

The acquisition of Catalan clitics and its implications for complex verb structure

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0. *Introduction*

There is a growing body of research on the acquisition of the pronominal system of natural languages. The goal of this paper¹ is to examine the contrast between strong pronouns and clitics in the light of their acquisition; the data considered will be from Catalan, and further data from other languages will also be brought in. Our binding and coreference findings will be shown to have implications for the postulation of complex verb structure.

The first finding in relation to the acquisition of strong pronouns, taken as our point of departure, is the contrast between pronouns and anaphors in English. Chien and Wexler (1990) observed that while (1a), with an anaphor, was an early acquisition, (1b), with a pronoun, was a late one.

- (1) a. John washes himself.
b. John washes him.

On the other hand, McKee (1992) found that this result was not replicated in the acquisition of Italian; children displayed adult-like behaviour for both (2a) and (2b) from early on.

- (2) a. Gianni si lava.
b. Gianni lo lava.

Italian pronouns and anaphors, unlike their English counterparts, are clitics, not strong pronouns.

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Against this background, we examine the acquisition of strong pronouns and clitics in Catalan. Catalan has pronominal clitics, like other Romance languages, and strong pronouns. Clitics and strong pronouns can cooccur in the ‘clitic doubling’ construction, which in Catalan is only possible for dative complements. Strong pronouns cannot be found in isolation in object position (3a), and occur on their own only as PP complements (3b). (3c) to (3e) exemplify the behaviour of clitics: their inability to appear in isolation (3c), to appear in coordination (3d), or to be focused (3e):

- (3) a. *Veig ella.
I-see her
- b. Penso en ella.
I-think in her ‘I am thinking of her.’
- c. -Què has vist? -*La.
what have-you seen it-fem(cl) ‘What have you seen? It.’
- d. *Els i les conec.
them-(cl) and them-fem(cl) know ‘I know them and them.’
- e. *EL conec.
it(cl) I-know ‘I know HIM.’

It is our purpose to consider a wider range of data than McKee, in particular the conditions of: (i) clitics in simple sentences, (ii) clitic doubling, (iii) clitics in complex structures, and (iv) strong pronouns within PPs.

Like Chien and Wexler, we claim that the contrast between anaphors and pronouns, known as the delay of principle B-effect, is not in fact a delay of principle B as understood in the classical binding theory, but rather a lack of processing maturity regarding the application of a pragmatic principle which determines coreference in Reinhart’s theory of binding and coreference; our results will lend support to Grodzinsky and Reinhart’s (1993) pragmatic approach to coreference.

The specific questions we address are: (i) Why is there a contrast between English and Italian? Can the results of McKee be replicated in Catalan? (ii) Is there any delay of principle B-effect to be found in Catalan? (iii) In what way is the difference between clitics and full pronouns relevant to the acquisition of the pronominal system?

The paper proceeds as follows: we first describe the experiment; present its results, and discuss them (sections 1, 2, 3); we also consider cross-linguistic evidence of similar phenomena and argue that they are best treated on a par with our results (section 4). In section 5 we present the results of a pilot study set up to verify one of the predictions of our proposal with regard to complex verb structure.

1. *Description of the experiment*

The experiment carried out is a modified version of Chien and Wexler's (1990) fourth experiment, adapted from Philip and Coopmans (1996). It consists of a truth conditional task conducted by two experimenters. The subjects were presented with 56 items in a pseudo-random order.

The experimental procedure was as follows. At each trial of an experimental condition, one of the picture items was held by one of the experimenters so that the child could see it but the second experimenter could not. The first experimenter or the child himself stated the objects appearing in the picture; when the context was set, the second experimenter, who could not see the picture, would suggest what was happening in each picture. The child's task was to look at the picture and judge whether the proposition (the target input) was correct or not. The experiment was preceded by a brief explanation of the 'game' and children were familiarised with the kind of picture and the kind of characters and events depicted. Unlike in Chien and Wexler's experiment, no proper names were used in the context-setting statements and in the target input, only definite and indefinite descriptions. Grammatical antecedents to the target input were always primed last. The children were interviewed individually for 10 to 15 minutes in two sessions, and the environment was a quiet area of the school.

The subjects were 37 children of ages between 3 and 6, and 26 adult students were also tested as control.

