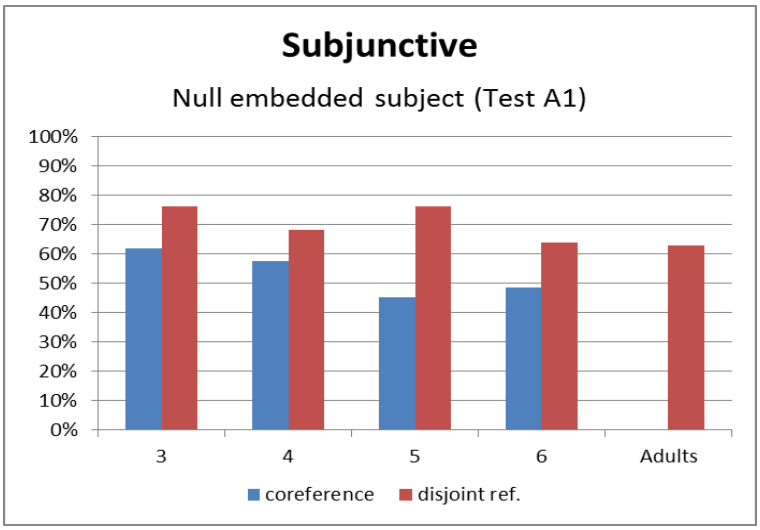
comparisons of each group of children with the control group, showing that these children are already at the same level as the adults).

In regard to the disjoint reference with the null embedded subject (Graphic 13), children at the age of 3 started with an acceptance rate of 38%, which increased to 44% at 4 years old and to 45% at the age of 5. This acceptance of the disjoint reading decreases to 23% at 6 years of age ($\chi2 = 4.64$, $p = 0.03$ between the 5-year-old and 6-year-old groups, expressing a statistically significant difference). However, adults showed in this context an acceptance rate of 8% ($\chi2 = 3.90$, $p = 0.0484 < 0.05$ between the 6-year-old age group and the control group, which means that children were still not close to the adults).

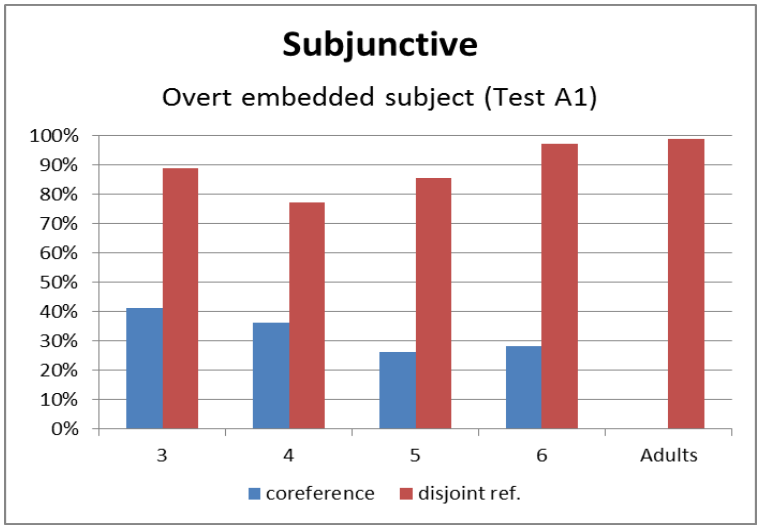
As for the interpretation of coreference concerning the overt embedded subject (Graphic 14), children showed an acceptance of 63% at the age of 3, decreasing to 59% at 4 years old ($\chi2 = 0.11$, $p = 0.74$ between these two age groups). Afterwards, at the age of 5, this rate diminished again to 54% ($\chi2 = 0.26$, $p = 0.61$ between the groups of the 4-year-olds and the 5-year-olds). Nevertheless, it rised to 59% at the age of 6 ($\chi2 = 0.13$, $p = 0.71$ between the 5-year-old and the 6-year-old groups). This percentage was far from the one obtained by the adults, which was 10% ($\chi2 = 31.98$, $p < 0.0001$ between the 6-year-olds and the adults, which indicates a very significant difference in this comparison). Thus, children's performances did not get close to the adults' interpretation.

Regarding the overt embedded subject in the preferred context of disjoint reference (Graphic 14), children obtained the following results as for the acceptance rate: 86% at the age of 3; slightly diminishing to 85% at 4 years old; it increased to 87% at the age of 5; and it kept on rising to 90% at 6 years old. The adults reached 94% in this acceptance rate ($\chi2 = 0.23$, $p = 0.63$ between the 6-year-old group and the adults' group, confirming that the proximity between these children and these adults was evident).

Graphic 15 and Graphic 16 present the results in *subjunctive* complement clauses (**Test A1**).



Graphic 15: Acceptance rates for the *null* embedded subject in the *subjunctive* (**Test A1**)



Graphic 16: Acceptance rates for the *overt* embedded subject in the *subjunctive* (**Test A1**)

In the case of the null subjects (Graphic 15), the 3-year-old children showed an acceptance rate of coreference of 62%, which reduced to 58% at the age of 4 ($\chi 2 = 0.10$, $p = 0.75$). This rate decreased again, at the age of 5, to 45% ($\chi 2 = 1.78$, $p = 0.18$ between the 4-year-old and the 5-year-old groups). At the age of 6, the acceptance of coreference slightly increased to 49% ($\chi 2 = 0.03$, $p = 0.87$ between the age groups of 5 and of 6 years old). In the control group, this acceptance rate was 0% ($\chi 2 = 44.74$, $p <$

0.0001 in relation to the 6-year-old group, which shows a very significant difference). This indicates that children's performance was far from that of adults.

In what concerns the null embedded subject in the disjoint reference context (Graphic 15), children reached an acceptance rate of 76% at the age of 3, which decreased to 68% at 4 years old. At the age of 5, this rate amounted to 76%, then diminishing to 64% at 6 years old. The group of adults had, in this context, an acceptance of 63% ($\chi 2 = 0$, $p = 1$ between the 6-year-old group and the adults, showing that these children were close to the latter).

In the subjunctive, concerning the overt embedded subject in the context of coreference (Graphic 16), children at the age of 3 showed an acceptance rate of 41%, which successively decreased: at 4 years old to 36%; at 5 years old to 26%; at the age of 6 to 28%. In this context, adults presented an acceptance of 0% ($\chi 2 = 22.67$, $p < 0.0001$ in relation to the 6-year-old group, confirming that children were still far from the adults).

Within the scope of the overt embedded subject in what respects the correct context of disjoint reference (Graphic 16), children at the age of 3 reached an acceptance rate of 89%, which decreased to 77% at 4 years old. After that, increases of this rate were observed: to 86% at the age of 5 and to 97% at 6 years old. As for the adults, they obtained in this context an acceptance rate of 99% ($\chi 2 = 0$, $p = 1$ when comparing with the group of 6-year-olds, which shows that these children are close to the adults at this age).

Discussion of the results from Test A1

With the indicative, adults clearly distinguished null pronouns from overt pronouns: their preferred interpretations were consistent with the ones described in the literature. In turn, children do not established the interpretative distinction between null and overt pronouns in the same way. Their acceptance rates concerning either the dispreferred reading of disjoint reference for null pronouns (23-45%) or the dispreferred reading of coreference for overt pronouns (54-63%) were higher than the adults' acceptance rates (8% and 10%, respectively). In spite of that, the difference

between children and adults was more evident with the overt subject pronoun than with the null subject pronoun. Children's acceptance of the dispreferred reading of coreference with overt pronouns was always higher than their acceptance of the dispreferred reading of disjoint reference with null pronouns. This observation appears to suggest that children performed less adult-like with overt subject pronouns in the indicative. In this case, there was a statistically significant difference in the 3-year-olds ($t(20) = -2.77$, $p = 0.01$) and in the 6-year-olds ($t(12) = -2.42$, $p = 0.03$). In the interpretation of null embedded subjects, children's high acceptance rates of the preferred reading of coreference (94-98%) were leveled in relation to the adults' performance (98%). Additionally, in each children's group, the preferred interpretation of coreference with null subjects was always slightly more accepted than the preferred interpretation of disjoint reference with overt subjects (with no statistically significant difference, since $p > 0.05$ in all comparisons).

With the subjunctive, adults did not accept coreference with both null and overt subject pronouns (0%). Their acceptance rate of disjoint reference with the overt embedded pronominal subject was 99%, while the rate of disjoint reference with the null embedded pronominal subject was 63%. This difference may be due to the fact that, in the subjunctive, the alternative interpretation of the null pronoun as the 2nd person singular used for formal treatment (*você* – you) was made available to the control group. Children did not yet associate the subjunctive (selected by the volitional verb *querer* – to want) with disjoint reference: unlike adults, they accepted coreference either with null pronouns or with overt pronouns, which was more evident with the null embedded subject. This fact was not surprising, since overt pronouns are generally associated with disjoint reference (which is the preferred interpretation in the indicative).

In the subjunctive condition, no developmental effects were observed in the children tested, from 3 to 6 years old. This suggests that the subjunctive obviation is an aspect of relatively late development (after the age of 6).

In the context of interpretation of the null embedded subject, children appear to be sensitive to the temporal properties of subjunctive clauses selected by the verb *querer* (in which the null form is necessarily disjoint) and of indicative clauses selected

by the verb *dizer* (in which coreference is the preferred reading and disjoint reference is the dispreferred one). The percentages of acceptance of coreference for the null subject pronoun were lower in the subjunctive (Graphic 15) in comparison to the ones in the indicative (Graphic 13), with $p < 0.05$ for each comparison inside each age group, using a paired t-test. Furthermore, within each age group, children displayed higher rates of acceptance of disjoint reference for the null form in the subjunctive (Graphic 15) than in the indicative (Graphic 13), with a paired t-test showing that $p < 0.05$ in each comparison.

In the context of interpretation of the overt embedded subject, children accepted coreference in the subjunctive (Graphic 16), but at a lower percentage than the one obtained in the indicative (Graphic 14). Within each age group, the comparison between the indicative and the subjunctive, regarding the specific case of the overt pronoun in the coreference context, always provided a $p < 0.05$ using a paired t-test. This seems to indicate that children differentiate the subjunctive context selected by the verb *querer* (in which *ele* is necessarily disjoint) from the indicative context selected by the verb *dizer* (in which *ele* is preferentially disjoint).

Comparison between Pretest and Test A1

The reader is referred to Table 44 (p. 186) for the acceptance rates obtained in the pretest, and to Table 47 (p. 196) for the acceptance rates obtained in test A1.

Both the pretest and the test A1 had only one intrasentential antecedent (subject antecedent before the pronoun) for the null and overt pronominal subjects, with the indicative selected by the verb *dizer* (to say) and with the subjunctive selected by the verb *querer* (to want).

In the pretest the predicate of the embedded clause contained an object (direct or prepositional) or a predicative expression, whereas in the test A1 the embedded predicate did not include any object. Therefore, the sentences of the pretest were longer to process than the ones of the test A1. This difference in the length of the sentences could represent an additional difficulty for children in interpreting the structures of the pretest.

In a general manner, there were similar performances in each age group in the comparison between the pretest and test A1. Hence, the presence of an object (direct or prepositional) or a predicative expression in the embedded predicate had no interpretative effect.

In the indicative, with the null embedded subject pronoun in the coreference context, each age group had a similar performance in the pretest and in the test A1 ($p > 0.05$ in each comparison, using an unpaired t-test). Also in the indicative, but with the null subject pronoun in the disjoint reference context, only the 5-year-olds ($t(51.12) = -2.4075$, $p = 0.0197$) and the adults ($t(27) = -2.5529$, $p = 0.0167$) showed a statistically significant difference between their performances in the pretest and in the test A1. The other age groups presented similar performances in both acquisition tests ($p > 0.05$ in each comparison).

In the indicative, with the overt embedded subject pronoun in coreference, each one of the groups had similar performances in both the pretest and the test A1 ($p > 0.05$ in all the applied unpaired t-tests). Still in the indicative and with the overt embedded subject pronoun in disjoint reference, each one of the groups also had performances with no statistically significant difference in both interpretation tests ($p > 0.05$ in all the corresponding unpaired t-tests).

In the subjunctive, concerning the null embedded subject pronoun in coreference, only the 5-year-olds presented a significant difference between their performances in the pretest (67%) and in test A1 (45%), with $t(51.67) = 2.03$, $p = 0.0477$. Each one of the other age groups had similar results in both tests ($p > 0.05$ in the t-tests of these groups). Also in the subjunctive and with the null subject in disjoint reference, similar interpretations were observed in each age group in the comparison between the pretest and the test A1, not registering statistically significant differences ($p > 0.05$ in each group).

In the subjunctive, with respect to the overt embedded subject pronoun either in coreference or in disjoint reference contexts, there was no significant difference in the performances of any of the age groups in the two interpretation tests ($p > 0.05$ in all cases).

6.5.2. Test A2

Test A2 addressed the interpretation of null and overt embedded pronominal subjects only in the subjunctive (matrix verb *pedir* – to request) with one antecedent in the sentence (subject antecedent before the pronoun). The embedded clause included an intransitive verb (with no objects).

