Computational complexity and the acquisition of the CP field in European Portuguese

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This paper investigates the production of root *wh*-questions, clefts, topics and embedded declaratives by three children acquiring European Portuguese as L1 from 1;2.0 to 4;5.19. I argue that the emergence order of these constructions in the child's speech is explained by the complexity of the syntactic computation. After reviewing the accounts that this notion has received in the literature, I present a characterization of syntactic complexity couched in the minimalist framework (Chomsky 1995, 2001).

1. Introduction

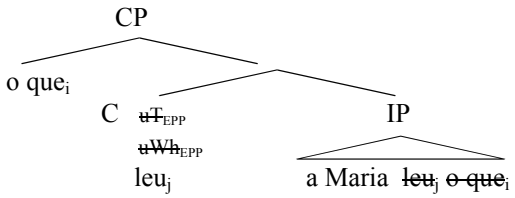
In European Portuguese (EP hereafter), there are several different syntactic constructions that require a visible constituent in the CP domain: *wh*-questions, topicalization constructions, clefts and embedded declaratives. This paper concentrates on the production of these sentences by three native Portuguese children from 1;2.0 to 4;5.19. It will be argued that CP is projected in an early stage of language development (Stromswold 1990, Hyams 1992, Verrips & Weissenborn 1992, Poeppel & Wexler 1993) and that the acquisition of the constructions involving the left periphery mentioned above is determined by the complexity of the syntactic computation. The paper is organized as follows: in the next section, I briefly refer to some relevant syntactic properties of the constructions involving the left periphery. Section 3 addresses the main conclusions of previous studies on the acquisition of the CP field. In section 4 I present a characterization of syntactic computational complexity after pointing out the accounts that this notion has received in the literature. Section 5 characterizes the corpus analyzed in this study. The results are presented and discussed in section 6, and final remarks are found in section 7.

2. Some remarks on the constructions in focus

2.1. Wh-questions

In EP, root *wh*-questions present a fronted *wh*-phrase and subject/verb inversion. The fronting of the *wh*-phrase and verb raising to C are traditionally motivated by the need to satisfy the *Wh*-criterion (May 1985, Rizzi 1991) that regulates the formation of *wh*-structures. This criterion states that a *wh*-operator and a [wh] head must be in a spec-head configuration. A *wh*-feature hosted by the functional head C (Rizzi 1991, 1997) then triggers the movement of the *wh*-phrase to [Spec, CP]. However, it has been suggested that in languages like English and French, the *wh*-feature is hosted by the inflectional node I° (Rizzi 1991). This entails verb movement to C°. Under current minimalist assumptions, it is proposed that C bears an uninterpretable *wh*-feature (*u*Wh) that has to be checked and deleted (Chomsky 2001, Pesetsky & Torrego 2001). The EPP property of this feature requires a *wh*-phrase in the specifier position of CP for deletion of the uninterpretable *wh*-feature, as argued by Pesetsky & Torrego. These authors also claim that T-to-C movement is required for checking reasons: C bears an uninterpretable T feature (*u*T) with the EPP property that may be deleted by a nominative *wh*-phrase or by the verb itself.

(1)



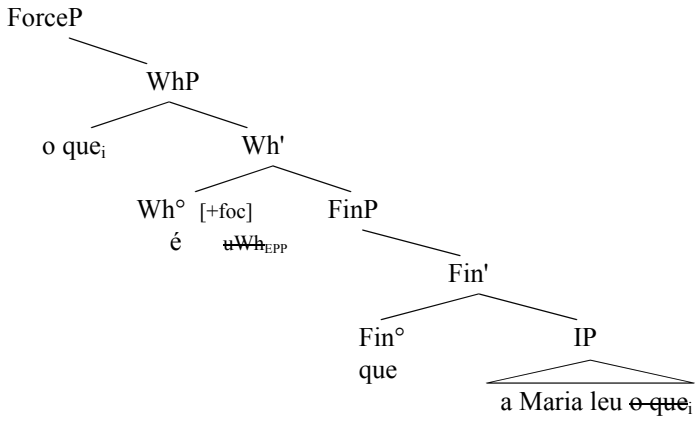
In EP, T-to-C movement is not manifested in all root *wh*-questions.

(2) O que é que a Maria leu?
What is that the Maria read
'What did Maria read?'

