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Effects of syntactic structure on the comprehension of clefts

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The present paper presents an experiment testing Portuguese-speaking children's comprehension of different types of subject and object clefts – *é que* clefts, standard clefts and pseudoclefts. We consider previous studies that explain asymmetric difficulties in the comprehension of structures with object A-bar extraction as an effect of featural intervention, and we show that only *é que* clefts and standard clefts (as opposed to pseudoclefts) involve a configuration justifying intervention along these lines. Featural intervention accounts therefore predict that comprehension asymmetries between subject and object clefts are only found in *é que* clefts and in standard clefts, but not in pseudoclefts. Our study supports the featural intervention account. In addition, it also supports the claim that different syntactic structures underlie the different types of clefts under analysis: pseudoclefts are distinguished from other clefts for not involving extraction of the clefted constituent in an intervention configuration.

Keywords: clefts; subject-object asymmetries; European Portuguese; acquisition; featural intervention

1 Introduction

European Portuguese (EP) displays different types of cleft structures, with distinct syntactic and pragmatic properties, that have been the object of several research studies (Casteleiro 1979; Ambar 1999; Costa & Duarte 2001; Lobo 2006; Soares 2006; Barbosa 2013; Vercauteren 2015; among others). In (1) we list different cleft structures available in European Portuguese.¹

- (1) a. standard cleft
Foi este ator que a Academia escolheu.
be.PAST this actor that the Academy choose.PAST
'It was this actor that the Academy chose.'
- b. wh-cleft
Foi este ator quem a Academia escolheu.
be.PAST this actor who the Academy choose.PAST
'It was this actor who the Academy chose.'

¹ We specifically refer to European Portuguese, since there are some differences between European Portuguese and Brazilian Portuguese in what concerns the cleft structures available and their syntactic properties.

- c. pseudocleft
 Quem a Academia escolheu foi este ator.
 who the Academy choose.PAST be.PAST this actor
 ‘Who the Academy chose was this actor.’
- d. inverted pseudocleft
 Este ator foi quem a Academia escolheu
 this actor be.PAST who the Academy choose.PAST
 ‘This actor was who the Academy chose.’
- e. *é que* cleft
 Este ator é que a Academia escolheu.
 this actor be.PRS that the Academy choose.PAST
 ‘It was this actor that the Academy chose.’

The clefts in (1a–d) are available in many other languages (Bernini & Schwartz. eds. 2006) and they all express a single semantic proposition by using two syntactic clauses (Hedberg 1988). But (1e) is a cleft available only in Portuguese – no identical construction can be found in any other Romance language. This particular cleft type, unlike other clefts, corresponds to a single syntactic clause, as we will see in section 2.

It is commonly assumed that a cleft sentence breaks into two parts, which are linked by the copula: the clefted constituent, adjacent to the copula, and the cleft clause, which corresponds to a *wh*- or to a *that*-clause:

- (2) It is [the actor] [that the Academy chose].
 CLEFTED CONSTITUENT CLEFT CLAUSE

Even though the relation between the clefted constituent and the cleft clause has received different analyses, several studies assume that the clefted constituent (or pivot) is extracted from the cleft clause (e.g. Modesto 1995; Jones 1996; Kiss 1998), via A-bar movement:²

- (3) It was [this actor] [that the Academy chose ~~the actor~~].

If the moved element is a lexically restricted DP object,³ as in (3), and if it crosses an overt lexical subject, a configuration in which intervention effects occur arises. Since the subject also contains a lexical NP restriction, it intervenes between the head and the tail of the A-bar chain. Children are sensitive to these effects, which have been explored in other structures involving A-bar movement, namely relatives and *wh*-questions, and justify comprehension difficulties (Friedmann, Belletti & Rizzi 2009; Belletti & Rizzi 2013).

When we deal with a derivation in which such movement does not occur, intervention effects are not expected. If a subject is extracted, as in subject clefts, no intervention effects arise:

- (4) It was [the Academy] [that ~~the Academy~~ chose this actor].

And in the case of a construction which does not involve extraction of the clefted constituent from the cleft clause, no intervention effects arise either. We will argue that pseudoclefts are such a construction:

- (5) [Who chose this actor] [was ~~who chose this actor~~ [the Academy]].

² Some researchers consider that it-clefts (or the corresponding standard cleft in EP) are copular sentences (Costa & Duarte 2001; a.o.) while others propose a configuration in which a copula selects a complementizer domain.

³ A lexically restricted DP is a DP that includes a lexical overt noun phrase (see Friedmann, Belletti & Rizzi 2009).

As we will see in section 2, in (5) only the cleft clause is extracted from the small clause in which the predication relation with the clefted constituent *the Academy* was established.

Although the comprehension of clefts by children has been explored for other languages, most studies have been conducted with English-speaking children (Lempert & Kinsbourne 1978; Dick et al. 2004; Aravind, Hackl & Wexler 2017). Data from the acquisition of other languages is therefore necessary to provide crosslinguistically robust findings to the processes that underlie the comprehension of complex sentences. In the present paper, we explore the effects of syntactic contrasts in the comprehension of clefts by European Portuguese-speaking children. Our central aim is to verify the predictions of the hypothesis holding that a stricter version of a locality principle, Relativized Minimality, operates in early grammars (Friedmann, Belletti & Rizzi 2009; Belletti & Rizzi 2013). Furthermore, there are cleft types in European Portuguese (EP) that are not available in other languages, and EP differs from English in several respects, including the availability of null subjects. Our study will thus enrich the language acquisition literature, by considering the robustness of crosslinguistic findings in a typologically different language.

This paper investigates children's comprehension of three different cleft structures available in EP – standard clefts, *é que* clefts and pseudoclefts. To our best knowledge, no research on the comprehension of clefts was carried out before for Portuguese.⁴ Pseudoclefts differ from standard clefts and *é que* clefts in what concerns their syntactic properties, allowing the claim that in the case of pseudoclefts, as opposed to *é que* and standard clefts, no intervention configuration is observed and thus allowing us to test the predictions of a featural intervention model, along the lines of Friedmann, Belletti & Rizzi (2009) and Belletti & Rizzi (2013).

We present the results of a truth value judgment task and show that the acquisition results support not only the featural intervention hypothesis, but also a syntactic analysis for pseudoclefts that does not involve extraction of the clefted constituent, unlike what happens in standard clefts and *é que* clefts.

The paper is organized as follows: in section 2, we present the core syntactic properties of EP clefts under observation and the analysis we assume for these structures; in section 3, we summarize previous findings regarding early production and comprehension of clefts and in section 4 we present our research questions, the predictions that follow from former results and the experimental study; in sections 5 and 6, we discuss our results and summarize our main conclusions.