(173) O bombeiro pediu que ***pro***/**ele** cantasse. **(Subjunctive)**

the fireman requested that *pro*/he sang

Figure 6: Characters used in Test A2

		Test A2
		Subjunctive
Null pronoun	**Coreference**	**Pirate:** Can I jump?! **Puppet (Pinocchio):** Hmm... The Pirate... The Fireman... *O Pirata pediu que **pro** saltasse?* the Pirate requested that *pro* jumped **Expected interpretation: no**
	Disjoint reference	**Pirate:** Hey Fireman, sing! **Puppet (Pinocchio):** Hmm... The Pirate... The Fireman... *O Pirata pediu que **pro** cantasse?* the Pirate requested that *pro* sang **Expected interpretation: yes**
Overt pronoun	**Coreference**	**Pirate:** Can I scream?! **Puppet (Pinocchio):** Hmm… The Pirate… The Fireman… *O Pirata pediu que **ele** gritasse?* the Pirate requested that he screamed **Expected interpretation: no**
	Disjoint reference	**Fireman:** Hey Pirate, whistle! **Puppet (Pinocchio):** Hmm... The Fireman... The Pirate... *O Bombeiro pediu que **ele** assobiasse?* the Fireman requested that he whistled **Expected interpretation: yes**

Table 48: Examples of items organized by condition from Test A2

6.5.2.1. Results

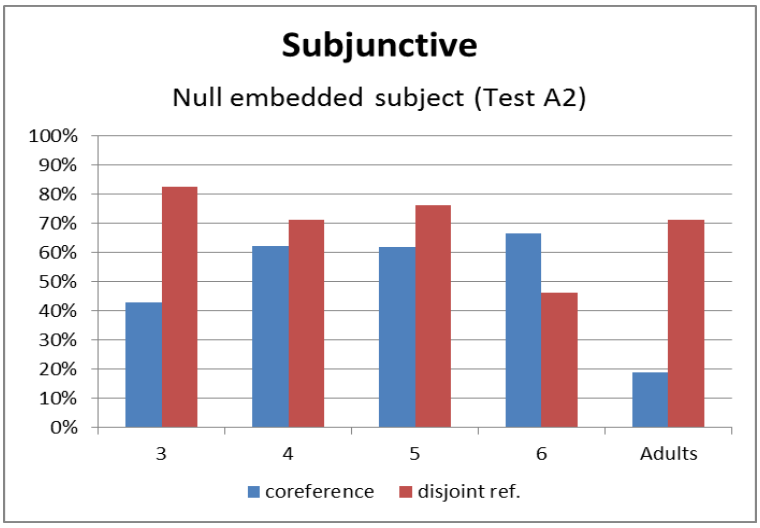
The tables that indicate the statistical test scores and the exact p-values resulting from all the established comparisons are presented in the appendix CD.

Table 48 refers to the **acceptance rates** (percentages of "yes" answers) of interpretation of null and overt embedded pronominal subjects, with one intrasentential antecedent (subject antecedent before the pronoun), in contexts of coreference (coref.) and of disjoint reference (disj. ref.) in relation to the matrix subject. The complement subordinate clauses had the subjunctive selected by the verb *pedir* (to request). The embedded predicate included an intransitive verb, with no objects (**Test A2**).

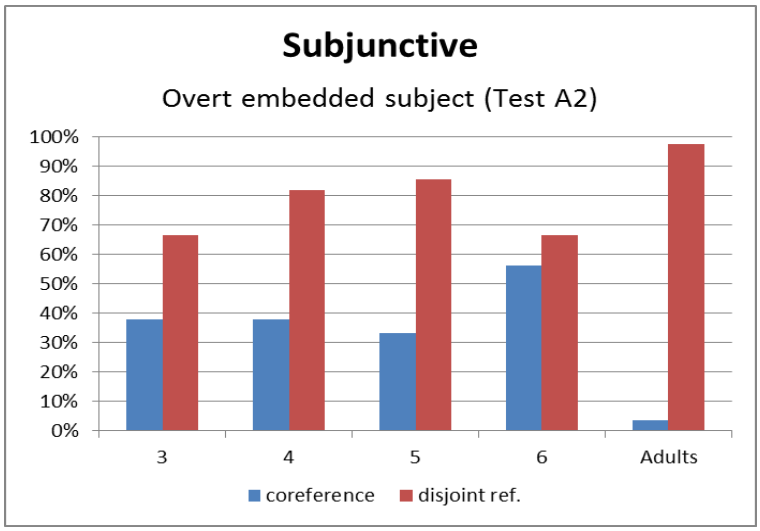
	Test A2			
	Subjunctive			
	Null subject		**Overt subject**	
Age	**coref.**	**disj. ref.**	**coref.**	**disj. ref.**
3	27/63 **42.86%**	52/63 **82.54%**	24/63 **38.10%**	42/63 **66.67%**
4	41/66 **62.12%**	47/66 **71.21%**	25/66 **37.88%**	54/66 **81.82%**
5	52/84 **61.90%**	64/84 **76.19%**	28/84 **33.33%**	72/84 **85.71%**
6	26/39 **66.67%**	18/39 **46.15%**	22/39 **56.41%**	26/39 **66.67%**
Adults	16/84 **19.05%**	60/84 **71.43%**	3/84 **3.57%**	82/84 **97.62%**

Table 49: Results (acceptance rates) from Test A2

Graphic 17 and Graphic 18 display the results in *subjunctive* complement clauses (**Test A2**).



Graphic 17: Acceptance rates for the *null* embedded subject in the *subjunctive* (**Test A2**)



Graphic 18: Acceptance rates for the *overt* embedded subject in the *subjunctive* (**Test A2**)

In regard to the null embedded subject in the subjunctive (Graphic 17), the adults preferred disjoint reference much more (with 71% of acceptance) than coreference, which they also accept (19%).[89] With this type of subject, children also allowed more frequently disjoint reference than coreference, but they accepted more the coreferential reading than the adults ($p < 0.05$ in the comparison between each

[89] In the discussion of the results from Test A2, the percentages are rounded to whole numbers.

age group of children and adults). In the context of coreference (Graphic 17), children started with an acceptance rate of 43% at the age of 3, which amounted to 62% at 4 years old ($\chi 2 = 4.06$, $p = 0.0440$ between these two age groups). This rate remained the same (62%) at the age of 5, increasing at 6 years old to 67%.

In the context of disjoint reference with null subjects (Graphic 17), children reached 83% of acceptance at the age of 3, diminishing to 71% at 4 years old and increasing to 76% at 5 years old, but decreasing again to 46% at the age of 6. The comparison of these 6-year-olds with the adults expressed a significant difference in the acceptance rates of disjoint reference ($\chi 2 = 6.28$, $p = 0.01$).

As for the overt embedded subject in the subjunctive (Graphic 18), adults also clearly favored disjoint reference (with 98% of acceptance) and they rarely accepted coreference (4%). With the overt pronoun, children also preferred disjoint reference more than coreference. In the coreferential context (Graphic 18), children obtained the following results with respect to the acceptance rate: 38% at the age of 3 and 4 years, but diminishing to 33% at the age of 5 and rising to 56% at 6 years old ($\chi 2 = 42.71$, $p < 0.0001$ between the 6-year-old group and the group of adults).

With respect to the interpretation of the overt embedded subject in disjoint reference (Graphic 18), children at the age of 3 presented an acceptance of 67%, which increased to 82% at 4 years old. Afterwards, at the age of 5, this rate rose again to 86%, but falling to 67% at the age of 6. This percentage is still significantly far from the 98% of the adults ($\chi 2 = 21.03$, $p < 0.0001$ between the 6-year-olds and the adults). In fact, comparing each of the other children's groups (the 3-, the 4 and the 5-year-olds) with the control group in this context, the chi-square tests also provided a $p < 0.05$.

Discussion of the results from Test A2 (including comparison with Test A1)

Test A2 replicated the subjunctive context of test A1 with a different matrix verb. It only contained subjunctive clauses because the correspondent indicative context was already included in test A1.

The reader is referred to Table 47 (p. 196) for the acceptance rates obtained in test A1, and to Table 49 (p. 205) for the acceptance rates obtained in test A2.

The results seem to suggest that there is some lexical-semantic interference that derives from the type of matrix verb used in test A2. Some differences were registered in the acceptance rates of coreference and of disjoint reference, either with null or with overt subject pronouns, when the subjunctive is selected by the verb *querer* (test A1) and when the subjunctive is selected by the verb *pedir* (test A2). These differences were observed especially in the group of the 6-year-old children, whose acceptance of coreference increased with the null subject while their acceptance of disjoint reference decreased with the overt subject in test A2. In spite of that, the general interpretative tendency with the matrix verb *pedir* (test A2) was similar to the one found with the matrix verb *querer* (test A1).

In the statistical comparison between test A1 and test A2, only the adults showed a significant difference in their performance with the null subject in coreference ($t(27) = -3.03$, $p = 0.01$). In addition, only the 3-year-olds ($t(20) = 2.26$, $p = 0.04$) and the 6-year-olds ($t(12) = 2.80$, $p = 0.02$) differed significantly in their interpretations with the overt subject in disjoint reference. No statistically significant differences were observed in all the other cases when comparing both subjunctive conditions ($p > 0.05$).

The adults passed from 0% of acceptance of coreference in the subjunctive with the matrix verb *querer* to 19% in the subjunctive with the matrix verb *pedir*, concerning the interpretation of the null form (which appears to be more ambiguous for the control group in this context). This ambiguity was reflected in the performance of the oldest group of children tested (the 6-year-olds), who accepted coreference more (67%) than disjoint reference (46%) regarding the null subject in subjunctive clauses selected by the declarative verb of order *pedir* (to request). However, there was no statistical difference in this comparison within the age of 6 ($t(12) = 1.12$, $p = 0.28$).

Comparing the results obtained by children in the indicative selected by the verb *dizer* (test A1) with the results in the subjunctive selected by the verb *pedir* (test A2), some sensitivity to the syntactic context with one intrasentential antecedent can be observed. Accordingly, children seem to be sensitive to the distinction between the indicative and the subjunctive. Within each age group, the acceptance rates of

coreference regarding the null embedded subject pronoun was lower in the subjunctive (in which the null form is generally disjoint) than in the indicative (in which the null form is preferentially coreferential), with a paired t-test providing a $p < 0.05$ in each comparison. The acceptance of disjoint reference for the null pronouns was higher in the subjunctive than in the indicative, and this comparison showed a $p < 0.05$ in each age group with the exception of the 6-year-olds ($t(12) = -1.90$, $p = 0.08$). Concerning the interpretation of the overt embedded subject, coreference was accepted at lower percentages in the subjunctive (in which the overt form is necessarily disjoint) than in the indicative (in which the overt form is preferentially disjoint). In this comparison, a paired t-test showed $p < 0.05$ in each age group, except for the 6-year-olds ($t(12) = 0.20$, $p = 0.84$).

6.5.3. Test B

Test B investigated the interpretation of null and overt embedded pronominal subjects in the indicative (matrix verb *dizer* – to say) and in the subjunctive (matrix verb *pedir* – to request) with two available antecedents in the sentence (subject antecedent and object antecedent before the pronoun). The embedded clause included an intransitive verb (with no objects).

(174) O bombeiro disse ao avô que ***pro***/**ele** emagreceu. **(Indicative)**

the fireman said to-the grandpa that *pro*/he lost-weight

(175) O bombeiro pediu ao avô que ***pro***/**ele** saltasse. **(Subjunctive)**

the fireman requested to-the grandpa that *pro*/he jumped

Figure 7: Characters used in Test B

		Test B	
		Indicative	**Subjunctive**
Null pronoun	**Coreference**	**Grandpa:** I slipped! **Puppet (Pinocchio):** Hmm... The Grandpa... The Fireman... *O Avô disse ao Bombeiro que **pro** escorregou?* the Grandpa said to-the Fireman that *pro* slipped **Expected interpretation: yes**	**Fireman:** Can I whistle?! **Puppet (Pinocchio):** Hmm... The Fireman... The Grandpa... *O Bombeiro pediu ao Avô que **pro** assobiasse?* the Fireman requested to-the Grandpa that *pro* whistled **Expected interpretation: no**
	Disjoint reference	**Fireman:** You sneezed, Grandpa! **Puppet (Pinocchio):** Hmm... The Fireman... The Grandpa... *O Bombeiro disse ao Avô que **pro** espirrou?* the Fireman said to-the Grandpa that *pro* sneezed **Expected interpretation: no**	**Fireman:** Hey Grandpa, jump! **Puppet (Pinocchio):** Hmm... The Fireman... The Grandpa... *O Bombeiro pediu ao Avô que **pro** saltasse?* the Fireman requested to-the Grandpa that *pro* jumped **Expected interpretation: yes**
Overt pronoun	**Coreference**	**Fireman:** I fainted! **Puppet (Pinocchio):** Hmm... The Fireman... The Grandpa... *O Bombeiro disse ao Avô que **ele** desmaiou?* the Fireman said to-the Grandpa that he fainted **Expected interpretation: no**	**Fireman:** Can I jump?! **Puppet (Pinocchio):** Hmm... The Fireman... The Grandpa... *O Bombeiro pediu ao Avô que **ele** saltasse?* the Fireman requested to-the Grandpa that he jumped **Expected interpretation: no**
	Disjoint reference	**Grandpa:** You lost weight, Fireman! **Puppet (Pinocchio):** Hmm... The Grandpa... The Fireman... *O Avô disse ao Bombeiro que **ele** emagreceu?* the Grandpa said to-the Fireman that he lost weight **Expected interpretation: yes**	**Grandpa:** Hey Fireman, dance! **Puppet (Pinocchio):** Hmm... The Grandpa... The Fireman... *O Avô pediu ao Bombeiro que **ele** dançasse?* the Grandpa requested to-the Fireman that he danced **Expected interpretation: yes**

Table 50: Examples of items organized by condition from Test B

6.5.3.1. Results

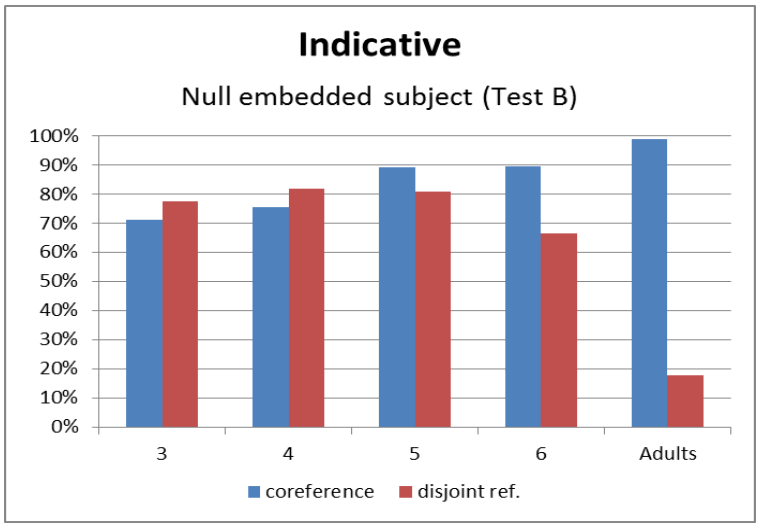
The statistical test scores and the exact p-values resulting from all the established comparisons are organized in tables included in the appendix CD.