In fact, the question in (2) illustrates a usual *wh*-question formation process in colloquial EP: the *wh*-phrase is fronted and it is followed by the 3rd person singular form of *ser* 'to be' in the present tense and by the complementizer *que* 'that'. Duarte (2000) proposes that (2) is a focalized *wh*-question and that the *é que* expression lexicalizes a [focus] feature of the C° head. Assuming the split CP hypothesis (Rizzi 1997), in Soares (2003) I have proposed that *é que* occupies two different head positions in the left periphery: Wh and Finiteness. I have further suggested that *ser* 'to be' lexicalizes a focus feature of the Wh head. Additionally, the complementizer, which is assumed to be in the Force

head in declarative sentences (Rizzi 1997), is in Fin°[1] in interrogative sentences.

(3) *Focalized* wh-*questions*



Summarizing, in EP root *wh*-questions, an uninterpretable *wh*-feature with the EPP property attracts a *wh*-phrase to a specifier position of the CP field. T-to-C movement is motivated by the *u*T feature with the EPP property (Pesetsky & Torrego 2001). Furthermore, in focalized questions a [focus] feature is spelled out by the unmarked form of the copula and Fin° is lexicalized by a complementizer. An important issue is that operator movement and verb movement to the left periphery are independently motivated.

2.2. Topicalization

EP displays the construction usually known as topicalization (Chomsky 1977, Rivero 1980, Baltin 1982, among others, and Duarte 1987, 1996 for EP). In (i)-(viii) I list the basic properties of this construction in EP (from Duarte 1987, 1996).

(i) The phrase that occupies the first position of the clause is linked to a position inside the sentence, an empty category.
(ii) The topicalized constituent and the empty category display referential, case, categorial and thematic connectivity.
(iii) It is not restricted to main clauses.
(iv) It does not show sensitivity to *wh*-islands.
(v) It is compatible with *wh*-movement.
(vi) More than one topicalized constituent is allowed in the same clause.

[1] See Soares (2003) for further details of the proposal.

(vii) Contrary to *wh*-questions with a fronted *wh*-constituent, topicalization construction does not display a clitic-verb order (see also Rouveret 1992).

(viii) The fronted phrase represents old or 'given information'[2] (because it occurred in the preceding linguistic context or because it is prominent in the extralinguistic context). It may also introduce a new topic in discourse or contrast some part of old information with a new predication[3].

It is a well-known fact that topicalization constructions obey strong island constraints (see Duarte 1987 on EP) and since Chomsky (1977), it is widely accepted that topicalization involves the movement of an XP from its base-generated position to the sentence-initial position [4]. Topics have been analyzed as occupying Top, a position external to CP, as in Chomsky (1977), as adjoining to S/IP (Baltin 1982; Lasnik & Uriagereka 1988; Lasnik & Saito 1992) or as occupying the specifier position of a functional projection (Rizzi 1997, Grohmann 2000, among others), Topic Phrase. Duarte (1996), observing that in EP several topics are allowed in the same clause, that they are compatible with *wh*-phrases in questions and that topicalized constructions do not display the clitic-verb order in EP, argues that topicalization is not an instance of *wh*-movement in EP. She claims that topicalization in EP is a scrambling construction and she assumes further that in EP it involves adjunction to IP or to CP. On the other hand, Rouveret (1992), in order to explain the contrasts between enclisis in matrix declaratives and proclisis in matrix or embedded *wh*-questions and in complement declarative clauses, argues for the existence of an autonomous functional head, W[5], that may host clitics when it is projected. This head bears a [topic] feature that requires an XP in its specifier position. Moreover, Rouveret (1992) claims that topicalized constituents are adjoined to this projection or may occupy its specifier position. I will assume, following Rouveret (1992), that a feature in a functional head attracts topic phrases. I assume a topic-projection inside a more articulated CP domain (Rizzi 1997). This projection has the property of being recursive (cf. Rizzi 1997). I further suggest that the topic head bears a [topic] feature that has to be satisfied by the raising of an XP with the matching feature.

2.3. Clefts and é que *clefts in EP*

[2] It never introduces new information and consequently it may not be used for answering questions.

[3] For a complete and detailed description of topicalization constructions in EP, see Duarte (1987, 1996).

[4] Chomsky (1977) assumes that the topic is base generated in [Top, S"]. A null *wh*-operator is moved to C and deleted later.