2 Three types of European Portuguese cleft structures

Clefts are syntactic structures that put a sentence constituent into focus (Rochemont 1986; Lambrecht 1994; 2001). The partition of cleft constructions into a clefted constituent and a clefted clause is identical in different languages:

- (6) *English*
It was [the book] [that Mary wrote].
- (7) *French*
C' est [le livre] [que Marie a écrit].
It is the book that Marie has written
'It's the book that Mary wrote.'

⁴ As for production, Lobo, Santos & Soares-Jesel (2016) have shown that subject clefts are generally more frequent than object clefts, and that pseudoclefts are less frequent than standard clefts and *é que* clefts.

- (8) *Portuguese* (standard cleft)
 Foi [o livro] [que a Maria escreveu].
 was the book that the Maria write.PAST
 'It's the book that Mary wrote.'

A copula, a form of *be*, introduces the clefted constituent. In (6) to (8), the clefted constituent *the book/le livre/o livro* is the focused constituent and the cleft clause, which expresses presupposition, is traditionally considered a CP introduced by a complementizer or a *wh*-word (Heggie 1988). The examples in (6)–(8) above illustrate a particular type of cleft: standard cleft (the *it*-cleft in English). Other clefts share several properties with standard clefts but present specific syntactic properties – *é que* clefts (9) and pseudoclefts (10):

- (9) *é que* cleft
 O estudante é que o professor ajudou.
 the student is that the teacher helped
 'It was the student that the teacher helped.'
- (10) pseudocleft
 Quem o professor ajudou foi o estudante.
 who the teacher helped was the student
 'Who the teacher helped was the student.'

In standard clefts and pseudoclefts, the copula exhibits obligatory tense agreement with the main verb (see Ambar 2005). Also, there is person and number agreement between those two elements, when a subject is clefted. The examples in (11) show that missing tense agreement between the copula and the main verb or missing person and number agreement between the copula and a clefted subject gives rise to ungrammaticality:

- (11) a. standard cleft
 Foram os rapazes que ganharam a maratona.
 were the boys that win.PAST.3PL the marathon
 'It was the boys that won the marathon.'
- a'. *É/*São/*Foi os rapazes que ganharam a maratona.
 is/are/was the boys that win.PAST.3PL the marathon
- b. pseudocleft
 Quem ganhou a maratona foram os rapazes.
 who win.PAST.3SG the marathon were the boys
 'Who won the marathon were the boys.'
- b'. *Quem ganhou a maratona são/foi/é os rapazes.
 who win.PAST.3SG the marathon are/was/is the boys

A possible line of analysis introduced by Chomsky (1977) and further developed by other researchers (e.g. Williams 1980; Rochemont 1986; Heggie 1988; Kiss 1998; Merchant 1998; a. o.) proposed that there is a predication relation between the clefted constituent and the cleft clause.⁵

Although there have been different analyses for EP clefts by different authors,⁶ we will consider here, following Soares (2006), that the copula is introduced by an expletive and

⁵ Belletti (2015) explores this idea by considering a Pred head internal to the cleft clause.

⁶ See for instance Ambar (1999; 2005), Costa & Duarte (2001) and Vercauteren (2015).

selects a clausal constituent.⁷ The clefted constituent is extracted to the left periphery of the constituent selected by the copula (see Soares 2006, for arguments sustaining this proposal; see also Lobo 2006). This extraction is an instance of A-bar movement (Chomsky 1977). Note that, when the clefted constituent is extracted from an object position within the embedded CP (but not when it is extracted from the subject position), it crosses the subject of the embedded clause, as schematized in (12):

- (12) [_{TP} pro [_{TP} Foi [_{VP} [_V ~~foi~~ [_{XP} o livro [_{X'} [_{CP} [_{C'} que [_{TP} a Maria
was the book that the Maria
escreveu ~~o livro~~]]]]]]]]]
wrote

Pseudoclefts present relevant differences. A central point is the fact that they include a *wh*-clause. Many researchers considered that pseudoclefts are copular constructions that involve a small clause configuration (Higgins 1973; Heggie 1988; Costa & Duarte 2001; a.o.). The status of the *wh*-clause is controversial – some authors considered it a free relative (Akmajian 1979; Heggie 1988; Costa & Duarte 2001), others argued that it does not exhibit the properties of relative clauses (Ambar 2005), and others sustained that it corresponds in fact to an embedded *wh*-question (Den Dikken, Meinunger & Wilder 2002; Barbosa 2013). The discussion of the whole syntactic properties of pseudoclefts falls beyond the scope of this paper. We will assume Costa & Duarte's (2001) proposal according to which a pseudocleft corresponds to a copular construction presenting an unselected *wh*-clause, a domain in which *wh*-movement occurs. Furthermore, we will follow Lobo, Santos & Soares-Jesel's (2016) proposal according to which an anaphoric dependency relation must be established between the focused constituent and the *wh*-constituent within the cleft clause. This anaphoric relation determines the interpretation of the sentence. In (13) we present the structure that we assume for a pseudocleft.

- (13) [_{TP} [_{CP} Quem ganhou a maratona] foram [_{SC} ~~quem ganhou a maratona~~
who win.PAST the marathon were
[_{DP} os rapazes]]]
the boys

The relevant fact for the present discussion is that in (13) the clefted constituent *os rapazes* ('the boys') is not extracted from the cleft clause. For what is relevant in the discussion carried on in this paper, we should also consider object pseudoclefts, such as (14) below. In that case, within the cleft clause, an object (a *wh*-constituent, *quem* 'who') is moved crossing an overt subject (*a professora* 'the teacher'). However, as it is always the case in pseudoclefts, this *wh*-constituent is never lexically restricted.

- (14) [_{TP} [_{CP} Quem a professora reprovou quem] foram [_{SC} quem a
Who the teacher flunked were
~~professora reprovou quem~~ [_{DP} os rapazes]]]
the boys

The third type of cleft under investigation is the *é que* cleft. The *é que* cleft presents a copula, as in other cleft types, but it does not show tense, person or number agreement:

⁷ Since EP is a null subject language, an overt expletive is not required (see (12)).

- (15) a. O estudante é que o professor ajudou.
 the student is that the teacher help.PAST
 'It was the student that the teacher helped.
- a' *O estudante foi que o professor ajudou.
 the student be.PAST that the teacher help.PAST
- b. Os estudantes é que o professor ajudou.
 the.PL student.PL be.PRS that the teacher help.PAST

In these clefts, *é que* is invariable and it has consequently been considered a lexicalized expression in C (Soares 2006). An argument in favour of the idea that both elements form a single unit is the fact that no element can intervene between the copula and the complementizer (Ambar 1999; 2005; Costa & Duarte 2001; a.o) (see 16):

- (16) *O estudante é **realmente que** o professor ajudou.
 the student be.PRES.3SG really that the teacher help.PAST

We will follow Soares (2006) and Lobo (2006) and consider that *é que* clefts, unlike standard clefts, are simple clauses in which *é que* occupies a functional head in the C domain. The clefted constituent is extracted to a position in the left periphery of the clause (see Soares 2006 and Lobo 2006 for argumentation in favor of this analysis). A representation of *é que* clefts is provided in (17).