Table 50 indicates the **acceptance rates** (percentages of "yes" answers) of interpretation of null and overt embedded pronominal subjects, with two intrasentential antecedents (subject antecedent and object antecedent before the pronoun), in contexts of coreference (coref.) and of disjoint reference (disj. ref.) in relation to the matrix subject. The complement subordinate clauses had the indicative selected by the verb *dizer* (to say) and the subjunctive selected by the verb *pedir* (to request). The embedded predicate included an intransitive verb, with no objects (**Test B**).

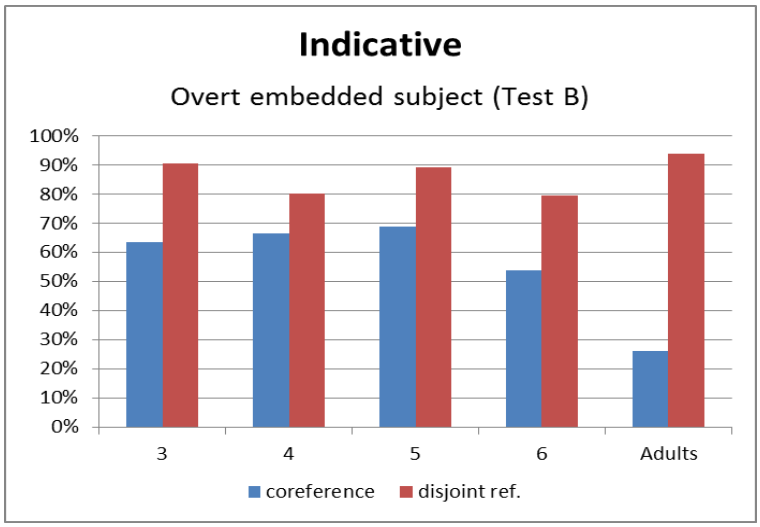
	Test B							
	Indicative				**Subjunctive**			
	Null subject		**Overt subject**		**Null subject**		**Overt subject**	
Age	**coref.**	**disj. ref.**	**coref.**	**disj. ref.**	**coref.**	**disj. ref.**	**coref.**	**disj. ref.**
3	45/63 **71.43%**	49/63 **77.78%**	40/63 **63.49%**	57/63 **90.48%**	18/63 **28.57%**	58/63 **92.06%**	32/63 **50.79%**	60/63 **95.24%**
4	50/66 **75.76%**	54/66 **81.82%**	44/66 **66.67%**	53/66 **80.30%**	22/66 **33.33%**	60/66 **90.91%**	28/66 **42.42%**	60/66 **90.91%**
5	75/84 **89.29%**	68/84 **80.95%**	58/84 **69.05%**	75/84 **89.29%**	21/84 **25.00%**	81/84 **96.43%**	29/84 **34.52%**	83/84 **98.81%**
6	35/39 **89.74%**	26/39 **66.67%**	21/39 **53.85%**	31/39 **79.49%**	8/39 **20.51%**	39/39 **100.00%**	15/39 **38.46%**	39/39 **100.00%**
Adults	83/84 **98.81%**	15/84 **17.86%**	22/84 **26.19%**	79/84 **94.05%**	7/84 **8.33%**	83/84 **98.81%**	6/84 **7.14%**	81/84 **96.43%**

Table 51: Results (acceptance rates) from Test B

Graphic 19 and Graphic 20 exhibit the results achieved in *indicative* complement clauses (**Test B**).



Graphic 19: Acceptance rates for the *null* embedded subject in the *indicative* (**Test B**)



Graphic 20: Acceptance rates for the *overt* embedded subject in the *indicative* (**Test B**)

In the indicative with the null embedded subject in the preferred context of coreference (Graphic 19), children's acceptance rate progressed gradually.[90] At the age of 3 it is 71%, and at 4 it is 76% ($\chi 2 = 0.13$, $p = 0.72$). It rose again at 5 years of age to 89% ($\chi 2 = 3.94$, $p = 0.0470$ between the 4-year-old group and this one). At the age of 6 a new increase occurred to 90% ($\chi 2 = 0$, $p = 1$ between the 5-year-old and the 6-year-

[90] The descriptive text of the results from Test B presents the percentages rounded to whole numbers.

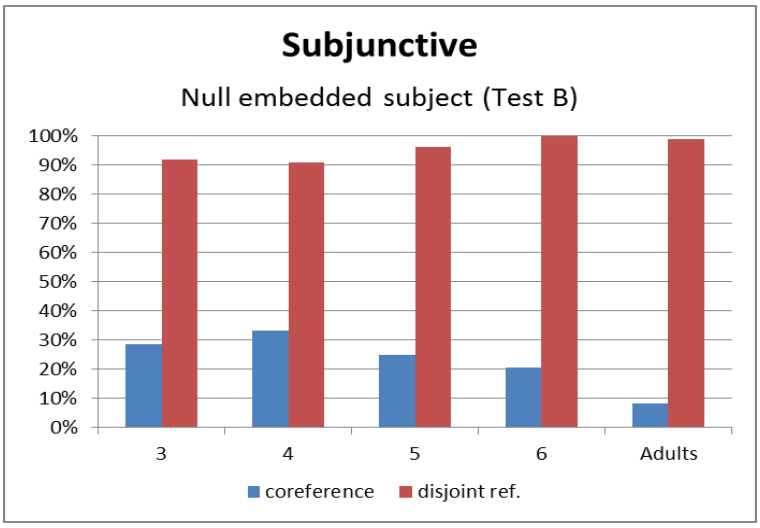
old groups). In this context, the adults registered a rate of 99% ($\chi 2 = 3.53$, $p = 0.06$ between the 6-year-old group and the adults, indicating that these children were close to the adults).

As for the null embedded subject in the disjoint reference context (Graphic 19), children began with an acceptance rate of 78% at the age of 3, which rose to 82% at 4. A slight diminution to 81% occurred at 5 years old, decreasing again to 67% at the age of 6. In this context, adults showed an acceptance of 18% ($\chi 2 = 26.40$, $p < 0.0001$ between the 6-year-old group and the control group, showing that children were not at the level of the adults yet).

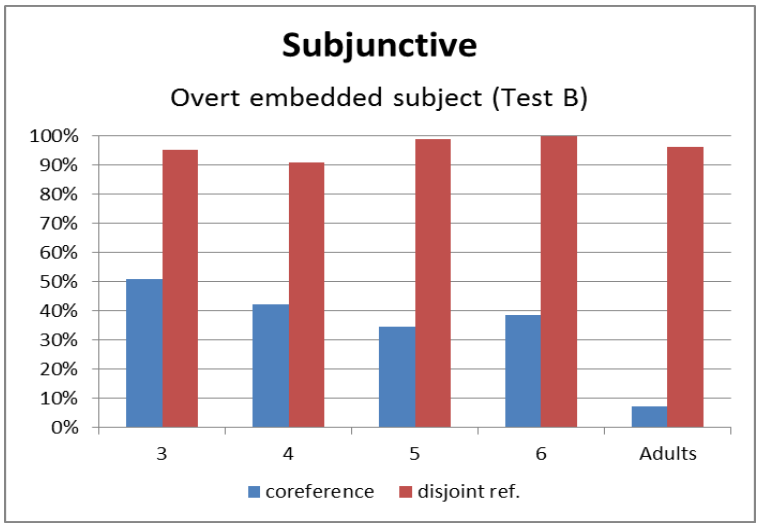
In the indicative and regarding the overt embedded subject in the context of coreference (Graphic 20), the 3-year-old children registered an acceptance rate of 63%, then rising to 67% at the age of 4. This rate increased to 69% at the age of 5 and then decreased to 54% at 6. In turn, the adults achieved an acceptance of 26% in this context ($\chi 2 = 7.78$, $p = 0.005$ between the 6-year-old group and the control group, meaning that children were still far from adults).

With respect to the overt embedded subject in the preferred context of disjoint reference (Graphic 20), there was the following variation in the children's acceptance rate: at 3 years of age 90%; at 4 a decrease to 80%; at 5 an increase to 89%; at 6 a new diminution to 79%. As for the adults, this acceptance rate was 94% ($\chi 2 = 4.53$, $p = 0.03$ between the 6-year-old group and this group, meaning that children remained distant from adults).

Graphic 21 and Graphic 22 show the obtained results in *subjunctive* complement clauses (**Test B**).



Graphic 21: Acceptance rates for the *null* embedded subject in the *subjunctive* (**Test B**)



Graphic 22: Acceptance rates for the *overt* embedded subject in the *subjunctive* (**Test B**)

In the subjunctive, concerning the null embedded subject in the context of coreference (Graphic 21), children at the age of 3 achieved an acceptance rate of 29%, which rose to 33% at 4. At 5 years old this rate reduced to 25% and at 6 decreased again to 21%. As for the adults, their acceptance rate in this coreference context is 8% ($\chi 2 = 2.64$, $p = 0.10$ between the 6-year-old group and adults). Therefore children were, in general, progressing and approaching the adults' performance.

In the subjunctive and with respect to the null embedded subject in the context of disjoint reference (Graphic 21) children began with an acceptance rate of 92% at the age of 3, which slightly decreased to 91% at 4. Then, it increased successively to 96% at 5 and to 100% at 6. Adults had in this context an acceptance of 99% ($\chi 2 = 0$, $p = 1$ between the 6-year-old group and the control group, indicating that children at the age of 6 are already at the level of adults).

In the subjunctive with the overt embedded subject in the coreference context (Graphic 22), an acceptance rate of 51% was registered for the 3-year-old children. This rate decreased successively to 42% at the age of 4 and to 35% at 5. However, it rose to 38% at the age of 6. In this context adults obtain 7% in their acceptance rate ($\chi 2 = 16.31$, $p = 0.0001$ between the 6-year-old group and the control group, which means that children were still far from the adults in this context).

Also in the subjunctive, but concerning the overt embedded subject in the context of disjoint reference (Graphic 22), the 3-year-old children showed an acceptance rate of 95%, which reduced to 91% at 4. At 5 this rate grew to 99%, rising again to 100% at the age of 6. In this context, the adults had an acceptance of 96% ($\chi 2 = 0.32$, $p = 0.57$ between the age group of 6 and adults, showing that there was no significant difference).

Discussion of the results from Test B

In the indicative, children were clearly different from adults, even in the 6-year-old group, accepting the disjoint reading more easily with the null pronoun (attributing to it the reference of the linearly closest antecedent, the matrix indirect object). Concerning the overt pronoun, once again children frequently accepted the dispreferred interpretation of coreference.

The subjunctive (selected by the declarative verb of order *pedir* – to request) continued to be problematic for children, but in test B they got closer to the adults' performance in the interpretation of the null embedded subject. Thus, children accepted disjoint reference with very high percentages in test B. Additionally, they accepted coreference with lower rates in test B (with two antecedents before the

pronoun, the matrix subject and the matrix object) when comparing their results in tests A1 and A2 (with only one antecedent before the pronoun, the matrix subject). This seems to support the idea that adding the matrix object antecedent in the main clause made the legitimate antecedent more accessible for null pronominal subjects in subjunctive clauses.

In the subjunctive context, there were no developmental effects in the children tested, from 3 to 6 years old. Hence, we can conclude that the mastery of the subjunctive obviation is developed relatively late (after the age of 6).