[5] W stands for Wackernagel.

In EP, clefting is a strategy to encode identificational focus (Kiss 1998). A usual distinction holds between clefts and pseudo-clefts/*wh*-clefts. In EP they have the form in (4) and (5):

(4) ***Cleft***
copula + clefted constituent + cleft clause

a.	Foi	a Maria	que	leu	o livro.
	Be-PAST-sg	the Maria	that	read-PAST	the book

'It was Mary who read the book.'

b.	Foram	os meninos	que	leram	o livro.
	Be-PAST-pl	the boys	that	read-PAST-pl	the book

'It was the boys who read the book'.

(5) ***Pseudo-cleft***
Cleft clause + copula + clefted constituent

Quem	leu	o livro	foi	a Maria.
Who	read-PAST	the book	was	the Maria

'Who read the book was Mary'.

In clefts and in typical pseudo-clefts the clefted constituent follows the copula. However, the pseudo-cleft may also be inverted. Then (6) obtains.

(6) ***Inverted pseudo-cleft***
A Maria foi quem leu o livro.
'Mary was who read the book.'

Another type of cleft in EP presents the invariable expression *é que* as a focalized *wh*-question. As we saw, *é* is the 3rd singular person form of ser ('to be') in the present tense and *que* is a complementizer. An important point to notice is that in this type of cleft the focalized constituent precedes the copula.

(7) **é que *cleft***
clefted constituent + *é que* + cleft clause

A	Maria	é	que	leu	o	livro.
The	Maria	be-PRES	that	ate-PAST	the	book

'It was Mary that read the book.'

For typical clefts and *é que* clefts in EP, Costa & Duarte (2001) have proposed that such clefts have very similar syntactic structures.

(8) *Clefts*
a. $[_{IP}$ ser $[_{SC}$ $[_{CP}$ OP que a Maria leu $]$ $[_{DP}$ o livro $]]]$
a'. $[_{IP}$ foi $[_{SC}$ $[_{DP}$ o livro $]_i$ $[_{SC}$ $[_{CP}$ OP que a Maria leu $]$ t_i $]]$

For these authors in clefts the copula spells out the I° head and the focalized constituent is scrambled[6], adjoining to the small clause. On the other hand, they assume that *é que* is a reanalyzed expression that lexicalizes the Inflection node in *é que* clefts. This would explain its lack of tense and agreement features. Furthermore, the focalized constituent is assumed to move to [Spec, IP].

(9) é que *clefts*

a. $[_{IP}$ é que $[_{SC}$ $[_{CP}$ OP_i a Maria leu t_i] $[_{DP}$ o livro]]]

a'. $[_{IP}$ $[_{DP}$ o livro $]_i$ é que $[_{SC}$ $[_{CP}$ OP a Maria leu] t_i]]

However, assuming that *é que* spells out I° does not explain the availability of sentences like (10) in EP, where both *é que* and *ser* occur:

(10) A Maria é que foi
The Maria be-PRES that was-PAST
quem leu o livro.
who read-PAST the book
'It's Mary who read the book.'

If in (10) the inflected copula spells out I°, as proposed by Costa & Duarte (2001), then *é que* is rather in the left periphery of the clause, as in *wh*-focalized questions (cf. Soares 2003 for further details). If Costa & Duarte's (2001) analysis is right and the syntactic structure of clefts and *é que* pseudo-clefts is similar, we should expect them to emerge around the same period in children's data production. Nonetheless, we will see that this is not the case.

In our corpus, there is only one occurrence of a pseudo-cleft, at 3;10, and only one occurrence of an inverted pseudo-cleft such as the one in (6), at 4;4. This indicates that pseudo-clefts and inverted pseudo-clefts are acquired rather late. In this paper I will focus on typical clefts and on clefts presenting *é que*.

3. *Previous research on the acquisition of CP*

Over recent years, several conclusions have emerged from the investigations on the acquisition of the CP field. It has been shown that:

a) Complementizers are not produced in the initial stages of language acquisition (Radford 1996, Meisel & Müller 1992).
b) Children sometimes produce sentences without overt complementizers that may nevertheless be interpreted as subordinate clauses (Clahsen *et al.* 1996).
c) Children omit auxiliaries or fail to invert the auxiliary in English *wh*-questions (Stromswold 1990, Guasti & Rizzi 1996, Radford 1996).