- (17) [_{XP} o estudante [_{X'} [_{CP} [_C [_C é que] [_{TP} o professor
 the student is that the teacher
 ajudou ~~o estudante~~]]]]]
 help.PAST

In this case, when the clefted constituent is the object, it crosses the subject position, which may be lexically overt, and c-commands the copy of the object in the tail of the chain. Therefore, to this extent, *é que* clefts pattern with standard clefts – a fact to which we will come back later.

Summarizing the analysis that we assume here, *é que* clefts, unlike standard clefts, correspond to a unique clausal domain. However, in both constructions, the clefted constituent is extracted to a peripheral position, crossing the subject when it is extracted from an object position. This contrasts with the derivation of pseudoclefts: pseudoclefts are copular sentences (in line with Costa & Duarte 2001) and the clefted material is not extracted from the cleft clause.

Notice that although there are differences between these three cleft structures in the kind of discourse context in which they are felicitous,⁸ all of them are adequate to convey contrastive focus:

⁸ *É que* clefts, for instance, are not appropriate in informational focus contexts:

- i) A: Quem chegou? 'who arrived?'
 B: a) #O pai é que chegou. 'Daddy is that arrived.'
 b) Foi o pai que chegou. 'It was Daddy that arrived.'
 c) Quem chegou foi o pai. 'Who arrived was daddy.'

- (18) A. O pai chegou.
the father arrived
- B. a) Não. A mãe é que chegou.
no the mommy is that arrived
- b) Não. Foi a mãe que chegou.
no be.PAST the mommy that arrived
- c) Não. Quem chegou foi a mãe.
no who arrived be.PAST the mommy
'It was mommy who arrived.'

Therefore, the possibility of marking contrastive focus is a common property of all types of cleft structures. This is precisely the kind of context that we will consider in our study.

3 Previous studies on the acquisition of clefts and subject-object asymmetries

In this section, we review the results of previous studies on the acquisition of clefts, summarizing results based on spontaneous and elicited production and stating our limited knowledge of children's comprehension of different types of cleft structures. We also discuss general subject-object asymmetries in the comprehension of other structures involving A-bar extractions and relate it to the study of clefts.

3.1 Early production of clefts

Only a few studies investigate the production of clefts. Hupet & Tilmant (1989) designed an elicited production task and tested French speaking children from 4 to 10 years. Their results allowed to identify a significant subject/object asymmetry in cleft production. Children produced more clefts in the subject condition than in the object condition. Contrastive stress on the object was the strategy that children preferred to use in order to focus this constituent.

Soares (2006), working specifically on European Portuguese, examined the spontaneous production of constructions entailing the left periphery of the clause, such as clefts, in the speech of three children from 1;2 to 4;6 years. She explored the idea that syntactic complexity constrains the emergence order of the different constructions involving the C-domain. Her idea is that language acquisition is affected by developmental constraints such as working memory, which are sensitive to the complexity of derivations (Jakubowicz 2011). In particular, she proposed that embedding entails a dependence relation between the head of the embedded clause and a superordinate category which represents an additional computational load for children. From this work resulted the prediction that cleft constructions that do not involve embedding (namely, *é que* clefts) are expected to emerge earlier than other clefts.

Lobo, Santos & Soares-Jesel (2016) did a combined analysis of Soares (2006) and Santos (2006) data and examined the spontaneous production of clefts in the speech of six Portuguese children (1;6–4;6). They found that there was no statistically significant difference between the emergence of *é que* clefts and the emergence of standard clefts in spontaneous production, but they also concluded that the production of clefts which include a wh-clause, such as pseudoclefts, was extremely rare, whereas standard clefts and *é que* clefts were significantly more frequent in child speech. According to the authors, the production of clefts including a wh-constituent was delayed because children must learn

that in these clefts an anaphoric dependency between the clefted constituent and the *wh*-constituent must be computed. Another relevant finding was the fact that subject clefts were more frequent than clefts presenting a clefted constituent other than a subject. The two types of asymmetries were confirmed by the authors with an elicited production task used to test children from 3 to 6 years: children and adults almost never produced clefts in conditions other than the subject condition;⁹ in addition, *wh*-clefts were also found to be rare in elicited production, contrasting with *é que* and standard clefts.

Puppo, Pivi & Cardinaletti (2015), in a study on the acquisition of Italian, found the same extremely marked asymmetry between elicited production of subject and object clefts (only those two types of grammatical relations were considered): children never produced object clefts, even though they produced some object relatives (at significantly lower levels than subject relatives, as expected).

Therefore, Hupet & Tilmant (1989), Puppo, Pivi & Cardinaletti (2015), and Lobo, Santos & Soares-Jesel (2016) have all found in the production of cleft structures an asymmetry between subject clefts and object clefts, even though extended to the clefting of other constituents in the latter study. The same study on Portuguese equally found a frequency asymmetry between *é que* and standard clefts, on the one hand, and pseudoclefts, on the other hand.

3.2 Early comprehension of clefts

The comprehension of a cleft involves syntactic, semantic and pragmatic knowledge, including the knowledge which allows the speaker to: i) interpret changes in word order and link moved elements to their base-generated position; ii) interpret the appropriate information structure, the type of focus and its presupposition. Different studies have investigated how some of these properties of clefts develop in young children. We will review some of them, concentrating mainly on the syntactic properties of clefts, since this is the focus of our research.¹⁰

The syntactic properties of clefts, namely the displacement of a constituent and the chain established between the clefted constituent and the copy left in the cleft sentence, have been considered in different studies, namely those concerned with subject-object asymmetries in the comprehension of clefts.

Bever (1970) used an Act-Out task to investigate children's comprehension (2;0 to 4;11) of different kinds of structures in which the order of the arguments does not correspond to the canonical subject – verb – object order. The study included cleft sentences, and overall children had worse results in object cleft sentences (*It's the horse that the cow kisses*) than in subject cleft sentences (*It's the horse that kisses the cow*). These results were confirmed by Lempert & Kinsbourne (1978), who used an Act-Out Task to investigate whether children correctly interpret sentences with non-canonical word orders, including passives and what they call "inverted clefts", which are *it*-clefts with a clefted object (e.g. *It's the truck that the wagon bumps*). The authors compare the comprehension of these sentences with the comprehension of sentences with canonical word order, including active sentences and subject clefts (e.g. *It's the cow that bumps the horse*). The children tested, aged 3;8 to 6;9 years-old, obtained better results with sentences with canonical word orders (actives and

⁹ In non-subject conditions, adults and children preferred to produce simple clauses or fragments displaying a prosodically focused constituent or fragments.