(4)	AGE GROUP	number	mean age	age range
	3-year-olds	3	3,7	3,5 to 3,9
	4-year-olds	12	4,4	4,0 to 4,9
	5-year-olds	16	5,6	5,0 to 5,9
	6-year-olds	4	6,1	6,0 to 6,3

total	37	5,2	3,5 to 6,3
adults	26		

The constructions tested were the following: (i) simple sentences with reflexive clitics (5a), (ii) simple sentences with pronoun clitics (5b), which were both control conditions, and (iii) sentences with clitic doubling of a reflexive clitic (6a), (iv) sentences with clitic doubling of a pronoun (6b), (v) sentences with perception verbs and a reflexive clitic (6c), (vi) sentences with perception verbs and a pronoun (6d), (vii) sentences with a reflexive expression within a PP (6e), (viii) sentences with a pronoun within a PP (6f). Each of these constructions was tested six times, three with an affirmative answer and three with a negative one; to these, fillers were added.

- | | | | |
|-----|----|--|-----------|
| (5) | a. | L'àvia s'eixuga.
the grandmother self-dries
'The grandmother dries herself.' | ZY-ZN |
| | b. | La nena la toca amb la mà.
the girl her touches with the hand
'The girl touches her with her hand.' | PY-PN |
| (6) | a. | L'àvia s'assenyala a ella mateixa amb el dit.
the grandmother self-points to her self with the finger
'The grandmother points at herself with her finger.' | DZY-DZN |
| | b. | La mamà l'eixuga a ella.
the mother her dries to her
'The mother dries her.' | DPY-DPN |
| | c. | La nena es veu ballar.
the girl self sees dance
'The girl sees herself dance.' | CHZY-CHZN |
| | d. | La nena la veu saltar a corda.
the girl her sees skip to rope
'The girl sees her skipping the rope' | CHPY-CHPN |
| | e. | L'àvia assenyala cap a ella mateixa.
the grandmother points towards her self
'The grandmother points at herself.' | PZY-PZN |
| | f. | La mare assenyala cap a ella.
the mother points towards her | PPY-PPN |

‘The mother points at her.’

2. *Results of the experiment*

Control conditions - The 26 adults in the control group gave expected ‘yes’ and ‘no’ answers 100% of the time for all control conditions (ZY-ZN, PY-PN). For the 3-, 4-, 5- and 6-year olds performance on the control conditions was highly adult-like across-the-board, as shown in table (7). The only minor deviation was the 3-, 4- and 5-year olds’ slight tendency to respond ‘yes’ with conditions that elicited an adult ‘no’. This implies that their performance on the experimental conditions may be partially misled by a general strategy of answering affirmatively.

(7) Percentage of ‘yes’ and ‘no’ answers on control conditions eliciting adult ‘yes’ and ‘no’ responses

age group	ZY	ZN	PY	PN
3 yrs	100%	100%	100%	86,6%
4 yrs	100%	83,3%	100%	85,83%
5 yrs	100%	97,5%	100%	84,37%
6 yrs	100%	100%	100%	100%

Test conditions - The 26 adults in the control group gave the expected response 100% of the time for the clitic doubling (DZN-Y, DPN-Y) and perception verb conditions (CHZN-Y, CHPN-Y). Given the percentage of children’s responses in tables (8-9), there is a highly adult-like performance on the clitic doubling conditions (DZN-Y, DPN-Y) and the perception verb construction with anaphors (CHZN-Y), whereas there is a clear non-adult-like response with respect to the perception verb construction with pronouns (CHPN-Y). Childrens’ tendency to give an affirmative answer explained the higher scores on the elicited ‘yes’ responses, with respect to the ‘no’ responses in general.

(8) Percentage of ‘no’ responses on test conditions eliciting adult ‘no’ responses

age group	DZN	DPN	CHZN	CHPN
3 yrs	86,66%	73,3%	76,66%	40%
4 yrs	90%	83,33%	86,66%	32,5%
5 yrs	100%	77,5%	91,25%	32,5%
6 yrs	100%	88,33%	100%	73,3%

(9) Percentage of ‘yes’ responses on test conditions eliciting adult ‘yes’ responses

age group	DZY	DPY	CHZY	CHPY
3 yrs	100%	100%	100%	73,3%
4 yrs	96%	90%	96,6%	75%
5 yrs	100%	80,6%	88,1%	55%
6 yrs	93,3%	100%	93,33%	80%

The adults’ response to the PP condition was 100% with anaphors (PZN-Y), while with pronouns it was 70% and 87% of the time a ‘no’ and a ‘yes’ answer respectively. This is due to the fact that adults allow a coreferential reading of a pronoun following a preposition. It is not clear that the relatively low responses of children with respect to the PP conditions should be treated as non-adult-like performance. We turn to this directly in the analysis.