In test B (with subject and object antecedents before the pronoun), children appear to show some sensitivity regarding the distinction between the indicative context selected by the verb *dizer* and the subjunctive context selected by the verb *pedir*. In the interpretation of the null embedded subject pronoun, each age group of children exhibited lower rates of acceptance of coreference in the subjunctive (in which the null form is generally disjoint) in comparison to the ones in the indicative (in which coreference is the preferred reading and disjoint reference is the dispreferred one), with $p < 0.05$ for each comparison inside each age group using a paired t-test. The percentages of acceptance of disjoint reference increased in the subjunctive in relation to the indicative in all the children's groups for the null pronoun. However, a paired t-test showed that this comparison is only statistically significant in the case of the 5-year-olds ($t(27) = 2.46$, $p = 0.02$) and the 6-year-olds ($t(12) = 3.61$, $p = 0.004$).

In the interpretation of the overt embedded subject pronoun, children accepted coreference in the subjunctive (in which *ele* is necessarily disjoint), but at a lower percentage than the one obtained in the indicative (in which *ele* is preferentially disjoint). In the comparison between the indicative and the subjunctive, regarding the specific case of the overt pronoun in coreference context, a paired t-test provided a significant difference in the 4-year-olds ($t(21) = 2.84$, $p = 0.01$) and in the 5-year-olds ($t(27) = 4.34$, $p = 0.0002$). Furthermore, the acceptance rates of disjoint reference were superior in the subjunctive in comparison with the ones in the indicative for the overt pronoun, with a statistically significant difference in the 5-year-old group ($t(27) = 2.12$, $p = 0.0432$).

Comparison between Test A1 and Test B

The reader is referred to Table 47 (p. 196) for the acceptance rates obtained in the test A1, and to Table 51 (p. 211) for the acceptance rates obtained in test B.

Both tests A1 and B had the indicative clauses selected by the verb *dizer* (to say). The subjunctive clauses were selected by the verb *querer* (to want) in test A1 and by the verb *pedir* (to request) in test B.

The introduction of an object antecedent before the pronoun (following the matrix verb – test B) was relevant especially with respect to the interpretation of the null embedded pronominal subject by children. Within each age group, the acceptance rates of the dispreferred disjoint reference for the null pronoun increased in the indicative of test B (Graphic 19), making children's results deviate more from those of adults when compared with the indicative of test A1 (Graphic 13). In turn, within each group of children, the acceptance rates of coreference with the null pronoun decreased in the subjunctive of test B (Graphic 21), improving the results when compared with the subjunctive of test A1 (Graphic 15). Therefore, it seems possible to claim that children often identify the pronominal reference with the closest antecedent that precedes the null pronoun (not necessarily in a c-command configuration). In the indicative, children deviated more from the adults' responses when the matrix object antecedent is added in the referential dependency between the preferred matrix subject antecedent and the null embedded subject pronoun. In the subjunctive, the addition of the matrix object antecedent before the pronoun made the legitimate antecedent more accessible for null pronominal subjects.

As for the overt embedded pronominal subject, the introduction of the indirect object antecedent before the pronoun did not have, in general, an effect in the children's interpretation in both indicative and subjunctive contexts.

Some adults increased their acceptance of disjoint readings with null forms in indicative clauses when the sentence included an object antecedent before the pronoun (18% in test B) in comparison with sentences with only the subject antecedent before the pronoun (8% in test A1). By hypothesis, these adults were also sensitive to the linear position of the matrix object antecedent that precedes the null

embedded subject pronoun in this case. However, the comparison of the adults' responses between test A1 and test B, concerning the acceptance rates of coreference with the null subject in indicative clauses, did not register a statistically significant difference ($t(27) = -1.69$, $p = 0.10$). Furthermore, the large majority of the adults still preferred to associate the null subject pronoun in indicative clauses with the subject antecedent, having higher acceptance rates of coreference than of disjoint reference in test B. This is in conformity with the Position of Antecedent Hypothesis suggested by Carminati (2002), according to which the null pronoun should be preferentially assigned to the constituent that occupies the highest Spec IP position, which normally corresponds to the subject antecedent of the main clause.

The probable sensitivity to the presence of the indirect object antecedent that linearly precedes the null pronoun may also explain the increase in the adults' acceptance of disjoint readings with null embedded subjects in the subjunctive of test B (99%) in comparison with the subjunctive of test A1 (63%). This comparison provided a significant difference in the adults' results ($t(27) = -4.26$, $p = 0.0002$). Here, in subjunctive clauses, the legitimate antecedent was made more accessible by occurring before the null pronoun.

In the indicative, with null embedded subject pronoun in the coreference context, only the groups of the 3-year-olds ($t(20) = 2.65$, $p = 0.02$) and of the 4-year-olds ($t(21) = 3.78$, $p = 0.0011$) had significant differences in relation to their performances between both interpretation tests. Each one of the other age groups had similar performances in both tests ($p > 0.05$, using paired t-tests). Also in the indicative but with the null pronoun in the disjoint reference context, except for the adults ($t(27) = -1.69$, $p = 0.10$), each group of children had interpretations with significant differences in both tests ($p < 0.05$).

Still in the indicative, regarding the overt subject pronoun in coreference, each group of children displayed similar performances in both test A1 and test B ($p > 0.05$ in all cases). Only the adults had a significant difference in their results in the comparison between test A1 (10%) and test B (26%), with $t(27) = -3.00$, $p = 0.01$. As for the overt pronoun in disjoint reference, there were no significant differences in any of the age groups in relation to their performances in both tests ($p > 0.05$).

In the subjunctive, with the null subject in coreference, only the 3-year-olds ($t(20) = 4.37$, $p = 0.0003$) and the 5-year-olds ($t(27) = 2.26$, $p = 0.03$) had significant differences in their results between test A1 and test B. When the null subject occurred in the context of disjoint reference, each one of the groups registered significant differences in their interpretations concerning both acquisition tests ($p < 0.05$ in each comparison).

Also in the subjunctive, with the overt subject pronoun in coreference, only the adults differed significantly in their acceptance rates in the comparison between test A1 (0%) and test B (7%), with $t(27) = -2.27$, $p = 0.03$. When the overt subject was in the disjoint reference context, only the 5-year-olds presented a significant difference in their behavior in test A1 (80%) and in test B (99%), with $t(27) = -2.84$, $p = 0.01$.

As described above, some adults increased their acceptance of coreference with the overt subject in the indicative, from test A1 (10%) to test B (26%). This result may be due to the fact that the overt pronoun can present some flexibility in its antecedent preferences (Carminati, 2002)[91] and, for this reason, some of the adults chose the subject antecedent instead of the (more pragmatically appropriate) object antecedent in test B. In spite of that, the large majority of the adults accepted much more the preferred reading of disjoint reference (94%) than the dispreferred one of coreference (26%) in test B, which is in accordance with the Position of Antecedent Hypothesis.

Furthermore, as previously indicated, a few adults increased their acceptance of coreference with the overt subject in the subjunctive of test B (in relation to the subjunctive of test A1). In this case, a different matrix verb was used to select the

[91] The division of labor between the null and the overt pronoun described in the Position of Antecedent Hypothesis by Carminati (2002) was based on the processing results of Italian adults. However, the author admits there may be some variability across *pro*-drop languages regarding this effect. According to Carminati (2002: 326-327), one factor that may cause eventual differences is the different historical origin of overt pronouns. For instance, the Italian pronouns *lui*/*lei* are derived from the oblique forms of the Latin demonstrative *ille*, while the corresponding pronouns Spanish *él*/*ella* (just like the pronouns *ele*/*ela* in EP) are derived from the nominative forms. The researcher considers that oblique forms are more marked than non-oblique forms. Based on a scale of accessibility marking for referring expressions (Ariel, 1990, 1994), Carminati (2002) hypothesizes that *pro* and *lui*/*lei* would be more distant from each other in Italian than *pro* and *él*/*ella* in Spanish (or than *pro* and *ele*/*ela* in EP). The author (2002) predicts there would be more possibility of overlapping the two pronominal forms in Spanish (or in EP) than in Italian, that is, there would be slightly variations in these languages regarding a wider tolerance for the overt pronoun in contexts of coreference where a null pronoun is more felicitous.

subjunctive clauses in each acquisition test: the volitional verb *querer* in test A1 and the declarative verb of order *pedir* in test B. Accordingly, the increase of coreference with the overt pronoun in the performance of a few adults may be derived from a lexical-semantic difference associated with the properties of these two verbs. Nevertheless, 7% cannot be considered a high acceptance level.

Comparison between Test A2 and Test B

The reader is referred to Table 49 (p. 205) for the acceptance rates obtained in the test A2, and to Table 51 (p. 211) for the acceptance rates obtained in test B.

In both tests A2 and B, the subjunctive was selected by the matrix verb *pedir* (to request). In the comparison between these two interpretation tests, the introduction of an indirect object antecedent before the pronoun (test B) had the effect of improving children's results with the null embedded subject, since it made the legitimate antecedent more accessible (by preceding the null pronoun) in the subjunctive. Thus, in the subjunctive and with the null pronominal subject, the acceptance rates of coreference decreased in test B when comparing with test A2. In parallel, the acceptance rates of disjoint reference (with the null subject in the subjunctive) increased in test B in relation to the ones in test A2.

In addition, regarding the null embedded subject in subjunctive clauses, the adults also increased their acceptance rates of disjoint reference in test B (99%) when comparing to the ones in test A2 (71%). This difference was statistically significant ($t(27) = -3.40$, $p = 0.002$). This is explained if the adults were sensitive (like children) to the linear proximity of the matrix object antecedent that precedes the null pronoun in test B.

In the subjunctive, with the null subject in coreference, only the 3-year-olds and the adults had similar performances in their results in test A2 and in test B ($p > 0.05$ in the comparative paired t-test). In the other age groups, children had performances with significant differences in this context in both acquisition tests ($p < 0.05$ in the corresponding t-tests). Also in the subjunctive, with the null subject in disjoint reference, only the 3-year-old group had a similar performance in these acquisition

tests ($t(20) = -1.67$, $p = 0.11$ in the comparative t-test). The other groups differed significantly in their performances ($p < 0.05$ in the respective t-tests).

In the subjunctive and with the overt subject in coreference, each age group had similar performances in both the acquisition tests ($p < 0.05$ in each one of the 5 comparative t-tests). In the subjunctive and with the overt subject in disjoint reference, only the 4-year-olds ($t(21) = -1.24$, $p = 0.23$) and the adults ($t(27) = 0.37$, $p = 0.71$) had similar interpretations in test A2 and test B. The other groups registered results with significant differences in both acquisition tests ($p < 0.05$ in each respective t-test).

6.5.4. Test C

Test C evaluated the interpretation of null and overt embedded pronominal subjects in the indicative (matrix verb *dizer* – to say) and in the subjunctive (matrix verb *pedir* – to request) with two available antecedents in the sentence (subject antecedent before the pronoun and object antecedent after the pronoun). The embedded clause included an intransitive verb (with no objects).

The main goal of test C was to verify if the simple presence of two potential antecedents in the sentence (with the object antecedent occurring after the pronoun) causes difficulties for children's interpretation of null pronominal subjects, in indicative complement clauses, by increasing the flexibility of readings. This contrasts with the alternative possibility that the difficulties with null pronominal subjects in the indicative are due to the linear intervention of a constituent (the object antecedent before the pronoun) in the referential dependency between the null subject pronoun and its preferred matrix subject antecedent (test B).

Therefore, the difference between tests B and C will allow us to specify if the linear position of the indirect object antecedent in the sentence, before the pronoun (following the matrix verb – test B) or after the pronoun (in sentence final position – test C), has an influent role in the interpretation of embedded pronominal subjects, especially of null subject pronouns in the indicative context.