¹⁰ Semantic and pragmatic properties of clefts, including their exhaustive reading, have been investigated by Heizmann (2007; 2012), for English and German, and by Lobo & Vaz (2012) and Vaz (2012), for European Portuguese. Children aged 3 to 5 distinguish cleft sentences from simple declarative sentences, although children's interpretations initially differ from those of adults, since children more often accept non-exhaustive readings for clefts.

subject clefts), and worse results in object clefts and in passives. These authors explain children's difficulties by hypothesizing that children initially follow an "agent first" heuristic. Therefore, in sentences with the linear word order N – V – N children would interpret the first N as the agent. Dick et al. (2004), who investigated the development of the comprehension of subject and object it-clefts, and also active and passive sentences, by English-speaking children and adolescents aged 5 to 17, comparing typically developing children with different groups of linguistically impaired children, have found similar subject-object asymmetries in the comprehension of it-clefts and longer reaction times in object clefts.

Thornton, Kiguchi & D'Onofrio (2016), however, show that children have grammatical knowledge of constraints that do not simply rely on linear word order. Following previous studies, the authors investigate whether children apply binding principles at levels of representation other than the surface syntax, that is whether they are able to reconstruct in two kinds of cleft sentences, involving the computation of Principle C (e.g. *It was Spot that he brushed*) and bound variable readings (e.g. *It was her pig that every girl carried*). To have the right interpretation, children had to be able to reconstruct the cleft constituent in its base position within the cleft sentence. The authors used a truth value judgment task with short stories, following Crain & Thornton (1998). The children tested, aged from 4;0 to 5;5 years-old, correctly rejected sentences that violated Principle C and accepted sentences with bound variable readings in a significant number of cases. The authors argue that these results show that children at 4 years old already have access to an abstract level of representation where reconstruction takes place and use c-command relations to compute the interpretation of cleft sentences.

More recently, Aravind, Hackl & Wexler (2017) question the nature of the subject-object asymmetry identified in the previous literature (namely Bever 1970; Lempert & Kinsbourne 1978; Dick et al. 2004) by investigating English-speaking children's comprehension of it-clefts and pseudoclefts. Aravind, Hackl & Wexler (2017) aim at assessing children's syntactic and pragmatic knowledge involved in the comprehension of clefts and argue that most previous experiments used to test the comprehension of clefts ask children to interpret cleft structures in infelicitous contexts. They also aim at determining whether a word-order-based interpretative strategy (an "agent first" heuristic) is indeed what explains children's interpretation of clefts. For this reason, they compare it-clefts with pseudoclefts: whereas object it-clefts do not present the default SVO order, in the case of pseudoclefts it is the subject cleft that does not conform to SVO (19). As in the discussion carried by Aravind, Hackl & Wexler (2017), we only refer to the word order of subjects and objects with a lexical NP restriction.

- (19) Aravind, Hackl & Wexler (2017: 6, 9; adapted)
- | | | |
|----|---|---------------------|
| a. | It's a cat that the dog is chasing . | Object it-cleft |
| | O S V | |
| b. | What the dog is chasing is a cat . | Object pseudocleft |
| | S V O | |
| c. | What is chasing the cat is a dog . | Subject pseudocleft |
| | V O S | |

The results obtained allow the authors to claim that only in infelicitous contexts do children show difficulties in the comprehension of clefts: in a first set of experiments, the subject-object asymmetry found in previous studies, with lower accuracy in the comprehension of object clefts, was replicated with it-clefts only in infelicitous contexts. When pseudoclefts were tested, a subject-object asymmetry was also found in infelicitous contexts, but in this case children revealed difficulties not in object pseudoclefts (which conform to an SVO

word order, see 19b), but in subject pseudoclefts (which show a different word order, see 19c). According to the authors, “children’s unexpected success on object pseudoclefts and failure on subject pseudoclefts is predicted, however, on a view on which children adopt word-order-based interpretive heuristics when they can” (Aravind, Hackl & Wexler 2017: 23). The authors claim that these results do not support a general difficulty with the syntax of clefts (good comprehension was found in felicitous contexts), instead subject-object asymmetries in comprehension of clefts are taken to be merely superficial.

3.3 Subject – object asymmetries in the comprehension of structures involving A-bar movement

It is well-known that subject-object asymmetries have been found in child acquisition of different A-bar movement structures, including wh-questions, relative clauses, and topicalization structures (Corrêa 1995; Friedmann, Belletti & Rizzi 2009; Cerejeira 2009; Adani et al. 2010; Costa, Lobo & Silva 2011; Abalada 2012; Costa, Grillo & Lobo 2012; among many others). The fact that the derivation of (some) clefts involve A-bar extraction of a constituent to a left-peripheral position in the clause (see section 2) makes these structures a good testing ground for different explanations for subject-object asymmetries.

An explanation for these asymmetries, alternative to the “agent-first strategy” mentioned in the preceding section, has been proposed in Friedmann, Belletti & Rizzi (2009) and adopted in many subsequent studies. According to the authors, children’s immature grammatical system is more sensitive to intervention effects: children have trouble connecting the head X of the chain with the tail Z of the moved element when an element Y with at least a partially overlapping set of features intervenes (X c-commands Y and Y c-commands Z):

- (20) **Which monkey did the dog** bite ~~which monkey~~?
- | | | |
|-----------|-------|-----------|
| X | Y | Z |
| [+Q, +NP] | [+NP] | [+Q, +NP] |

In the adult grammar, this kind of configuration is only problematic when the featural specification of the intervening element (Y) is not distinct from the featural specification of the moved element. This happens when we try to extract a wh-word from an indirect question, a weak island context, as in the example below:

- (21) *How do you wonder who cleaned the apartment ~~how~~?
- | | |
|------|------|
| [+Q] | [+Q] |
|------|------|

In (21), the moved wh-word and *who* bear a structural similarity, since they are both specified with the [+Q] feature. Hence, the connection between the moved element and its copy fails. This has been captured in terms of Relativized Minimality, a locality principle in syntactic theory (Rizzi 1990; see Starke 2001 for a complete discussion).