[6] For arguments in favor of scrambling in EP see Costa (1998).

d) Subject/verb inversion is not attested in the first stages of acquisition of French (Hulk 1996), for example.

The omission of auxiliaries in English root *wh*-questions has been important evidence taken to support the idea that the child's grammar lacks C°. Some authors have argued that *wh*-words are adjoined to VP or to IP in the early stages of language acquisition (cf. Guilfoyle & Noonan 1988, Radford 1996). The lack of embedded sentences in the child's speech has also been interpreted as resulting from a deficit in the child's functional structure (Guilfoyle & Noonan 1988, Radford 1996, Clahsen 1990, Meisel & Müller 1992, Penner 1992). This paper contributes to this discussion by showing that at an early stage of EP acquisition there is evidence for a CP layer in the child's grammar. Furthermore, I will argue that the acquisition of the left periphery is determined by the complexity of the syntactic computation.

4. Computational complexity

The notion of "syntactic complexity" has received different accounts in the literature. Jakubowicz & Nash (2001) and Jakubowicz (2002) propose, for the IP domain, that complexity may be characterized by the properties of functional categories: core functional categories (like I°) are easier to compute than additional functional categories that are merged to the obligatory functional skeleton of the clause (like Past°). The fact that the present tense is mastered earlier than the past tense in normal and impaired language acquisition is explained this way. Kampen (1997) argues that children begin with less complex structures, that is, with structures that require less movement. Other researchers account for complexity in terms of a slightly different view of economy: when the child has the choice between several structures allowed in the same semantic/pragmatic context, (s)he starts by choosing the most economical option, i.e., the one that involves least movement (Hulk & Zuckerman 2000, Zuckerman 2001).

I propose a notion of complexity couched in the minimalist framework (Chomsky 1995, 2001). I assume that the core syntactic operations are *Merge* and *Agree* and that the former is costless. Furthermore, *Move* is a compound operation, composed of Agree / Pied-Piping / Merge, which is consequently more costly. I characterize computational complexity as follows:

(11) <u>Syntactic computational complexity:</u>

a. The application of Move is more complex than the application of Merge.

b. Moving N constituents is less complex than moving N+1 constituents.

My working hypothesis is that - as far as the several constructions involving the left periphery are concerned - less complex structures emerge earlier in the child's speech.

5. The data

The corpus under study corresponds to the spontaneous speech production of three children acquiring European Portuguese (EP) as L1: Marta[7] (1;2.0-2;2.17), Sandra (2;6.3-3;5.17) and Carlota (3;6.24-4;5.19). All three children were recorded monthly at home, in the presence of their mothers. All data consist of video-recordings that were fully transcribed and coded in Chat format and analyzed within the CHILDES system (MacWhinney 1991). Imitations or repetitions of adult's utterances were not taken into consideration.

6. Results and discussion

6.1. Simple extraction: the emergence of wh-*questions and of topicalization constructions*

6.1.1. wh-*questions at an early stage*

Wh-questions are the first constructions that present a constituent that has apparently been extracted from the clausal domain. In fact, even if in EP *wh*-phrases may also occur in situ, *wh*-in situ interrogatives are absent in the early child production. All the *wh*-questions found in the youngest child's files have a fronted *wh*-word, as in (12):

(12) a. **(O) que** é? (1;2.0)
What is
'What is it?'

b. **O(nde)** (es)tá mé-méf? (1;4.8)
Where is lamb
'Where is (the) lamb?'

c. **O(nde)** (es)tá mão? (1;4.8)
Where is hand
'Where is (the) hand?'

d. **Quem** é? (1;4.8)

[7] Marta was videotaped by Maria João Freitas in the framework of the Psycholinguistics Laboratory of the University of Lisbon project PCSH/LIN/524/93, directed by Isabel Hub Faria, whom I thank for making available to me Marta's videotapes (cf. Freitas 1997). I also thank Maria João Freitas for allowing me to use her phonetic transcriptions of Marta's utterances from which I did transcriptions in Chat format.

Who is
'Who is it?'

In Soares (2003) I argued that at this stage there is no conclusive evidence suggesting that the *wh*-constituent moved to a specifier position in the left periphery. The main problem is that all post-verbal subjects attested appear in constructions with copulas, as in (12b,c). In addition, subject questions like the one in (12d) are not evidence for a CP layer either.