(176) O príncipe disse que ***pro***/**ele** desmaiou ao avô. **(Indicative)**

the prince said that *pro*/he fainted to-the grandpa

(177) O príncipe pediu que ***pro***/**ele** dançasse ao avô. **(Subjunctive)**

the prince requested that *pro*/he danced to-the grandpa

Figure 8: Characters used in Test C

		Test C	
		Indicative	**Subjunctive**
Null pronoun	**Coreference**	**Prince:** I tripped! **Puppet (Pinocchio):** Hmm... The Prince... The Grandpa... *O Príncipe disse que **pro** tropeçou ao Avô?* the Prince said that *pro* tripped to-the Grandpa **Expected interpretation: yes**	**Grandpa:** Can I jump?! **Puppet (Pinocchio):** Hmm... The Grandpa... The Prince... *O Avô pediu que **pro** saltasse ao Príncipe?* the Grandpa requested that *pro* jumped to-the Prince **Expected interpretation: no**
	Disjoint reference	**Prince:** You fell asleep, Grandpa! **Puppet (Pinocchio):** Hmm... The Prince... The Grandpa... *O Príncipe disse que **pro** adormeceu ao Avô?* the Prince said that *pro* fell asleep to-the Grandpa **Expected interpretation: no**	**Prince:** Hey Grandpa, dance! **Puppet (Pinocchio):** Hmm... The Prince... The Grandpa... *O Príncipe pediu que **pro** dançasse ao Avô?* the Prince requested that *pro* danced to-the Grandpa **Expected interpretation: yes**
Overt pronoun	**Coreference**	**Prince:** I lost weight! **Puppet (Pinocchio):** Hmm... The Prince... The Grandpa... *O Príncipe disse que **ele** emagreceu ao Avô?* the Prince said that he lost weight to-the Grandpa **Expected interpretation: no**	**Prince:** Can I dance?! **Puppet (Pinocchio):** Hmm... The Prince... The Grandpa... *O Príncipe pediu que **ele** dançasse ao Avô?* the Prince requested that he danced to-the Grandpa **Expected interpretation: no**
	Disjoint reference	**Prince**: You fainted, Grandpa! **Puppet (Pinocchio):** Hmm... The Prince... The Grandpa... *O Príncipe disse que **ele** desmaiou ao Avô?* the Prince said that he fainted to-the Grandpa **Expected interpretation: yes**	**Grandpa:** Hey Prince, jump! **Puppet (Pinocchio):** Hmm... The Grandpa... The Prince... *O Avô pediu que **ele** saltasse ao Príncipe?* the Grandpa requested that he jumped to-the Prince **Expected interpretation: yes**

Table 52: Examples of items organized by condition from Test C

6.5.4.1. Results

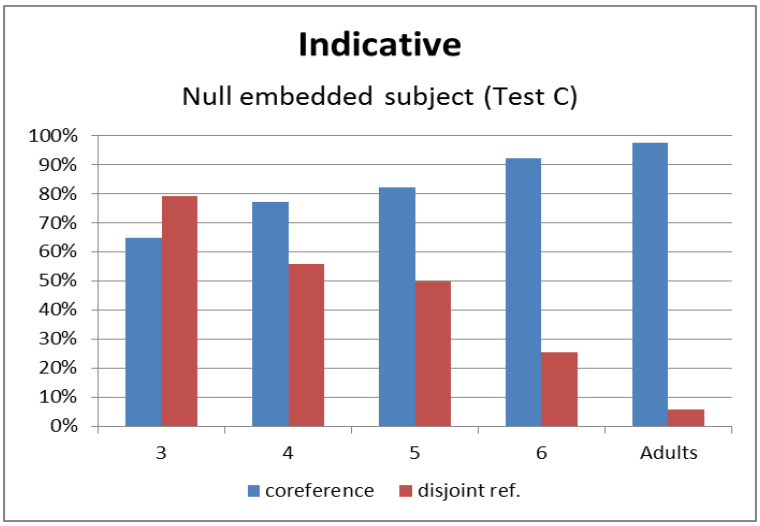
The appendix CD contains the statistical test scores and the exact p-values resulting from all the established comparisons.

Table 52 presents the **acceptance rates** (percentages of "yes" answers) of interpretation of null and overt embedded pronominal subjects, with two intrasentential antecedents (subject antecedent before the pronoun and object antecedent after the pronoun), in contexts of coreference (coref.) and of disjoint reference (disj. ref.) in relation to the matrix subject. The complement subordinate clauses had the indicative selected by the verb *dizer* (to say) and the subjunctive selected by the verb *pedir* (to request). The embedded predicate included an intransitive verb, with no objects (**Test C**).

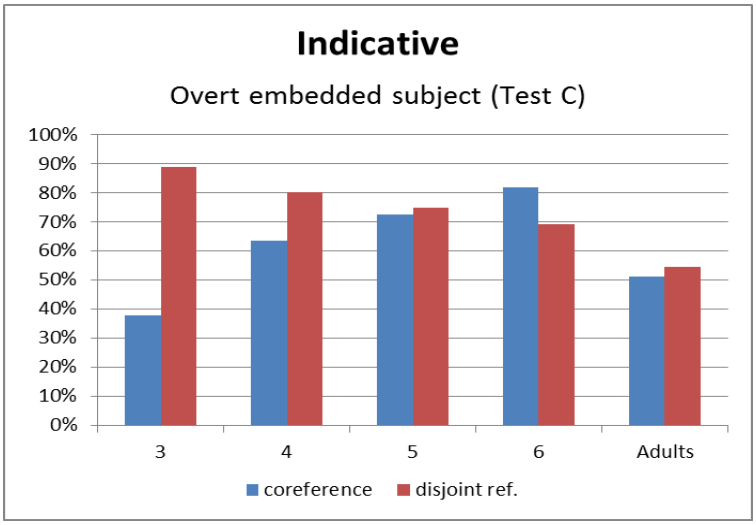
	Test C							
	Indicative				**Subjunctive**			
	Null subject		**Overt subject**		**Null subject**		**Overt subject**	
Age	**coref.**	**disj. ref.**	**coref.**	**disj. ref.**	**coref.**	**disj. ref.**	**coref.**	**disj. ref.**
3	41/63 **65.08%**	50/63 **79.37%**	24/63 **38.10%**	56/63 **88.89%**	22/63 **34.92%**	54/63 **85.71%**	16/63 **25.40%**	51/63 **80.95%**
4	51/66 **77.27%**	37/66 **56.06%**	42/66 **63.64%**	53/66 **80.30%**	31/66 **46.97%**	51/66 **77.27%**	31/66 **46.97%**	54/66 **81.82%**
5	69/84 **82.14%**	42/84 **50.00%**	61/84 **72.62%**	63/84 **75.00%**	39/84 **46.43%**	72/84 **85.71%**	29/84 **34.52%**	77/84 **91.67%**
6	36/39 **92.31%**	10/39 **25.64%**	32/39 **82.05%**	27/39 **69.23%**	24/39 **61.54%**	28/39 **71.79%**	21/39 **53.85%**	33/39 **84.62%**
Adults	82/84 **97.62%**	5/84 **5.95%**	43/84 **51.19%**	46/84 **54.76%**	32/84 **38.10%**	69/84 **82.14%**	26/84 **30.95%**	61/84 **72.62%**

Table 53: Results (acceptance rates) from Test C

Graphic 23 and Graphic 24 reveal the results in *indicative* complement clauses (**Test C**).



Graphic 23: Acceptance rates for the *null* embedded subject in the *indicative* (**Test C**)



Graphic 24: Acceptance rates for the *overt* embedded subject in the *indicative* (**Test C**)

In the indicative and with respect to the interpretation of the null embedded subject (Graphic 23), there was a progress in the context of coreference and a developmental effect in the context of disjoint reference.[92] In the preferred context of coreference (Graphic 23), children achieved at the age of 3 an acceptance rate of 65%. This rate increased continuously: 77% at 4; 82% at 5; 92% at 6. Adults had in this

[92] In the descriptive text of the results from Test C, the percentages are rounded to whole numbers.

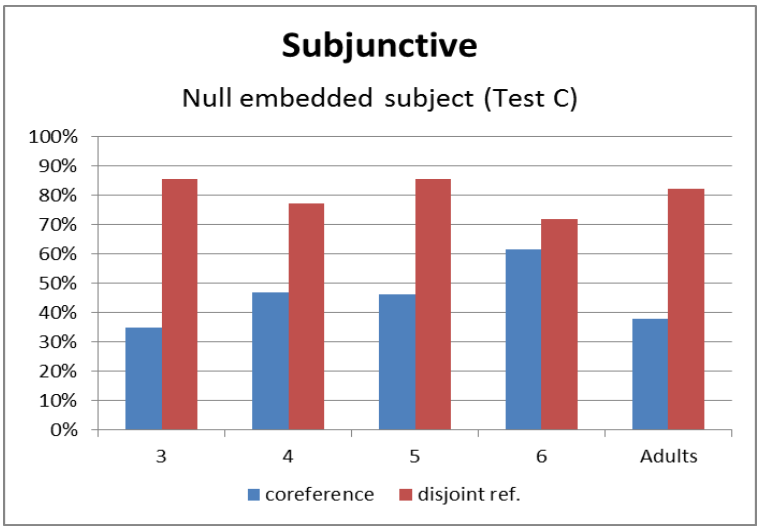
context an acceptance of 98% ($\chi 2 = 0.81$, $p = 0.37$ in comparison with the 6-year-old group, indicating that these children are already close to adults).

Still regarding the null embedded subject (Graphic 23), as children's age increases, their acceptance rate of disjoint reference decreased. It started with 79% at the age of 3, successively diminishing to 56% at 4, to 50% at 5 and to 26% at 6. This development was more significant between 3 and 4 years old ($\chi 2 = 6.95$, $p = 0.008$) and between the ages of 5 and 6 ($\chi 2 = 5.52$, $p = 0.02$). This evolution showed that there was indeed an effect of development in children's results in this context. As for the adults, their acceptance rate of disjoint readings with null subjects was 6% ($\chi 2 = 7.89$, $p = 0.005$ in relation to the 6-year-old group, thus revealing that children were still distant from adults).

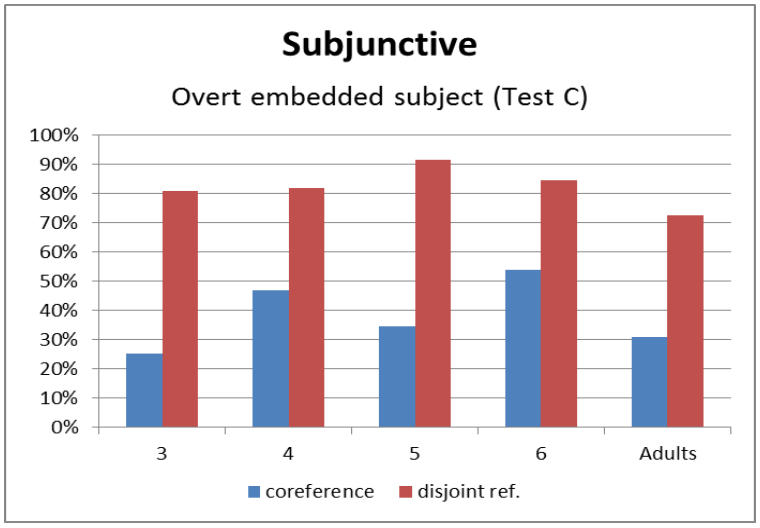
In the analysis of the overt embedded subject in the context of coreference (Graphic 24), we can observe that children had an acceptance rate of 38% at the age of 3. Afterwards, this rate gradually rose: to 64% at the age of 4; to 73% at 5; it reached 82% at 6. For the adults, with overt pronouns in this coreference context, there was an acceptance rate of 51% ($\chi 2 = 9.40$, $p = 0.002$ comparing to the 6-year-olds, which shows a significant difference between these children and the adults).

As for the overt embedded subject in the preferred context of disjoint reference (Graphic 24), 3-year-old children had an acceptance rate of 89%, which diminished to 80% at 4. It kept on diminishing to 75% at the age of 5 and to 69% at 6. In turn, adults had an acceptance of 55% in this context, ($\chi 2 = 1.75$, $p = 0.19$, comparing with the group of the 6-year-olds, revealing that children were getting close to the adults' performance).

Graphic 25 and Graphic 26 indicates the results in *subjunctive* complement clauses (**Test C**).



Graphic 25: Acceptance rates for the *null* embedded subject in the *subjunctive* (**Test C**)



Graphic 26: Acceptance rates for the *overt* embedded subject in the *subjunctive* (**Test C**)

In the subjunctive, concerning the null embedded subject in the coreference context (Graphic 25), children at the age of 3 showed an acceptance of 35%, which increased to 47% at the age of 4. After that, a slight decrease of this rate occurred to 46% at 5, rising again to 62% at 6. The adults obtained in this context an acceptance rate of 38% ($\chi 2 = 4.99$, $p = 0.03$ in relation to the 6-year-olds, which shows that children were still at a considerable distance).

Regarding the null embedded subject in the context of disjoint reference (Graphic 25), children at the age of 3 had an acceptance rate of 86%, which decreased to 77% at 4. Afterwards this rate increased to 86% at 5 years old, and diminished again to 72% at 6. However, the adults achieved an acceptance rate of 82% ($\chi 2 = 1.15$, $p = 0.28$ when comparing with the 6-year-old group, indicating that the latter was not distant from the adults).

With respect to the overt embedded subject in the context of coreference (Graphic 26), children at 3 years old had an acceptance rate of 25%, which rose to 47% at 4. At the age of 5 this rate reduced to 35%, rising again to 54% at the age of 6. In turn, the control group registered an acceptance rate of 31% ($\chi 2 = 4.98$, $p = 0.03$ in confront with the 6-year-old children, showing that the difference is significant).

Still concerning the overt embedded subject and in the context of disjoint reference (Graphic 26), children reached an acceptance rate of 81% at the age of 3, which increased to 82% at 4 and 92% at 5. This rate reduced to 85% at 6. As for the adults, the corresponding rate was 73% ($\chi 2 = 1.51$, $p = 0.22$ in comparison with 6-year-old children, indicating that this group of children and the adults were not distant in their performances).

Discussion of the results from Test C

In test C, the adults' results are different from what was expected: with respect to the other interpretation tests (A1, A2 and B), the acceptance of coreferential readings with the overt pronoun in the indicative increases, and the acceptance of coreferential readings with both null and overt pronouns in the subjunctive also increases.

Test C included a subject antecedent before the pronoun and an object antecedent after the pronoun (in sentence final position). The order S V IO DO is the preferential one in EP if the direct object (DO) is lexically heavy and structurally complex. In the presence of a sentential DO, considered to have lexical weight effect, the indirect object (IO) occurs preferentially before the referred DO. However, the sentences in test C show the order S V DO IO, which the control group (composed of

28 adults) considered not to be usual. In this case, the fact that the object antecedent (the preferred one for the overt subject in the indicative and the legitimate one for both null and overt subjects in the subjunctive) occurs after the pronoun presumably makes it less accessible for the adults' interpretation. This is reflected in the adults' performance regarding an increase in the acceptance of coreferential interpretations in relation to the matrix subject (when comparing test C with the other acquisition tests applied) in the three mentioned contexts: with the overt subject pronoun in indicative complement clauses and with both null and overt subject pronouns in subjunctive complement clauses. Children's performance is, nevertheless, still distant from that of adults in these contexts of test C.