Object root questions do not present a similar configuration. In (20), above, only the chain, but not the intervener, holds the feature [+Q], associated to the interrogative operator. However, according to Friedmann, Belletti & Rizzi (2009), in children’s grammar, the DP “the dog” may also intervene between a displaced wh-element such as “which monkey” and its copy, since children’s grammar would be characterized by a stricter version of the Relativized Minimality principle and would not admit an inclusion configuration in which the potential intervener partially shares features with the chain, as in (20) (also Belletti & Rizzi 2013). Therefore, children’s grammar (contrary to the adults’ grammar) requires that the chain and the intervening element present a disjoint featural

specification. Thus object questions with d-linked wh-elements (as in 20) correspond to configurations that trigger intervention effects in children since the wh-chain and the intervening element share the feature [+NP] (associated to nominal expressions with a lexical restriction). Summarizing, the same locality principle (Relativized Minimality) would be operative in the adult and the child grammars, but children would adhere to a stricter version of Relativized Minimality. Whether this constraint is grammatical or the result of a processing mechanism is a matter of debate. Other studies have shown that adults are also sensitive to these constraints in tasks that are more demanding (e.g. self-paced reading) (Costa, Grillo & Lobo 2012, among others). Therefore, the difficulties may equally be seen as a processing constraint which relies on grammatical features and which is subject to development.

Several studies have investigated which type of features and configurations are relevant for intervention. The effects seem to be stronger when the morphological features shared by the moved element and the intervener overlap (including gender and number features) (Adani et al. 2010; Belletti et al. 2012). However, the effects of a lexical restriction on the moved element and on the intervener have been particularly explored, as explained above. Several studies found asymmetries between d-linked and non d-linked object wh-questions (Cerejeira 2009; Friedmann, Belletti & Rizzi 2009; Baião 2013; Baião & Lobo 2014), between restrictive and free object relatives (Friedmann, Belletti & Rizzi 2009), and between headed object relatives with a *pro* subject and headed object relatives with a lexical subject (Friedmann, Belletti & Rizzi 2009). In all these cases, when either the moved element or the intervener is a pronoun, therefore not a DP containing a lexically overt noun phrase (it does not have a [+NP] feature), the results in the comprehension of object extractions improve and no subject-object asymmetry was found in children's comprehension.

The comprehension of object cleft sentences has been less frequently explored in the general framework of the discussion of intervention effects, possibly given the syntactic and pragmatic complexity of clefts. In what follows, we present the rationale and the research questions of the present study, which aims at exploring the existence of intervention effects in clefts, considering the syntactic diversity of different types of clefts in European Portuguese and using a protocol that maintains felicitous conditions for clefts to occur.

4 The experimental study

4.1 Comprehension of different types of EP clefts: Research questions and predictions

In this study, we consider the well documented subject-object asymmetries in structures with A-bar movement, but also the syntactic properties of different cleft structures available in European Portuguese. In particular, we aim at comparing adults' and children's comprehension of *é que* clefts, standard clefts and pseudoclefts, which we divide in two types according to their syntactic derivation and according to the assumptions made explicit in section 2 ((22) recovers the information on the syntactic structures of these different types of clefts): the derivation of *é que* clefts (22a) and of standard clefts (22b) involves A-bar movement of a constituent, which may be lexically restricted, as in (22a, b). When the clefted constituent moves, it crosses a DP that may also present a lexical restriction. If both constituents are lexically restricted, an intervention configuration arises. This is typically the case of object clefts; the derivation of a pseudocleft does not involve such movement, since in this case only a non-lexically restricted wh-element (*quem* 'who' in 22c) is extracted internally to the CP. In (22) potential interveners are represented in bold.

We therefore consider the following research questions:

- a) Are there subject-object asymmetries in Portuguese-speaking children's comprehension of clefts?
- b) Are these subject-object asymmetries, if found, exclusive of *é que* and standard clefts and do they negatively affect the interpretation of object clefts?
- c) If subject-object asymmetries extend to pseudoclefts, does the asymmetry found in these structures go in the reverse sense, i.e. lower accuracy is found with subject pseudoclefts?

Assuming the analysis outlined in section 2 for EP clefts, and assuming that intervention effects (structurally defined, namely in terms of c-command) and not word-order-based strategies determine the interpretation of clefts, we predict:

- i) subject-object asymmetries in the comprehension of both *é que* clefts and standard clefts: in this case, accuracy rates with object clefts are expected to be significantly lower than with subject clefts;
- ii) the inexistence of a subject-object asymmetry in the comprehension of pseudoclefts, since they do not correspond to a configuration in which featural intervention is expected.

In order to test the comprehension of standard clefts, *é que* clefts and pseudoclefts, we conducted an experiment using the truth value judgment task (Crain & Thornton, 1998) and manipulating two within-subjects independent variables: type of cleft (standard cleft, *é que* cleft and pseudocleft) and grammatical relation of the clefted constituent (subject vs. object). In what follows, we explain the method used and the results obtained.

4.2 Method

4.2.1 Participants

Forty preschool children (aged 4;0–5;09) participated in the study. All children were monolingual speakers of European Portuguese living in the Lisbon area, from middle socio-economical status, and with no previous diagnoses of language disorder. The children were tested in a quiet room in the kindergarten they attended. In addition, the experiment was applied to a control group of 20 adults. The information concerning subjects is summarized in Table 1.

4.2.2 Experimental design, materials and methods

The task consists in setting up an experimental scenario which includes pictures that are seen by the child and described by a puppet. The child is instructed to accept or reject the puppets' description of the scenario (the experimental item). Our major concern was to provide the child with a felicitous context to accommodate a cleft. As noted before, Aravind, Hackl & Wexler (2017) point out that previous studies on the comprehension of clefts fail to provide felicitous contexts for clefts, in which the pragmatic requirements on the use of a cleft are satisfied. Since our central goal was to evaluate possible interven-

Table 1: Subjects.

Group	N	Age range	Mean age
4-year-olds	20 (9 F, 11 M)	4;0–4;8	4;2
5-year-olds	20 (9 F, 11 M)	5;0–5;9	5;3
Adults	20 (13 F, 7 M)	18–38	24

tion effects comparing different syntactic configurations associated to different clefts, we privileged only contexts that satisfied discourse and pragmatic constraints on cleft use and which could work for the three different types of clefts tested.¹¹ Since the three cleft structures we considered are all felicitous in contrastive focus contexts, our experiment tested the comprehension of clefts in this context.

As we noted in section 2, it is a well-known fact that the cleft clause denotes presupposition (Akmajian 1970; Higgins 1973; a. o.). For a cleft like (24) to be felicitous, it must be clearly established in the context that the monkey is being hugged by someone:

(24) It is the boy that is hugging the monkey.

In our experimental design, each scenario corresponds to two images that settle two reverse situations that are described by the investigator (cf. Figure 1). A puppet was also looking at the pictures. Before starting, each child was told that the puppet was talkative and that she liked to talk about things she sees but sometimes she could be distracted. The test started with the presentation of the two pictures by the investigator to the puppet, who was also looking at them.¹² Each picture was described by a simple transitive sentence, as shown in Figure 1.