(10) Percentage of ‘no’ and ‘yes’ responses to the PP condition

age group	PZN	PPN	PZY	PPY
3 yrs	40%	73%	73%	73%
4 yrs	67,5%	60%	90%	60%
5 yrs	73,12%	55%	81,25%	70%
6 yrs	83,33%	40%	83,33%	70%
adults	100%	70%	100%	87%

In order to evaluate the significance of the percentages, in (11) the results of some two-tailed t-tests are given. In the first place, the contrast between the simple and the clitic doubling anaphoric conditions (ZN, DZN) turned out to be non-significant for the children in all groups. Collapsing the age groups into a single sample ($n=37$), the t-tests also show a non-significant contrast between the ZN and DZN conditions ($0,7 < 2,43$). All children in each group showed high levels of adult-like performance on the pronominal simple and doubling (PN, DPN) conditions. As shown by the values in the table, the contrast between the PN and DPN conditions was not significant in any group. Finally, children showed extremely low levels of adult-like performance under the perception verb with a pronoun negative condition (CHPN). This explains why the values in the t-test showed a highly significant contrast between PN and CHPN conditions among 3-, 4- and 5-year olds, and among 4- and 5-year olds between PY and CHPY conditions. Collapsing all children together ($n=37$), we also obtained a significant difference between PY and CHPY ($3,63 >$

2,43). The values found in the contrast between simple and perception verb anaphoric conditions (ZN, CHZN) were not significant in any group.

(11) T-test ($p < 0,02$)

age group	ZN vs. D	ZNPN vs. DPN	ZN vs. CHZN	PN vs. CHPN	PY vs. CHPY
3 yrs t(2)	p = 0,4226	p = 0,4226	p = 0,4226	p = 0,0198	p = 0,1835
4 yrs t(11)	p = 0,4382	p = 0,7705	p = 0,5863	p = 0,0001	p = 0,0105
5 yrs t(15)	p = 0,3332	p = 0,0854	p = 0,3596	p = 0,0000	p = 0,0004
6 yrs t(3)	p = 0,3632	p = 0,3632	p = -	p = 0,0250	p = 0,0756

3. *Analysis of the results*

The results above indicate that the Catalan children have no problem with the binding theory in the cases of (i) simple sentences with pronouns or anaphors, and (ii) clitic doubling constructions with pronouns and anaphors. The principles of the binding theory (in Chomsky's 1981 classical formulation or in Reinhart and Reuland's 1993 formulation) are obeyed, as has been found for other Romance languages (e.g. Padilla 1990 and Baauw et al 1997 for Spanish)². Thus the results of McKee are replicated in Catalan, and therefore the contrast between English and Romance is corroborated.

We argue, with Avrutin and Wexler (1992) and Baauw et al. (1997) that the reason why Romance children differ from English children who seem to allow a coreferential reading of a pronoun with a c-commanding DP (McDaniel, Cairns and Hsu 1990, Chien and Wexler 1990) is related to the fact that clitics (unlike strong pronouns) are not subject to the pragmatic principle that applies to English pronouns which may enter into accidental coreference. It has been claimed that, in the acquisition of English, children display difficulty in applying a pragmatic or semantic principle (principle P in Chien and Wexler 1990, or Rule I in Grodzinsky and Reinhart 1993) and therefore incorrectly allow the English pronoun to corefer with a sentential DP antecedent. Clearly, this difficulty does not interfere with the Catalan speaking children's processing of simple sentences with clitics.

² The binding principles are also known to be obeyed by English speaking children, as shown by their adult-like performance in sentences with quantified subjects:

- (i) Every mom loves her.

Quantified objects, being non-referential, cannot possibly be the antecedent for the pronominal, not even by accidental coreference.