In regard to the interpretation of overt subjects in the indicative, the performance of the oldest group of children tested (the 6-year-olds) also showed that the occurrence of the object antecedent after the pronoun makes it less accessible. They accepted coreference (the dispreferred reading) more with 82% than disjoint reference (the preferred reading) with 69%, but this comparison did not provide a statistically significant difference ($t(12) = 0.89$, $p = 0.39$).

However, the adults' behavior with the null subject pronoun in indicative clauses is consistent with the expected interpretation. Here, the preferred reading is the coreference in relation to the matrix subject, which occurs before the pronoun in test C.

Concerning the interpretation of null pronominal subjects in the indicative, the youngest group of children tested (the 3-year-olds) had a higher acceptance rate of disjoint reference (the dispreferred reading) with 79% than of coreference (the preferred reading) with 65%. In spite of that, there was no statistical difference in this comparison within the age of 3 ($t(20) = -1.44$, $p = 0.17$).

In test C (with subject antecedent before the pronoun and object antecedent after the pronoun), children also seem to be sensitive to the temporal properties of indicative clauses selected by the verb *dizer* and of subjunctive clauses selected by the verb *pedir*. In the interpretation of the null embedded subject, each group of children exhibits lower rates of acceptance of coreference in the subjunctive context (in which the null form is generally disjoint) than in the indicative (in which coreference is the

preferred reading and disjoint reference is the dispreferred one), with $p < 0.05$ for each comparison inside each age group using a paired t-test. Additionally, the percentages of acceptance of disjoint reference for the null form increase in the subjunctive in comparison to the ones in the indicative (a paired t-test showed that $p < 0.05$ in each comparison, except in the case of the 3-year-olds with $t(20) = -0.81$, $p = 0.43$).

In the interpretation of the overt embedded subject, children accept coreference in the subjunctive (in which *ele* is necessarily disjoint), but at a lower percentage than the one obtained in the indicative (in which *ele* is preferentially disjoint). The comparison between the indicative and the subjunctive, regarding the specific case of the overt pronoun in coreference context, provided a $p < 0.05$ within each age group of children, with the exception of the 4-year-olds ($t(21) = 1.91$, $p = 0.07$). The acceptance rates of disjoint reference are superior in the subjunctive in comparison with the ones in the indicative for the overt pronoun, with a statistically significant difference in the 5-year-old group ($t(27) = 2.87$, $p = 0.008$).

Comparison between Test A1 and Test C

The reader is referred to Table 47 (p. 196) for the acceptance rates obtained in the test A1, and to Table 53 (p. 223) for the acceptance rates obtained in test C. In both tests A1 and C, the matrix verb *dizer* (to say) selected the indicative clauses. The subjunctive was selected by the verb *querer* (to want) in test A1 and by the verb *pedir* (to request) in test C.

In the indicative, with the null embedded subject in coreference, only the 6-year-olds ($t(12) = 0.81$, $p = 0.44$) and the adults ($t(27) = 0.00$, $p = 1.00$) had similar performances in the acquisition tests. The other age groups registered significant differences in their results in both these tests ($p < 0.05$ in the corresponding t-tests). Also in the indicative, with the null embedded subject in disjoint reference, only the 3-year-olds differed significantly in their interpretations ($t(20) = -4.24$, $p = 0.0004$); all the other age groups got similar results ($p > 0.05$ in each comparison).

In the indicative, with the overt embedded subject in the coreference context, only the 4-year-olds ($t(21) = -0.43$, $p = 0.67$) and the 6-year-olds ($t(12) = -2.00$, $p = 0.07$)

obtained similar responses in both interpretation tests. The other groups had results with significant difference ($p < 0.05$). When the overt subject is in the context of disjoint reference, only the adults differed significantly in their performance between test A1 and test C ($t(27) = 5.12$, $p < 0.0001$).

In the subjunctive, with the null subject in coreference, only the 3-year-olds ($t(20) = 2.72$, $p = 0.01$) and the adults ($t(27) = -5.44$, $p < 0.0001$) had significant differences in both tests of acquisition (A1 and C). With the null subject in disjoint reference, each age group had similar interpretations ($p > 0.05$ in all comparisons).

Still regarding the subjunctive, but with the overt subject pronoun in coreference, only the 3-year-olds ($t(20) = 2.12$, $p = 0.0469$) and the adults ($t(27) = -4.84$, $p < 0.0001$) showed significant differences in their responses between test A1 and test C. When the overt subject is in the disjoint reference context, only the control group had results with significant difference ($t(27) = 4.03$, $p = 0.0004$).

Comparison between Test A2 and Test C

The reader is referred to Table 49 (p. 205) for the acceptance rates obtained in the test A2, and to Table 53 (p. 223) for the acceptance rates obtained in test C. Both tests A2 and C included subjunctive clauses selected by the matrix verb *pedir* (to request). While test A2 had one intrasentential antecedent, test C had two antecedents in the sentence.

In the subjunctive, in regard to the null embedded subject in coreference, there were significant differences only in the 5-year-olds ($t(27) = 2.37$, $p = 0.03$) and in the adults ($t(27) = -2.59$, $p = 0.02$). Concerning the null subject in disjoint reference, each age group exhibited similar performances in both tests A2 and C ($p > 0.05$ in all comparisons).

Also in the subjunctive, with the overt embedded subject in both contexts of coreference and of disjoint reference, only the adults obtained significant differences in their responses ($p < 0.05$ in both comparative paired t-tests).

Comparison between Test B and Test C

The reader is referred to Table 51 (p. 211) for the acceptance rates obtained in the test B, and to Table 53 (p. 223) for the acceptance rates obtained in test C.

Both tests B and C had the matrix verb *dizer* (to say) selecting the indicative clauses and the matrix verb *pedir* (to request) selecting the subjunctive clauses.

The presence of an object antecedent after the pronoun (in sentence final position – test C) affected particularly the interpretation of null embedded pronominal subject. Children got closer to the adults' performance with the null pronoun in the indicative of test C (Graphic 23), reducing in general the acceptance rates of disjoint reference in comparison with test B (Graphic 19). In turn, their results with the null pronoun got worse in the subjunctive of test C (Graphic 25), increasing the acceptance rates of coreference in relation to test B (Graphic 21). These observations reinforce the idea that children seem to be sensitive to the linear position of the dispreferred object antecedent with regard to the null pronoun. Accordingly, they deviated from the adults' responses in indicative complement clauses when the object antecedent occurred before the null pronoun, being linearly located between the preferred matrix subject antecedent and the null embedded pronominal subject in test B. In turn, their interpretation got closer, in general, to that of adults when the object antecedent occurred after the null pronoun and the linearly closest antecedent preceding the null pronoun was the preferred matrix subject antecedent in test C. This suggests that it is not the simple presence of two potential antecedents that interferes in children's interpretation of null subjects in the indicative. It is the linear intervention of the object antecedent in the referential dependency between the preferred matrix subject antecedent and the null subject pronoun (which does not necessarily imply a c-command configuration). Moreover, the occurrence of the object antecedent before the pronoun made the legitimate antecedent more accessible for the null pronominal subject in the subjunctive of test B, while the occurrence of the object antecedent after the null pronoun made it less accessible in the subjunctive of test C.

In the indicative, with respect to the null subject in coreference, each age group had similar interpretations in both tests B and C ($p > 0.05$ in all the comparative paired

t-tests). When the null subject is in disjoint reference, only the group of the 3-year-old children had a similar performance ($t(20) = -0.20$, $p = 0.84$).

Regarding the indicative with the overt subject pronoun in coreference, only the 3-year-olds ($t(20) = 3.93$, $p = 0.001$) and the adults ($t(27) = -3.47$, $p = 0.002$) obtained significant differences in their interpretations. As for the overt subject in disjoint reference, only the 5-year-olds ($t(27) = 2.58$, $p = 0.02$) and the control group ($t(27) = 5.91$, $p < 0.0001$) had significant differences in their results, when comparing test B with test C.

In the subjunctive, with the null subject pronoun in coreference, only the 3-year-olds ($t(20) = -0.89$, $p = 0.38$) and the 4-year-olds ($t(21) = -2.00$, $p = 0.06$) had similar interpretation in both acquisition tests. With the null pronoun in disjoint reference, only the groups of the 3-year-olds ($t(20) = 0.89$, $p = 0.38$) and of the 4-year-olds ($t(21) = 1.68$, $p = 0.11$) had similar performances.

Still in the subjunctive, in regard to the overt pronoun in coreference, only the 3-year-olds ($t(20) = 2.86$, $p = 0.01$) and the adults ($t(27) = -4.42$, $p = 0.0001$) differed significantly in the comparison between test B and C. With the overt subject pronoun but in disjoint reference, only the 3-year-olds ($t(20) = 2.42$, $p = 0.03$) and the control group ($t(27) = 4.03$, $p = 0.0004$) got results with significant differences in both interpretation tests.

6.6. General discussion

As previously mentioned, the results of the interpretation of null and overt embedded pronominal subjects were analyzed through acceptance rates (percentages of “yes” answers). Therefore, the adults’ performance was the reference for the analysis of children’s results.

The 3rd person singular subject pronouns were tested in sentences with only referential antecedents (subject and object).

The results of the **second study** show that, in indicative complement clauses with two available antecedents in the main clause (subject and object antecedents

before the pronoun – test B), Portuguese adults usually behaved in accordance with the Position of Antecedent Hypothesis (Carminati, 2002). The null pronoun was preferentially associated with the antecedent in subject position (with higher acceptance rates of coreference than of disjoint reference) and the overt pronoun was preferentially associated with the antecedent in object position (with superior acceptance rates of disjoint readings than of coreferential readings). Similarly, in indicative complement clauses with only one intrasentential antecedent (subject antecedent before the pronoun – pretest; test A1), these adults normally preferred the subject antecedent for the null pronoun (by accepting coreference much more than disjoint reference) and the extrasentential non-subject antecedent for the overt pronoun (by accepting the disjoint interpretation at higher rates than the coreferential one).

However, the adults' performance in test C (subject antecedent before the pronoun and object antecedent after the pronoun) was different from what was expected. Their acceptance of coreferential readings with the overt subject pronoun in the indicative increased and their acceptance of coreferential readings in the subjunctive, with both null and overt pronouns, also increased. This may be explained by the fact that the object antecedent (the preferred one for the overt subject in the indicative and the legitimate one for both null and overt subjects in the subjunctive) occurred after the pronoun, making it less accessible for the adults' interpretation. In fact, the adults considered the order S V DO IO of the sentence, in which the sentential DO is lexically heavy, not to be usual. In a general manner, we can admit that the sentences of test C, with an object antecedent after the pronoun (in sentence final position), may have been costly in terms of processing for all the participants, including the control group. In spite of that, their results regarding null subjects in the indicative were in accordance with the expected interpretation. In this case, the preferred reading is the coreference in relation to the matrix subject, which occurred before the pronoun in test C.

In the indicative with only one intrasentential antecedent (subject antecedent before the pronoun), the Portuguese children's performance in general exhibited a deviation from the adults' behavior, presenting an overacceptance of pragmatically

dispreferred coreferential readings (with respect to the matrix subject) for overt strong subject pronouns. This tendency of results is similar to what was previously observed in the monolingual acquisition of Italian (Sorace, Serratrice, Filiaci & Baldo, 2009) and EP (Ambulate, 2008; Costa & Ambulate, 2010).

Furthermore, in the indicative with two available intrasentential antecedents (the matrix subject and the matrix object), these Portuguese children also overaccepted the pragmatically inappropriate interpretation of coreference for overt strong subject pronouns, unlike adults.

Children showed an interpretation close to that of adults with null subject pronouns in indicative complement clauses, when there is only one intrasentential antecedent (the matrix subject); this finding confirms hypothesis a) of section 6.1. However, they often accepted the dispreferred reading of disjoint reference with null pronominal subjects in indicative clauses, when there were two potential antecedents (the matrix subject and the matrix object) in the sentence. This happened specifically when the matrix object antecedent was added between the preferred matrix subject antecedent and the null embedded subject pronoun.

In the subjunctive (selected by volitional verbs or declarative verbs of order), children incorrectly assigned coreferential readings to both types of subject pronouns (null and overt) when the sentence had one or two antecedents (as was predicted in hypothesis b) of section 6.1.).

Some interpretative differences arose when the matrix verb differed in the same context: subjunctive complement clauses selected by the verbs *querer* (test A1) or *pedir* (test A2), with only one intrasentential antecedent for the embedded subject. In this case, children in general accepted less coreferential readings with the volitional verb *querer* (to want) than with the declarative verb of order *pedir* (to request); these results are consistent with hypothesis c) of section 6.1.

The collected data suggest that there are cumulative effects: the overt forms, the linear position of the matrix object antecedent that precedes the null pronoun, the subjunctive mood and the type of matrix verb that selects the subjunctive. Taken separately, each one of these factors may not be very problematic but, when they

come together, children's interpretation becomes more distant from that of adults. The interplay between these factors, which appears to be relevant in understanding why children's performance is not more adult-like, will be discussed below. This discussion takes into account the nature of subject pronouns (null vs. overt), linear interventions effects in the interpretation of the null subject in indicative complement clauses, lexical-semantic properties of the matrix verbs that select the subjunctive (volitional verb *querer* – to want vs. declarative verb of order *pedir* – to request) and the specificities of the subjunctive obviation.