Several authors analyze early *wh*-movement as an instance of adjunction to VP or IP (Guilfoyle and Noonan 1988, Radford 1990, 1996). The idea is that adjunction is available to the child earlier than the CP layer. However this proposal raises a learnability problem: if early *wh*-words are adjuncts, what motivates the change to a system where *wh*-words are moved to a specifier position, as in adult language? And when does that change occur?

6.1.2. Topics

The first topicalized constituents appear later than *wh*-questions, from 1;8.18, and they correspond to direct objects, as in (13):

(13) a. Marta: N(ã)o (es)tão dodot.
'Dodots are not here'
Marta: **Dodot** não há!
Dodot not have
'There are no dodots'
%com:she is talking about a baby towel's empty box.

b. Marta: Este!
'this one'
%com:she takes a part of a puzzle.
Mother: ah # ainda não é daqui.
'This one does not belong here'
Marta: **Este** pôr.
This put
'I am going to put this one here'

Topicalized direct objects are not a frequent construction in the corpus. Carrilho (1994), in her study of topicalization in the spontaneous speech production of two Portuguese children from 2;0.2 to 3;3.21 reached a similar conclusion. In tables 1, 2 and 3 we present the topicalized direct objects[8] of the files:

[8] Topics found in our *corpus* convey 'given information'. The topicalized constituent has already been mentioned by the child or by an adult or it is salient in the extralinguistic context (as in adult language). It is also used to introduce a new topic in discourse. Moreover, topicalized direct objects in tables 1-3 were found in declarative sentences and in yes-no questions.

	1;2.0	1;3.0	1;4.8	1;5.17	1;6.23	1;7.18	1;8.18	1;10.4	1;11.10	2;0.26	2;1.19	2;2.17	**Total**
Direct Objects	0	0	0	0	0	0	**2**	3	0	2	0	0	**7**

Table 1. Topicalized direct objects in Marta's files.

	2;6.3	2;6.29	2;7.26	2;8.22	2;9.22	2;11.24	3;0.21	3;1.11	3;2.11	3;3.17	3;4.20	3;5.17	**Total**
Direct Objects	2	0	0	1	0	3	2	3	2	1	3	2	**19**

Table 2. Topicalized direct objects in Sandra's files.

	3;6.24	3;6.30	3;8.0	3;8.28	3;10.4	3;11.1	3;11.29	4;0.26	4;1.24	4;2.13	4;3.18	4;4.15	4;5.19	**Total**
Direct Objects	0	2	6	2	1	0	2	2	0	1	0	1	1	**18**

Table 3. Topicalized direct objects in Carlota's files.

If the emergence of object topics activates a new projection in the left periphery, TopPhrase, which hosts the left-dislocated phrase, we can conclude that the first extractions to the left periphery accomplished by the child involve a single application of *Move*.

6.2. Double extraction: topics in wh-*questions*

By the age of 1;10.4, topics and *wh*-phrases start to appear simultaneously in the left periphery:

(14) a. O gat(o) o(nde) (es)tá ? (1;10.4)
the cat where is
'Where is the cat?'

b. (e)sta # o que tem ? (2;1.19)
this what has
'What does this one have?'

c. este quem é ? (2;1.19)
this who is
'Who is this one?'

However, topicalized subjects[9] in *wh*-questions (cf. 14) are rare, even in the oldest child's files:

	1;2.0	1;3.0	1;4.8	1;5.17	1;6.23	1;7.18	1;8.18	1;10.4	1;11.10	2;0.26	2;1.19	2;2.17	**Total**
Subjects	0	0	0	0	0	0	0	**1**	0	0	**2**	0	**3**

Table 4. Marta's topicalized subjects in *wh*-questions.

[9] I found no examples of topicalized objects in *wh*-questions, although this is possible in the adult system. For a possible explanation for this fact see Soares (in progress).

	2;6.3	2;6.29	2;7.26	2;8.22	2;9.22	2;11.24	3;0.21	3;1.11	3;2.11	3;3.17	3;4.20	3;5.17	**Total**
Subjects	0	0	0	0	0	**2**	0	**1**	0	0	**1**	**1**	**5**

Table 5. Sandra's topicalized subjects in *wh*-questions.