- (12) Rule I: Intrasentential Coreference (Grodzinsky & Reinhart 1993)
 NP A cannot corefer with NP B if replacing A with C, C a variable A-bound by B, yields an indistinguishable interpretation.

In Grodzinsky and Reinhart's words (1993: 88), 'In order to decide whether Rule I allows the pronoun (...) to corefer (...), children must first determine whether the pronoun can be replaced with a bound element. If it could not be, their task would be over and coreference would be allowed'. But when it is possible to obtain an alternative variable-binding interpretation, 'the innate Rule I now requires children to do the following: While still holding the sentence under processing in memory, they must construct two representations, one for the binding option, and another for the alternative coreference reading. Next they must compare the two representations, relative to their context, in order to decide whether they are distinguishable. If they are, coreference is allowed; if they are not, it is ruled out. (...) The execution of all these steps (...) puts a much heavier burden on working memory than do other rules (e.g. the binding conditions) (...) Children know exactly what they are required to do by Rule I, but getting stuck in the execution process, they give up and guess.'

Turning to cases of Romance strong pronouns within PPs, we observed that both adults and children allowed a coreferential reading of the strong pronoun with the DP antecedent:

- (13) a. L'àvia_i assenyala cap a ella_{i/j}.
 the grandmother points towards her
 'The grandmother points at her.'
 b. La mamà_i mira cap a ella_{i/j}.
 the mum looks towards her
 'The mother looks towards her.'
 c. Només [pro]_i pensa en ella_{i/j}.
 only thinks in her
 'She only thinks of her.'

These examples unveil an area where pronouns and anaphors are not in complementary distribution. The bound variable interpretation for the strong pronouns in (13) does not however constitute a violation of the binding principles, since the locative PP constitutes its own domain (see Reinhart and Reuland 1993:689; also de Jong 1996). In fact, we did not

obtain any significant difference between the children's responses and the adult's responses with respect to the PPN condition in any group:

(14)	T-test	
	adults vs. children	PPN
	3 yrs, p (0,02)	t(27)= -21
	4 yrs, p (0,02)	t(36)= -49,68
	5 yrs, p (0,02)	t(40)= -49,27
	6 yrs, p (0,02)	t(29)= -20,19

On the assumption that binding is known by children, they are expected to perform like adults in accepting the coreferential reading of a prepositional strong pronoun with a DP antecedent in contexts such as those illustrated. Although not statistically significant, we comment on the difference between adult and children for this condition at the end of this section.

The experimental results for the sentences of the kind in (15) are more surprising. Children strongly differ from adults in giving a coreferential reading of the clitic and the DP antecedent in 50% of the cases, while no adult could interpret the clitic as coreferential with that DP antecedent.

- (15) La nena_i la_{j/*i} veu ballar.
 the girl her sees dance 'The girl sees her dance.'

The 50% (or: chance) performance on the sentences eliciting negative responses is highly indicative of a breakdown of Rule I; that is, only Grodzinsky and Reinhart's (1993) theory of coreference predicts chance performance as a response when the application of Rule I is too much of a burden for the processing capabilities of children.

Baauw et al. (1997) found similar results for Spanish, although for the Spanish counterparts of (14), *La niña la vió bailar* 'The girl saw her dance', they obtained in fact 64% correct responses in questions eliciting a negative response; this result does not match as neatly as ours the 50% correct response predicted, but this may be due to secondary experimental conditions. Baauw et al. (1997) argue that children differ with respect to adults in that children analyse *la* as both +R and -R (=referentially defective), in parallel with the rest of the pronominal system of Spanish, schematised in (16)

(16)	adult Spanish		child Spanish
	me	-/+ R	me -/+ R
	te	-/+ R	te -/+ R
	la	+ R	la -/+ R
	(Baauw et al. 1997)		

In their view, the coreferential reading is not ruled out by the theory of binding, which does not apply here because the construction involves more than one semantic predicate (since they assume Reinhart and Reuland's 1993 formulation); it is only the A-Chain condition that is violated in the childrens' responses:

- (17) General Condition on A-Chains (Reinhart & Reuland 1993)
 A maximal A-chain ($\alpha_1, \dots, \alpha_n$) contains exactly one link - α_1 - that is both +R and marked for structural Case.