The pictures' description and in particular the two reverse situations represented in the pictures establish the relevant context for a cleft to be uttered, assuming that a cleft is associated with focus, particularly contrastive focus. After hearing the description, the puppet pointed to one of the pictures, describing it by using a cleft. The focus of the cleft, expressed through prosodic prominence, felt always in the clefted constituent. The child was then asked to say whether the puppet's description was correct. In (25), we present the test item associated with Figure 1:

(25) *Puppet (pointing to picture 1):*
 Aqui, é o menino que está a abraçar o macaco.
 here is the boy that is PREP hug.INF the monkey
 'Here, it is the boy that is hugging the monkey.'
Expected answer: False.

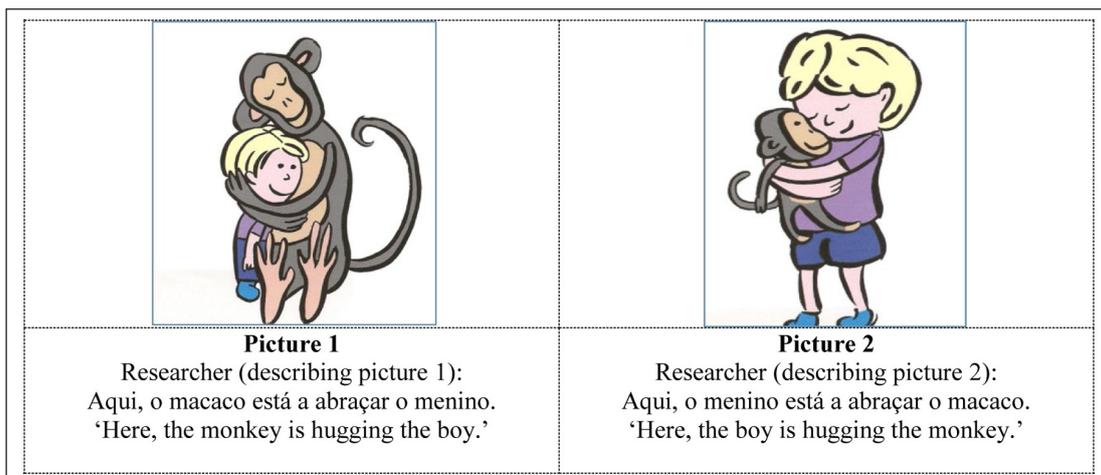


Figure 1: Pictures used to test a subject standard cleft.

¹¹ Our experimental design was conceived independently, before the publication of Aravind, Hackl & Wexler (2017).

¹² We thank Naama Friedmann, who authorized the use of the pictures.

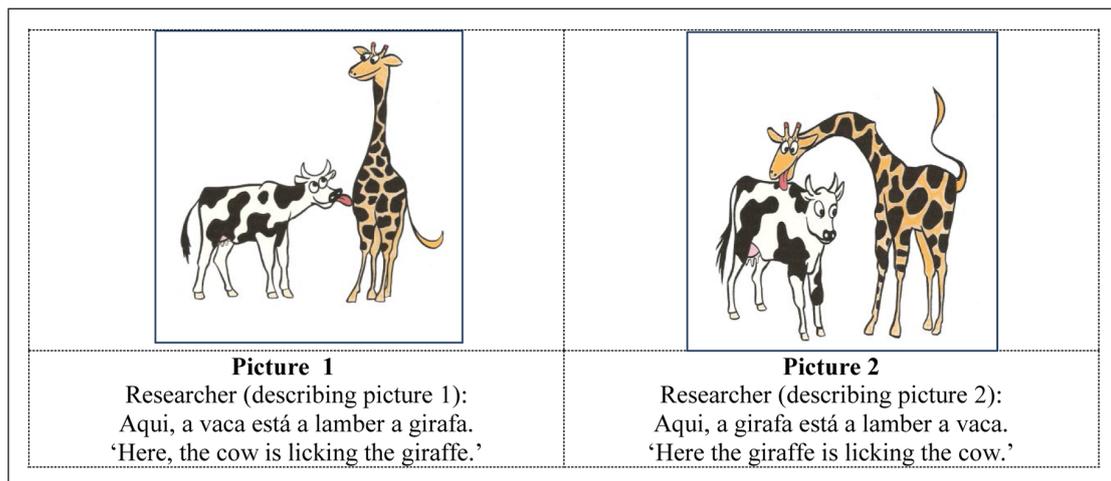


Figure 2: Pictures used to test an object pseudocleft.

In Figure 2, we present a pair of images associated to an item testing an object pseudocleft and we present the protocol used to describe the images and to set the context for the test sentence. In (26), we present the test sentence associated to the context presented in Figure 2.

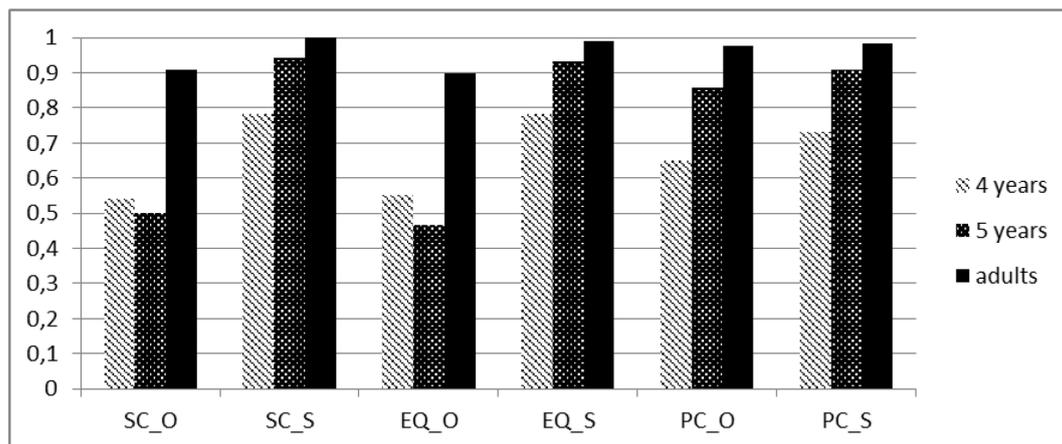
- (26) *Puppet (pointing to picture 1):*
 Aqui, quem a girafa está a lamber é a vaca.
 here who the giraffe is PREP lick.INF be.PRS the cow
 'Here, who the giraffe is licking is the cow.'
Expected answer: False.