First of all, we may admit the hypothesis formulated by Costa & Ambulate (2010), according to which it is expected that the interpretation of overt strong pronouns in EP is necessarily more difficult for children.

In the current investigation, the finding that children's performance differs from the adults' behavior with overt subject pronouns in indicative complement clauses (overacceptance of coreference) is argued to result from the fact that the referential dependency of those specific pronominal forms is established post-syntactically, at the interface level. We assume that the licensing of overt strong subject pronouns is post-syntactic, since their interpretation is constrained by discourse pragmatics. In the indicative context, both disjoint and coreferential readings are possible. This availability of readings is partly determined by the independent nature of Tense in indicative complement clauses, which is an autonomous binding domain due to that feature [+ T]. Hence, Principle B of Binding Theory does not rule out binding between the subject of the embedded clause and the subject of the matrix clause, because the latter is outside the binding domain of the former (Meireles & Raposo, 1983; Raposo, 1985). In the particular case of overt embedded pronominal subjects in the indicative, the preferred interpretation of disjoint reference with respect to the main subject is the pragmatically appropriate one, while the dispreferred interpretation of coreference in relation to the matrix subject is pragmatically inappropriate. However, the tested children overaccepted the dispreferred interpretation of coreference. Accordingly, the rejection of the dispreferred coreferential reading involves an interaction between syntax and discourse pragmatics. This post-syntactic operation, which occurs at the interface level,

requires the construction of a comparison set in order to evaluate whether the coreferential interpretation is pragmatically adequate with the overt subject pronoun in the indicative, which can cause additional processing costs. Thus, one needs to hold in memory two convergent syntactic derivations (one with the overt pronoun and another with the null pronoun) at the same time, make comparisons between them and realize that coreference is pragmatically inappropriate with the overt subject (considering that the coreferential reading is more adequate with the null subject). The execution of all these steps represents a heavy burden for the children's limited working memory (which is less developed when compared to that of adults, according to Reinhart, 1999, 2004). This is reflected in their deviating performance with respect to that of adults in the interpretation of overt pronominal subjects in indicative complement clauses.

With only one antecedent in the sentence, the extrasentential (discourse) non-subject antecedent is the preferred one for the overt pronoun. With two antecedents in the sentence, the matrix indirect object antecedent is the preferred one for the overt pronoun. However, the deviation of children's interpretation of overt pronouns in the indicative with regard to the adults' performance (overacceptance of coreference) was observed in the presence of one or two possible intrasentential antecedents. This means that the addition of another potential antecedent (a matrix indirect object antecedent) in the sentence did not cause impact in children's results with overt subjects in indicative complement clauses (not confirming the hypothesis d) of section 6.1. for the overt pronoun). In this specific context, the overacceptance of dispreferred coreferential readings remained, in general, even when the pragmatically appropriate object antecedent for the overt subject pronoun was present in the sentence.

In turn, children's interpretation of null subject pronouns, in both indicative and subjunctive clauses, is particularly affected by the presence of one or two potential antecedents in the sentence. This indicates that null pronouns are more dependent on the syntactic context.

When there is only one intrasentential antecedent (the matrix subject – pretest; test A1), children performed more adult-like with null pronominal subjects

than with overt pronominal subjects, in indicative complement clauses (as was predicted in hypothesis a) of section 6.1). They always accepted less the dispreferred reading of disjoint reference with null pronouns than the dispreferred reading of coreference with overt pronouns (this difference was significant in the youngest group of children, the 3-year-olds, and in the two oldest groups, the 5-year-olds and the 6-year-olds). Moreover, in each children's group, the preferred interpretation of coreference with null subjects was always slightly more accepted than the preferred interpretation of disjoint reference with overt subjects (with statistically significant difference for the 5- and 6-year-olds in the pretest). In the indicative context with only one intrasentential antecedent in subject position, children's results regarding the acceptance of coreference for the null pronoun were leveled in relation to the adults' responses.

We may assume that the establishment of the referential dependency between the null subject pronoun and the matrix subject antecedent, in indicative complement clauses, occurs in syntax and, for this reason, is more economical. Null pronouns are considered to be syntactically licensed in the sense that they are associated with functional categories, as inflection. In fact, there are authors (e.g. Barbosa, 2009) who argue that, for consistent null subject languages like EP, *pro* is redundant and the set of phi-features of Infl (person and number agreement inflection) is itself interpretable. In this case, the morphologically rich verbal agreement (Agr) is a referential definite pronoun, phonologically expressed as an affix. The basic idea of this analysis is that Agr is affix-like and behaves as a pronominal clitic. In turn, Holmberg (2005) assumes that the null subject *pro* is a weak deficient pronoun (Cardinaletti & Starke, 1999). For consistent null subject languages like EP, Holmberg (2005) argues there is a D(eterminer)-feature in Infl. The null subject pronoun (specified for interpretable phi-features such as person and number) has to enter an Agree relation with Infl (containing D, which encodes definiteness) in order to be interpreted as a definite argument. Because it lacks descriptive content, the null pronominal subject is dependent on an antecedent to have its reference fixed. In this proposal, the null subject is a pronoun that is not pronounced. These two different hypotheses show that

the null subject construction depends on inflection.[93] In the present research, null subjects are regarded as a type of deficient pronoun, being syntactically licensed by a functional head. This dependency of null subject pronouns on inflection is similar to the way clitic object pronouns are syntactically licensed: clitics are attracted to inflection.[94] In this perspective, the licensing of null pronouns (and of clitic pronouns) is different from that of overt strong pronouns. Children's interpretation of null pronominal subjects, in indicative clauses and with only one intrasentential antecedent, is considered to deviate less from the adults' behavior because the way of establishing the referential dependency of null pronominal forms takes place in syntax. In contrast, the establishment of the referential dependency of overt pronominal subjects is argued to be post-syntactic and, consequently, less economical. It involves the computation of alternative derivations at the interface level, which requires a great effort for children due to limitations in their working memory.

However, when there are two available antecedents (a subject and an object) in the main clause, children experience some processing constraints in the interpretation of null subject pronouns in indicative clauses. This is particularly observable in the case of the subject and object antecedents occurring before the null pronoun (test B). Children deviated more from the adults' performance, concerning a high acceptance of the dispreferred reading of disjoint reference for null subject pronouns in indicative clauses, when the matrix object antecedent was added between the preferred matrix subject antecedent and the null pronoun (as was expected in hypothesis d) of section 6.1.). In this case, the matrix indirect object antecedent can be regarded as a linearly intervening element in the referential dependency between the preferred matrix subject antecedent and the null embedded subject pronoun. This is illustrated in the following sentence:

[93] A more detailed description of these two proposals on the null subject construction is not provided, because it is beyond the purposes of this thesis. Nevertheless, the two hypotheses are mentioned in section 2.4. Our goal here is to show there is syntactic dependency of null subjects on inflection and its consequences for acquisition.

[94] Recall that we assume, in Study One, that children's good comprehension of clitic pronouns (especially of non-reflexive forms) in EP comes from the fact that clitics are licensed in syntax (cf. section 5.6.).

(178) O bombeiro disse ao avô que ***pro*** emagreceu.

the fireman said to-the grandpa that *pro* lost-weight

"The fireman told grandpa that he lost weight."

These results offer evidence of intervention effects, compatible with a linear view and not necessarily involving a c-command configuration, in binding structures (similarly to what was found in the interpretation of object pronouns by Friedmann, Novogrodsky & Balaban, 2010).[95] The linear intervention effect observed in the interpretation of null pronominal subjects, in indicative complement clauses and with two possible intrasentential antecedents, was reflected in the frequent acceptance of dispreferred disjoint readings. Children often accepted the establishment of a referential dependency with the linearly closer antecedent that precedes the null pronoun, the matrix indirect object. In consequence, it is admissible to say that they often accepted an antecedent according to its linear precedence to the null pronoun.

The linear position of the matrix indirect object antecedent, occurring before or after the pronoun, is relevant for children's interpretation of null pronominal subjects. When the object antecedent occurred after the pronoun, in sentence final position (test C), the 4-, the 5- and the 6-year-old groups (as well as the adults) had a better performance with null subjects in indicative complement clauses than when the object antecedent occurred before the pronoun. Therefore, they improved their results in test C when compared to test B, reducing their acceptance of dispreferred disjoint readings with null subjects (this difference was statistically significant). In test C, although the youngest group of children tested (the 3-year-olds) accepted more the dispreferred disjoint reference for null subjects, this acceptance rate successively decreased, showing a developmental effect in children's interpretation. In fact, with the exception of the 3-year-olds, the percentages of acceptance of disjoint readings displayed by the other groups (including the adults) in test C was similar to those in test A1 of only one intrasentential antecedent (with no statistically significant

[95] Cf. section 4.2. for a brief description on intervention problems in acquisition.

difference). In test C, the linearly closest antecedent that precedes the null pronoun was the preferred matrix subject antecedent, just as in test A1. This reinforces the idea that it is not the simple presence of two potential antecedents in the sentence that affects children's interpretation of null subjects in the indicative. It is the linear intervention of the matrix object antecedent in the referential dependency between the null embedded subject pronoun and its preferred matrix subject antecedent (which does not necessarily imply c-command), in test B, that makes children deviate more from the adults' behavior.

The condition in which the object antecedent occurs after the null pronominal subject in indicative complement clauses (in sentence final position) constitutes the only context from test C in which the adults performed as expected. As previously described, the other contexts of test C (overt pronominal subjects in indicative clauses, and both null and overt pronominal subjects in subjunctive clauses) are regarded as problematic for all the participants, including the adults. Here, we assume that the occurrence of the object antecedent (the preferred one for the overt subject in the indicative and the legitimate one for both null and overt subjects in the subjunctive) after the pronoun, in sentence final position, makes it less accessible for the interpretation of both children and adults.[96]

In conclusion, when there are two available antecedents (a subject and an object) in the sentence, children's interpretation of null pronominal subjects in indicative complement clauses appears to be guided by the linear proximity of the antecedent preceding the null pronoun. Hence, they often accepted the linearly closer potential antecedent that precedes the null pronoun (not necessarily in a c-command configuration).

In subjunctive complement clauses (test B), the introduction of another potential antecedent (the matrix indirect object) before the null subject pronoun also had influence in children's performance, improving their results when compared to the same condition with only the matrix subject antecedent in the sentence (tests A1 and A2). In test B (with subject antecedent and object antecedent before the pronoun),

[96] These results confirm the hypothesis f) for the overt pronoun in indicative clauses, and hypothesis g) for both null and overt pronouns in subjunctive clauses (cf. section 6.1.).

children's incorrect acceptance of coreference with the null subject decreases, whereas the acceptance of disjoint readings increases in the subjunctive (as was expected in hypothesis e) of section 6.1.).[97] Consequently, the addition of the object antecedent in the main clause made the legitimate antecedent more accessible, by preceding the null pronoun in subjunctive clauses. This further confirms that the interpretation of null pronouns (in both indicative and subjunctive clauses) is more dependent on the syntactic context, namely in the presence of one or two intrasentential antecedents.

The type of matrix verb selecting the subjunctive caused some interpretative differences, with children in general accepting less coreferential readings with the volitional verb *querer* (to want) than with the declarative verb of order *pedir* (to request); these results are in accordance with hypothesis c) of section 6.1. The results indicate that the volitional matrix verb *querer* is more categorical in determining the subjunctive obviation with both null and overt embedded subjects than the declarative verb of order *pedir*. The matrix verb *pedir* seems to be more ambiguous for some adults regarding the possibility of accepting coreferential readings with null subject pronouns in subjunctive clauses. This ambiguity was reflected by the oldest group of children tested (the 6-year-olds), who accepted coreference more than disjoint reference with the null subject in the subjunctive when the matrix verb was *pedir*. These 6-year-old children also increased their acceptance of coreference and diminished their acceptance of disjoint reference with overt subject pronouns in the subjunctive selected by *pedir*. We can consider that the volitional verb *querer* is more categorical in determining subjunctive obviation than the declarative verb of order *pedir*, if we assume that with *querer* there is no (or at least hardly any) exceptions to the obviation phenomenon of the embedded subject pronoun in the subjunctive (cf. section 3.2.2.). In turn, as reported by Lobo (2013: 2202), some EP speakers may allow coreference relations between the matrix subject and the null subject pronoun of the subjunctive clause selected by the verb *pedir*, when the embedded clause has a stative predicate like *ficar* (to stay), a modal semi-auxiliary verb like *poder* (can), the auxiliary

[97] Hypothesis e) of section 6.1. was not confirmed for the overt subject pronoun in the subjunctive, since neither the coreferential readings significantly decrease nor the disjoint readings, in general, increased in a significant way.

verb *ter* (to have) or certain temporal-aspectual adverbs as *ainda* (still). This makes, by hypothesis, the matrix verb *pedir* less categorical in determining obviation for some EP speakers, particularly with null pronouns. Nevertheless, the general interpretative tendency with the matrix verb *pedir* (test A2) was similar to the one found with the matrix verb *querer* (test A1).