	3;6.24	3;6.30	3;8.0	3;8.28	3;10.4	3;11.1	3;11.29	4;0.26	4;1.24	4;2.13	4;3.18	4;4.15	4;5.19	**Total**
Subjects	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	**2**

Table 6. Carlota's topicalized subjects in *wh*-questions.

Topicalized objects (tables 1-3) emerge before topicalized subjects (tables 4-6). Marta produces her first object topics at 1;8.18 and her first subject topic at 1;10.4. This is not very conclusive since both kind of topic appear nearly at the same period. However, when we look at Sandra's files the contrast is more striking: she starts producing object topics several months before producing subject topics in *wh*-questions. Furthermore, object topics are more frequent than subject topics in the files of all three children.

Carrilho (1994) claims that structures like those in (14) are ambiguous. Since EP is a null subject language, she argues that subject topics in *wh*-questions may also be interpreted as cases of Hanging Topic Left Dislocation[10]. She then concludes that topics in child *wh*-questions are base-generated in their surface position, as adjuncts. However, when the object is topicalized it is assumed that there is no ambiguity and only the topicalization analysis is possible. As we saw, topicalized objects emerge before topicalized subjects and this seems to indicate that when left-dislocated subjects emerge the child is able to analyze them as cases of topicalization. It is more difficult to maintain the idea that left-dislocated subjects are understood as HTLD knowing also that these constructions do not surface before 3;5 in the corpus under study (cf. Soares in progress). This suggests that the topicalized subjects in (14) are moved from an internal sentence position.

Furthermore, I argued in Soares (2003) that the *wh*-phrases in (14) can only be analyzed as occupying a specifier position of the left periphery. It follows from this that in (14), *Move* was applied to two different constituents. Under (11) this is more complex than the application of *Move* to a single constituent, explaining why topics in questions emerge later than topics in declarative sentences.

Summarizing, these results show that (i) fronted *wh*-words arise via *Move* at least from 1;10.4, (ii) the CP domain is available in the child grammar in an early stage (Stromswold 1990, Hyams 1992, Verrips & Weissenborn 1992, Poeppel & Wexler 1993), (iii) the co-occurrence of a topic and of a fronted *wh*-phrase emerges later that the simple extraction of a topic.

Another phenomenon that shows that computational complexity determines the emergence of syntactic structures entailing the left periphery is the absence of V-to-C movement in child Portuguese, as we will see in the next section.

[10] For Duarte (1987) and Carrilho (1994), the empty category in the subject position may be interpreted as a *pro* (and in that case we would have a case of HTLD) or as a variable (and we would have a case of topicalization).

6.3. No V-to-C raising to the left periphery: a preference for Merge over Move

In Soares (2003) I showed that in EP early acquisition data, V-to-C raising is not attested. The most important argument in favor of this claim is the absence of subject/verb inversion in *wh*-questions produced by children. In fact, children's questions that have a lexical subject are always focalized questions, as in (15), even at a late stage of language development:

(15) a. Qual <u>é qu(e)</u> eu vou fazer ?
Which is that I will do
'Which is the one that I am going to do?'
Sandra (3;3.17)

b. O qu(e)<u>é qu(e)</u> a minha mãe descobriu?
What *é que* the my mother discovered
'What did my mother discover?'
Carlota (3;6.30)

I argued that the absence of head movement to the CP domain is a result of a preference for *Merge* over *Move*: merging *é que* is more economical than verb movement (Soares 2003). Since *wh*-questions presenting V-to-C movement and focalized questions are allowed in the same context in EP the fact that children only produce focalized questions shows that they chose the option that involves least movement (cf. also Hulk & Zuckerman 2000, Zuckerman 2001).

6.4. Some more complex constructions: clefts and embedded declaratives

The oldest child was already producing clefts and *é que* clefts when I began to videotape her at 3;6.24 and the youngest child was not yet producing these kinds of structures. I thus focus on the production of Sandra (2;6.3-3;5.17). An important fact is that in Sandra's recordings, *é que* clefts appear from 2;7.26 (cf. (16a), before clefts, which are produced from 3;0.21 (cf. (16b)):

(16) a. A minha mãe é que vem fazer um
The my mother is that comes to do a
ba(r)co pa(ra) mim. (Sandra 2;7.26)
boat for me
'It's my mother who comes to make a boat for me.'

b. Sou eu que quero. (Sandra 3;0.21)
Am I that want
'It's me who wants.'