Type of cleft (standard cleft, *é que* cleft and pseudocleft) and Grammatical relation of the clefted constituent (Subject, Object) were crossed in a 3×2 design, resulting in 6 conditions. In order to construct a balanced experiment, and even though we expected that yes-bias effects could occur (see discussion in Crain & Thornton 1998), not only clefts expected to be judged as false were presented to the child, to avoid different biases: each of the 6 conditions was tested through 4 sentences designed to be judged as false and 2 designed to be judged as true, resulting in a total of 36 test items. Since the false items are core cases for the analysis (adult answers in this case cannot be obtained by a general acceptance tendency), the number of true and false items in the task is uneven. Additional false and true distractor items with declarative sentences were included. In the appendix, we present the complete list of the experimental items included in the experiment.

4.3 Results

We begin by presenting the global results obtained in each condition: in Graphic 1, we present the means of individual proportions of correct answers obtained in the six items for each condition. In the graph, as well as in the presentation of the statistical analysis, SC stands for standard cleft, EQ for *é que* cleft, PC for pseudocleft. In addition, the extension _O stands for an object cleft and _S for a subject cleft (e.g., SC_O identifies the object standard cleft condition).

The observation of the graph allows two main observations, one pointing to a subject/object asymmetry and another pointing to an asymmetry between types of clefts and suggesting the possibility of an interaction between the two variables. In first place, the results globally show lower proportions of correct answers in the case of object clefting than in the case of subject clefting. However, this asymmetry seems to be obvious in



Graph 1: Global results: mean correct answers.

the case of standard and *é que* clefts, but not in the case of pseudoclefts. The child groups, especially the 5-year-olds, seem to show better performance with object pseudoclefts than in other cases of object clefts (*é que* and standard).

A generalized linear mixed model (GLMM) executed in SPSS 22 was used to analyze the data. We wanted to verify the effect of the within subjects independent variables (Cleft type and Grammatical relation) and the effect of age as between subject factor. Since our hypotheses justified the expectation that a subject-object asymmetry would affect only children and would not be found in all types of clefts, we wanted to verify the effect of a Cleft type by Grammatical relation by Age interaction. Finally, we needed to accommodate the effects of a possible “yes-bias effect” affecting the judgment of children, which justified an Age by Expected answer (True vs. False) interaction.

Therefore, fixed effects entered into the model were Age_Group (4 years, 5 years, adults), Cleft type (SC, EQ, PC), Grammatical relation (Subject vs. Object) and a three-way interaction Age_Group by Cleft type by Grammatical relation interaction. In addition, a two-way interaction Age_Group by Expected_Answer (True vs. False items) was entered into the model. Subject was entered as a random factor. The model showed significant main effects of Age Group ($F(2,2139) = 4.024, p = .018$), and of the Age Group by Cleft type by Grammatical relation interaction ($F(12,2139) = 5.118, p < .001$). It also showed significant main effects of the Age Group by expected answer interaction ($F(3,2139) = 12.904, p < .001$).

We should first focus the yes-bias effect found in the data. As expected, the child groups, and particularly the 4-year-olds, are more likely to give the expected answer when this answer is True than when it is False. Sidak-corrected pairwise comparisons included in the model show significant differences between True and False items in the two child groups, but not in the adult group, which go in the expected direction: 4 years, True vs. False, $t(2139) = 5.844, p < .001$, 5 years, True vs. False $t(2139) = 2.838, p = .005$, adults, True vs. False n.s ($t(2139) = .028, p = .978$). However, the model equally showed the effect of the independent variables and interactions under scrutiny.

As for the global effect of Age, the model shows significant differences between the two child groups (4 vs. 5 years, $t(2139) = -2.836, p = .014$), but it showed no significant difference between 5 year-olds and adults. In this case, we need to look at the three-way interaction including age.

As for the interaction Age_group by Cleft type by Grammatical relation, which is the most relevant piece of the analysis allowing us to discuss our hypotheses, the Sidak-corrected pairwise comparisons included in the model allow us to confirm our predictions. First, we contrast subject and object clefts for each cleft type within each age group.

In this case, a major contrast is found confirming a difference between pseudoclefts and the other types of clefts. In the case of pseudoclefts, in no group a significant difference was found between subject and object clefts. This contrasts with what happens in the case of *é que* clefts and standard clefts: in this case, in the two child groups and also in the adult group, we found a significant effect of the subject/object contrast. In what follows, we detail these results: (i) for the adult group, and in the case of *é que* clefts, S vs. O, $t(2139) = 2.851, p = .004$; in the case of standard clefts, S vs. O $t(2139) = 3.019, p = .003$; (ii) for the 5 year-old group, in the case of *é que* clefts, S vs. O $t(2139) = 7.723, p < .001$; in the case of standard clefts, S vs. O $t(2139) = 7.229, p < .001$; (iii) for the 4 year-old group, in the case of *é que* clefts, S vs. O $t(2139) = 3.948, p < .001$; standard clefts, S vs. O $t(2139) = 4.082, p < .001$.

In addition, a comparison between the different types of object clefts for each age group shows significant differences between object pseudoclefts and object *é que* and standard clefts in the 5 year-old group: object pseudocleft vs. object standard cleft $t(2139) = 6.069, p < .001$; object pseudocleft vs. object *é que* cleft $t(2139) = 6.662, p < .001$. In the case of the 4 year-olds, who show in pseudoclefts global results lower than the other age groups (see Graph 1), the difference does not reach significance.

We can therefore conclude that (i) a subject vs. object asymmetry is found only in the comprehension of *é que* and standard clefts (as opposed to pseudoclefts) and (ii) clefting an object in the case of a pseudocleft does not affect children's comprehension in the same way as clefting an object with a standard cleft or an *é que* cleft. Moreover, the analysis shows that standard and *é que* clefts pattern together.

5 Discussion

The results obtained in this experiment allow us to give clear answers to our research questions. First, we were interested in verifying whether subject-object asymmetries could be replicated in the comprehension of clefts while maintaining felicitous contexts for cleft structures. Our results show that subject-object asymmetries can be found in *é que* clefts and standard clefts and that cleft structures should be undoubtedly added to the set of structures derived through A-bar movement which display this type of asymmetry.

Most importantly for the discussion of our hypotheses, the subject-object asymmetry we found did not arise with all types of clefts: only *é que* clefts and standard clefts showed the effect, not pseudoclefts. The pairwise comparisons included in the model to analyze the data not only confirmed significant differences between subject and object extractions in *é que* and in standard clefts but also confirmed that the asymmetry goes in the predicted direction: the probability of a correct answer is lower in object clefts than in subject clefts. In addition, the fact that in pseudoclefts no significant differences were found between subject and object clefts (consequently, no disadvantage of subject clefts could be confirmed) argues against the interpretation of comprehension difficulties with clefts as an effect of a word order effect, namely an "agent first" strategy in the interpretation of these structures, as in Bever (1970) or Lempert & Kinsbourne (1978), for instance.