In subjunctive complement clauses (selected by the volitional verb *querer* and the declarative verb of order *pedir*), the obviation effects with both types of subject pronouns (null and overt) were not completely acquired yet by children. In a general manner, there were no major developmental effects in the children tested, which indicates that the subjunctive obviation is a phenomenon of relatively late development (after 6 years old). Nevertheless, it seems that they were sensitive to the contrast between the indicative (when selected by the verb *dizer*) and the subjunctive (when selected by the verbs *querer* and *pedir*). Although children did not ignore the temporal properties of the subjunctive (characterized by the anaphoric or dependent nature of Tense), this acquisition was not stabilized yet. This may seem contradictory, but it is not the case. The ability to distinguish between the indicative and the subjunctive does not necessarily imply the knowledge of obviation in subjunctive clauses. Recall that there are exceptions to the subjunctive obviation, which shows that it may not result only from the anaphoric or dependent nature of Tense in subjunctive clauses (Ambar & Vasconcelos, 2012). The semantics of the matrix verbs also appears to play an important role in mood selection and in determining obviation. The fact that the coreferential and disjoint readings in the subjunctive are in part dependent on lexical and semantic knowledge (not just syntactic) can explain that the mastery of these readings takes some time to be acquired. Children have to determine for each verb the type of properties associated with it. Although there are general syntactic trends, there is lexical variation, which presumably takes time to acquire. These observations are consistent with what Padilla (1990) has proposed for the results found in the interpretation of null subject pronouns in subjunctive complement clauses by Spanish-speaking children.

In sum, the second study shows that Portuguese children are sensitive to the overtness of the embedded pronominal subject, to the linear proximity of the matrix

object antecedent that precedes the null pronoun, to the verbal mood (indicative or subjunctive) of the embedded clause and to the type of matrix verb that selects the subjunctive, making them not to perform in an adult-like manner.

7. Conclusions

This dissertation, composed of two experimental studies, analyzed the possibility of referential dependencies within a sentence in the acquisition of European Portuguese (EP). Study One concerned the interpretation of clitic and strong pronouns in object position, while Study Two was on the interpretation of null and overt pronouns in embedded subject position.

Based on the results from these two studies in EP, we will discuss possible answers to the three research questions posed in the introduction:

a) Do children have difficulties in the interpretation of some specific type of pronouns (clitic, strong or null)?

b) Do children have difficulties, in the interpretation of pronouns, due to a delay in the acquisition of pragmatic principles?

c) In the interpretation of pronouns, do children have difficulties that may be explained by a processing problem related to working memory limitations at the interface level?

With respect to question a), the grammatical status of pronouns (clitic, strong or null) shows to be intralinguistically relevant for their interpretation by children in EP. In the first study, on the interpretation of pronominal forms in object position, children exhibit a good performance with non-reflexive clitic pronouns but differ from adults with non-reflexive strong pronouns (in prepositional contexts). When interpreting non-reflexive strong pronouns within non-locative PPs, children overaccept dispreferred coreferential readings, even if the semantic and/or pragmatic properties of the predicates favor disjoint readings with these pronominal forms.

In the second study, on the interpretation of pronominal forms in embedded subject position, children's performance in indicative complement clauses is more adult-like with null pronouns, when there is only one intrasentential antecedent (the matrix subject), than with overt strong pronouns. Unlike adults, children overaccept pragmatically inappropriate readings of coreference for the overt strong subject pronoun in indicative clauses, whether there are one or two available antecedents in the sentence. In subjunctive complement clauses (selected by volitional verbs or

declarative verbs of order), children incorrectly assign coreferential readings to both types of subject pronouns. Nevertheless, the introduction of the matrix indirect object antecedent in the main clause improved children's results with the null pronominal subject, since it makes the legitimate antecedent more accessible (by preceding the null pronoun) in subjunctive clauses: the acceptance of coreference decreases and the acceptance of disjoint reference increases.

As the results show, children have more difficulties in the establishment of coreference relations in specific syntactic contexts and depending on the type of pronoun involved (clitic, strong or null). Therefore, we can assume that children do not present a generalized problem with coreferential readings. Because children's interpretation of coreference displays more difficulties in certain contexts, we can state that they do not have a generalized delay in the acquisition of pragmatic principles. In study one, the conditions for testing the interpretation of clitic and strong object pronouns have the same pragmatic setting. However, children obtain results close to those of adults with non-reflexive clitics but deviate from the adults' performance with non-reflexive strong pronouns. In study two, the test conditions for the interpretation of null and overt subject pronouns also have the same pragmatic setting. In spite of that, different results are obtained by children when compared with those obtained by adults, depending on the type of pronoun (null or overt) and on the syntactic context (one or two intrasentential antecedents; indicative or subjunctive), as previously described. For instance, children´s interpretation differs less from that of adults with null pronominal subjects than with overt pronominal subjects, in indicative clauses and with only one antecedent in the sentence. In subjunctive clauses, children overaccept coreference with both types of pronouns, but their performance gets slightly better with null subjects when the legitimate object antecedent is added to the main clause (and occurring before the null pronoun). These observations, in both studies in EP, allows us to conclude that pragmatics is not, by itself, the determinant factor causing the difficulties that children face in the interpretation of pronouns. This offers an appropriate answer to question b).

The findings from the first and the second studies of this dissertation support the intralinguistic relevance of the grammatical status of pronominal forms (clitic,

strong or null), because it influences children's interpretation in EP. The main difficulties are caused by strong pronouns in both object and embedded subject positions.

Children's performance deviates from that of adults regarding both non-reflexive strong object pronouns in non-locative PPs and overt strong subject pronouns in indicative complement clauses. This is argued to result from the fact that these strong pronominal forms are licensed post-syntactically. In both cases, the post-syntactic rejection of the dispreferred interpretation of coreference implies the interaction between syntax and other components of grammar, like semantics and/or pragmatics. This means that the interpretation of strong pronouns (in object or embedded subject positions) involves the computation of convergent syntactic derivations at the interface level in order to verify whether coreference is acceptable. This computational operation, which includes the construction of alternative derivations and their comparison, causes processing problems for children imposed by their working memory limitations. The overload on children's processing capacity is reflected in their deviating performances in relation to those of adults, through the frequent acceptance of the pragmatically inappropriate reading of coreference with strong pronouns. Accordingly, children often attribute non-adult interpretations to non-reflexive strong object pronouns within non-locative PPs and to overt strong subject pronouns in indicative complement clauses.

Consequently, a processing problem at the linguistic interfaces explains the difficulties with strong pronouns faced by Portuguese children in both studies, providing a possible answer to question c).

In turn, clitic pronouns are argued to be licensed in syntax and, for this reason, do not compete with alternative forms at the interface level. Children's limited processing capacity does not represent a challenge in this case and, as a result, there are no major difficulties in their comprehension of non-reflexive clitic pronouns.

Null pronouns, in indicative complement clauses, are also assumed to be syntactically licensed. Therefore, the establishment of the referential dependency between the null subject pronoun and the matrix subject antecedent in the indicative, which occurs in syntax, is considered to be more economical than the post-syntactic

establishment of the referential dependency of overt strong pronouns. In consequence, children's interpretation of null subject pronouns, in indicative clauses and with only one intrasentential antecedent, deviates less from the adults' behavior.

Clitic and null pronominal forms (both included in the set of deficient pronouns) are considered to be close to each other due to morphological and syntactic properties: both are licensed in syntax because they are dependent on functional categories, as inflection. Considering a scale of difficulty for the interpretation of pronominal forms in the acquisition of EP, clitic and null pronouns are, in general, easier than strong pronouns. Consequently, children are more adult-like with clitic and null pronouns, while they often deviate from the adults' performance with strong pronouns. This scale must take into account the grammatical function of these pronominal forms. With the function of object, children's interpretation of non-reflexive forms gets close to that of adults with clitic pronouns while it deviates with strong pronouns (in prepositional contexts). This contrast is only valid for non-reflexive object pronouns, since there is no scale of difficulties for reflexive forms (anaphors). The comprehension of reflexive forms is better than the one of non-reflexive forms. This fact reinforces the idea that coreference, rather than binding (which is relevant when interpreting anaphors), is a source of difficulties for children. Portuguese children demonstrate knowledge of Principle A of Binding Theory, because they display a good performance with local anaphors (regardless of their clitic or strong status). Additionally, Portuguese children know Principle B, having good results comprehending non-reflexive clitic pronouns.

With the function of subject, children perform more adult-like with null pronouns in indicative complement clauses, when there is only one intrasentential antecedent (the matrix subject), than with overt strong pronouns. Their interpretation of overt subjects shows an overacceptance of pragmatically inappropriate coreferential readings, whether there are one or two intrasentential antecedents. However, children's interpretation of null pronominal subjects is sensitive to the syntactic context. In the presence of two available intrasentential antecedents (the matrix subject and the matrix object), they experience some processing constraints and often accept the linearly closer antecedent that precedes the null pronoun in

indicative complement clauses (not necessarily involving a c-command configuration). This happens when another potential antecedent, the matrix indirect object, linearly intervenes in the referential dependency between the preferred matrix subject antecedent and the null embedded subject pronoun. In this specific case, children often accept the dispreferred reading of disjoint reference with null pronominal subjects in indicative clauses. Hence, their performance is guided by the linear proximity of the matrix object antecedent preceding the null pronoun.

These explanatory proposals, for the interpretation of object pronouns and of subject pronouns in indicative complement clauses by children, suggest a division of labor between syntax, semantic and/or pragmatic constraints and processing limitations.

In subjunctive complement clauses (selected by the volitional verb *querer* and the declarative verb of order *pedir*), children have not fully acquired yet the obviation effects with both null and overt subject pronouns. We can consider the subjunctive obviation to be a phenomenon of relatively late development (after 6 years old), since no major effects of development are observed in the results of the children tested. However, they are already able to distinguish between the indicative (when selected by the verb *dizer*) and the subjunctive (when selected by the verbs *querer* and *pedir*). Children reveal some knowledge of the temporal properties of the subjunctive (characterized by the anaphoric or dependent nature of Tense), but this acquisition is not stabilized yet. Their sensitivity to the contrast between indicative and subjunctive clauses is not enough to assure a full mastery of the subjunctive obviation. The semantics of the matrix verbs also contribute to mood selection and to determining obviation. Therefore, children need to acquire lexical and semantic knowledge (not just syntactic), which takes some time.

In sum, the categorial status of pronominal forms (clitic, strong or null) is important, but it also interacts with the grammatical function (object or subject) of pronouns, with the way pronouns are licensed (in syntax or post-syntactically), with the linear proximity of the matrix object antecedent that precedes the null pronoun, with verbal mood selection (indicative or subjunctive) and with the semantic class of

the matrix verb. As was shown, each one of these factors conditions the interpretation of pronouns by children.

We assume that Portuguese children's difficulties in the interpretation of pronouns do not result from the lack of either syntactic knowledge or pragmatic principles. Consequently, the difficulties in the post-syntactic rejection of the dispreferred coreference when interpreting strong pronouns, in object and embedded subject positions, are based on processing problems at the interface level. Here, there is competition between convergent syntactic derivations and the comparison between those structures is costly for children's limited working memory. Furthermore, the interpretation of non-reflexive strong pronouns within non-locative PPs and of both null and overt subject pronouns in subjunctive clauses also depend on lexical and semantic knowledge, which delay acquisition. There are also some processing constraints when interpreting null pronominal subjects in indicative clauses, in the presence of two potential antecedents before the pronoun. In this case, children often accept the linearly closest antecedent (the dispreferred matrix object) that precedes the null subject pronoun.

In view of all that was previously described we may generalize that, in the pronominal system, the more pronouns are syntactically licensed, the less problematic their acquisition becomes.

The research achieved in this dissertation has led to some suggestions for further work with pronouns in the acquisition of EP:

i) The interpretation of long-distance anaphors;
ii) The interpretation of null and overt subject pronouns in finite complement clauses (with the indicative and the subjunctive moods) regarding quantified antecedents;
iii) The interpretation of null and overt subject pronouns in adverbial clauses (contexts of anaphora and cataphora);
iv) The production of null and overt subject pronouns in indicative complement clauses.

It would be interesting to verify how Portuguese children interpret the reflexive strong pronoun *si* as a long-distance anaphor in complex sentences, since they exhibit

good results with local anaphors (independently of their clitic or strong status) in simple sentences.

There is crosslinguistic evidence of a better performance by children in the interpretation of both object and embedded subject pronouns when the antecedent is a quantifier than when the antecedent is a referential subject. For this reason, we suggest investigating how children interpret null and overt subjects, in indicative and subjunctive complement clauses, with regard to a quantified antecedent.

It would also be relevant to study how children interpret null and overt pronominal subjects in adverbial clauses, in which one or more potential antecedents occur before the pronoun (anaphora context) or after the pronoun (cataphora context) in the sentence. In this case, the intention would be to evaluate the higher or lower accessibility of antecedents with anaphoric and cataphoric subject pronouns.

Researching how children produce null and overt pronominal subjects in the indicative context would enable us to check if there is a division of labor between both types of pronouns in production, when expressing an interpretation of coreference or of disjoint reference.

These research topics may help us to have a more complete perspective on the acquisition of different types of pronominal forms as well as confirming the explanatory proposals formulated in this thesis. The issues listed above are left open for future work.

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