Another significant piece of evidence is that *é que* clefts are produced at a stage where focalized *wh*-questions are also produced:

	2;6.3	2;6.29	2;7.26	2;8.22	2;9.22	2;11.24	3;0.21	3;1.11	3;2.11	3;3.17	3;4.20	3;5.17	**Total**
Wh-focalized questions	**4**	0	3	2	1	1	2	0	1	2	24	56	**96**

Table 7. Focalized *wh*-questions in Sandra's files.

These facts suggest that there is a correlation between the emergence of focalized *wh*-questions on the one hand and the emergence of *é que* clefts, on the other. This also suggests that both constructions have a similar syntactic structure. Also, clefts and embedded sentences emerge later than *é que* clefts and at about the same period. The first embedded sentence with a lexical complementizer is produced at 2;9.22.

The late emergence of embedded declaratives calls for an explanation. We saw that there are strong arguments to say that the child's grammar does not lack CP; *wh*-questions that present a topicalized constituent (from 1;10.4) and focalized questions (from 2;6.3) are strong arguments in favor of this claim. Therefore, the absence of embedding before 2;9.22 may not correlate with a functional deficit in the child's grammar. Additionally, the child is able to produce declarative complementizers in answers to *wh*-questions, for instance, before producing embedded sentences:

(17) ADU: O que é que disseste?
'What did you say?'
CHI: <u>Que</u> ab(r)i isto.
That (I) opened this (Sandra 2;6.3)

The example in (17) strongly suggests that the production of complementizers is dissociated from the emergence of embedding in EP.

The late emergence of clefts also needs to be explained. We saw in § 2.3. that clefting is a strategy to encode identificational focus in EP. However, I would like to argue that the unavailability of clefts in the early stages of language acquisition cannot be explained by the failure to encode identificational focus, which expresses exhaustive identification (E. Kiss 1998), by children. In fact, before producing clefts children know how to express exhaustive identification. An argument supporting this idea is the fact that children are able to produce *é que* clefts earlier (from 2;7.26). A second argument is that children also produce a structure very similar to clefts in a very early period of language acquisition: answers to *wh*-questions introduced by *ser* ('to be'), as in (18):

(18) ADU: Quem é que te deu esta prenda?
'Who gave you this gift?'
CHI: Foi a João.

Be-PAST the João. (Marta 2;1.19)

In fact, in EP two kinds of answers to *wh*-questions are possible:

(19) A: Quem leu o livro?
'Who read the book?'
B: **A Maria.**
'Mary.'
B': **Foi a Maria.**
Be-PAST the Mary

However, the exhaustive reading is available only when the constituent in the answer is preceded by an inflected form of *ser* ('be'). The point I wish to make is that children are aware of this contrast when they start to produce answers introduced by *ser* ('to be'), from 2;1.19. Furthermore, at this period they have enough syntactic knowledge to encode identificational focus in answers to *wh*-questions. I suggest that in order to accomplish the derivation of embedded sentences and clefts children have to deal with a more significant level of complexity. Embedded declaratives and clefts clauses correspond to CP domains but are dependent CP domains, for instance, they are tense-dependent clauses. In root *wh*-questions and in *é que* clefts, we expect C° to contain specifications concerning the clausal type. In embedded declaratives and in cleft clauses, C° most likely contains specifications that account for its dependent nature. And this constitutes an additional source of complexity for the child.

7. Conclusions

In this paper I have argued that the emergence of different syntactic structures entailing the left periphery is determined by the complexity of the syntactic computation, which is essentially characterized in terms of the nature and number of operations involved in a derivation. An important finding is that the production of complementizers is dissociated from the emergence of embedding in EP. Furthermore, it was demonstrated that there is a correlation between the acquisition of focalized *wh*-questions and *é que* clefts. Additionally, it was argued that language acquisition data from EP do not support the standard syntactic analysis of Portuguese clefts and *é que* clefts (Costa & Duarte 2001).

Acknowledgements

I would like to thank Alain Rouveret and Celia Jakubowicz for their comments and encouragement. I am grateful to the Fundação para a Ciência e a Tecnologia (Portugal) that supports this research (doctoral grant PRAXIS

XXI/BD/20006/99). I also thank the Ecole doctorale Cognition, Language, Interaction (University Paris 8) for a travel grant to attend Console XII. All errors are my responsibility.

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