Therefore, we interpret these global results as an argument in favor of the definition of intervention effects in A-bar movement structures along the lines of Friedmann, Belletti & Rizzi (2009) and Belletti & Rizzi (2013), i.e. in terms of featural intervention. In *é que* clefts and standard clefts (see sections 2 and 3), a lexically restricted embedded object is moved to a left peripheral position, crossing an overt (lexically restricted) DP subject (in the case of the sentences tested here). In this situation, intervention effects are expected, particularly in children's comprehension, since the features of the moved element and the intervener are in an inclusion relation – namely both bear the feature [+NP], associated to the lexical NP restriction.

In contrast, in object (and subject) pseudoclefts intervention effects are not expected (see sections 2, 3 and 4.1):

- (27) $[_{TP} [_{CP} \text{Quem o cão mordeu quem}] \text{ foi } [_{SC} [\text{quem o cão mordeu quem}]]$
 who the dog bite.PAST be.PAST
 $[_{DP} \text{o porco}]]]$
 the pig

Since the features of the moved wh-element (which does not have a lexical NP restriction) and of the potential subject intervener (within the cleft clause) are disjoint, no intervention is expected. In this case, indeed no subject/object asymmetry was found. Our results are therefore compatible with a featural intervention account, since the subject-object asymmetry is only visible in *é que* clefts and standard clefts.

The intervention effect identified in *é que* and standard clefts, which is justified by moving a constituent that only partially matches the featural specification of the intervener, has been associated to children's grammars and has been justified by children's difficulty with comparisons between feature sets (Belletti & Rizzi 2013). Children would prefer configurations in which the moved element and the potential intervener bear completely different sets of features (see the case of pseudoclefts). However, our results also show that adults' comprehension of subject and object standard and *é que* clefts significantly differs, even though adults largely outperform children in the comprehension of object clefts. Such asymmetries have been found in previous work on the comprehension of wh-movement when adults face more demanding tasks, such as self-paced reading tasks (Costa, Grillo & Lobo 2012). This result suggests that, even though the adult grammar does not preclude a configuration of inclusion between the featural set of the moved element and the featural set of the intervener, such configuration may be responsible, even in adults, for imposing a greater processing load.

We should now highlight another theoretical outcome of our results. We have shown that intervention effects (justifying a subject-object asymmetry) are found in clefts, but not in all types of clefts: to this extent, standard clefts and *é que* clefts pattern together, contrasting with pseudoclefts. We have already commented on these results, showing that they argue against an "agent-first" strategy as the explanation for the subject-object asymmetries in clefts. Nevertheless, we also interpret these results as an argument offered by language acquisition in favor of a different analysis for pseudoclefts and for standard clefts, as we assumed in section 2: pseudoclefts are copular structures with the clefted DP base-generated in a domain which is independent from the cleft clause and in this case the clefted constituent is not extracted from the so-called cleft clause; in contrast, standard clefts imply extraction of the clefted material from the cleft clause.

What about other general structural effects that may affect the interpretation of different cleft structures? Soares (2006) suggested that a relevant structural difference between *é que* clefts and standard clefts – only the latter involve embedding, which should impose an additional computational load – could play a role in the emergence of the different types of clefts, something expected to happen between two and three years of age. In our data, which exclusively reflects the comprehension of 4-year-olds and 5-year-olds, no effect of embedding seems to be at stake. In general, *é que* and standard clefts pattern together. Even though embedding may increase the processing cost in an initial period of language development, which has an impact in language production (Soares 2006), it seems to play no role in the comprehension of clefts around 5.

Finally, is it the case that the subject-object asymmetry that we find in standard clefts and *é que* clefts is due to pragmatic factors? In section 3, we mentioned the study by Aravind, Hackl & Wexler (2017). The authors found that object it-clefts only posed difficulties in infelicitous contexts. This would lead the participants to resort to a word-order parsing strategy. We cannot exclude that the comprehension difficulties that we have found might disappear or are attenuated with a different methodology. And we should also acknowledge that even though the context we used was appropriate for the production of contrastive focus, it is not absolutely clear that the cleft clause met all discourse-pragmatic constraints and was interpreted as presupposed, since the previous context in our experiment mentioned sentences with two alternative agents and two alternative objects. However, pragmatic infelicity applies not only to object clefts but also to subject clefts, since the context for subject and object clefts was the same. Therefore, if children, when presented with infelicitous contexts, resorted to word order strategies, we would expect them to behave worse in subject pseudoclefts than in object pseudoclefts. Unlike what was found in Aravind, Hackl & Wexler (2017), where participants had a better performance on object pseudoclefts than in subject pseudoclefts, this did not happen in our study. This lack of asymmetry in pseudoclefts compared to an asymmetry in standard clefts and *é que* clefts cannot be solely explained by a word-order strategy. Even though a change in the experimental setting may improve children's behavior, as shown by Aravind, Hackl & Wexler (2017), syntactic constraints also play a role.¹³ The lack of asymmetry that we have found in pseudoclefts (and not a reverse pattern) favors an explanation in terms of featural intervention over a plain word order-based strategy.

6 Conclusion

In the experiment reported in the present paper, we could replicate with clefts, maintaining a felicitous context for a cleft sentence to be uttered, the type of subject-object asymmetry which was already sufficiently documented in other cases of A-bar movement. However, this subject-object asymmetry was not found with all types of clefts, with pseudoclefts not showing the effect, and with *é que* clefts and standard clefts showing a similar pattern. We interpret these results as an argument in favor of the definition of intervention effects in A-bar movement structures along the lines of Friedmann, Belletti & Rizzi (2009) and Belletti & Rizzi (2013), i.e. in terms of featural intervention. We also interpret these results as an argument offered by language acquisition which favors a different analysis for standard clefts and for pseudoclefts, with only pseudoclefts being analyzed as copular structures with the clefted DP base-generated in a domain which is independent from the cleft clause.

Abbreviations

INF = infinitive, PL = plural, PREP = preposition, PRS = present, SG = singular.

¹³ Some methodological issues may also explain the better results obtained in Aravind, Hackl & Wexler (2017). Their experiment 1 contained only sentences that were true varying in the pragmatic adequacy of the cleft sentence according to the previous context, unlike the task we used, which contained cleft sentences that were both true and false according to the context. The False items in their Experiment 2 (which contained both True and False items) did not allow for the reversible interpretation, since the DPs mentioned in the cleft sentence were not involved in the same event and could not be interpreted both as Agents or Patients. Therefore, the accurate rejection of False sentences did not require the syntactic parsing of the sentence, as the authors themselves acknowledge at the end of section 4.2.3.

Additional File

The additional file for this article can be found as follows:

- **Appendix.** Experimental items. DOI: <https://doi.org/10.5334/gjgl.645.s1>

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Competing Interests

The authors have no competing interests to declare.

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