Baauw et al. (1997) conclude that children know the universal condition on chains, but simply misuse the pronominal system (a particular instance of lexical feature acquisition; see Philip and Coopmans 1996). However, it is not clear why the difference in interpretation in (16) above does not hold in all constructions: the non adult-like definition of *la* as + and -R should, according to their hypothesis, lead to non adult-like performance with simple sentences too, contrary to fact.

As an alternative, we want to put forward an analysis which does not rest on any stipulation regarding the features assigned by children to the clitics. Rather, we propose that the delay of principle B-effect found in ECM small clauses in Catalan is indeed the result of the breakdown of Rule I alone. We follow Baauw et. al. (1997) and others in considering that clitics are outside the scope of Rule I, and therefore we do not expect any differences between the interpretation of simple sentences in adults and children. Nevertheless, complex sentences with ECM have been shown to exhibit a delay of principle B-effect, despite the presence of clitics in them. What is crucial to our analysis is the need for an empty pronominal in the small clause of the ECM construction.³ This *pro* element is subject to Rule I and, when the processing of this rule is not optimal (as in young children),

³ The configuration of the ECM clitic (Case-marked accusative) and the empty pronominal in the position of subject of the small clause may be seen as an instance of clitic doubling as devised by Torrego (1994) and Uriagereka (1999).

gives rise to a principle B-effect, i.e. Rule I breakdown. This is only found when the empty pronominal is not linked to a reflexive, in which case the interpretation is fully adult-like, as anaphors are not subject to Rule I.

(18) La nena la veu [[*pro*] ballar]

This empty pronominal must be specified as fully referential (+R, see Reinhart and Reuland 1993), to be subject to the rule of intrasentential reference. If so, since the processing Rule I is a burden beyond the processing capabilities of young children, as argued by Grodzinsky and Reinhart (1993), we expect that the processing of coreference in the perception verb construction will be problematic.

This property singles out perception verb constructions from the simple sentences and clitic doubling constructions in our experiment, and the result of the experiment matches the expectations of rule I breakdown: 50% correct responses, i.e. chance, in the non-coreferential readings. Rule I grammatical sentences (CHPY) also gave significantly low responses, although not chance. With respect to this, the predictions of Grodzinsky and Reinhart (1993) are less straightforward: ‘To decide whether the pronoun can corefer with [a given DP] the child must do more than in the cases of binding (...) - namely, check whether an alternative derivation with a bound element exists. However, unlike what happens in the non-coreference cases, once the child finds out that no such derivation does exist, Rule I already allows coreference and processing is completed, with no need to hold and compare the two representations to the context.’ (Grodzinsky and Reinhart 1993: 91). It is not clear from this that no problem should arise with questions eliciting affirmative responses, which imply nevertheless the comparison of two derivations. Our results indicate that there is indeed some delay of principle B-effect for these sentences.

Turning briefly to the locative PP constructions also tested in our experiment, if our hypothesis is correct, children allow a bound reading of the pronoun just as adults do; on the other hand, when the pronoun 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; i.e. they should respond at chance level when coreference is achieved outside the scope of binding. The combined effect of both coreference and binding being grammatical leads us to expect more than 50% adult-like responses. Thus our relatively low adult-like responses in the PP condition are also a reflection of Rule I breakdown. Baauw et al. (1997) in fact report on work in French where locative PPs were

only 50% adult-like. The difference between our results and the findings in French remains a topic for future research.

To summarise, what characterises the childrens' productions is their inability to process coreferential readings in the structures with a pronoun, as opposed to a clitic. Finally, the fact that clitics alone cannot enter into accidental coreference is corroborated by the facts of adult Catalan: accidental coreference of the kind found in English is not available with clitics in Romance (19), nor is a deictic use of clitics possible. (See Avrutin and Wexler 1992)

- (19) a. Everybody loves Oscar. Even Oscar loves him.
 b. *Tothom estima l'Òscar. Fins i tot l'Òscar l'estima.

4. *Cross-linguistic evidence*

Data are available on the acquisition of the pronominal systems of other languages. Besides McKee's (1992) first work on Italian mentioned above, we will report the results found for other languages with clitics, which furthermore seem amenable to our analysis.

For Spanish, Baauw et al. (1997) obtained the following results for the conditions they considered:

- (20) a. (i) simple S, reflexive: virtually 100% adult-like
 (ii) simple S, pronoun: 90% adult-like
 b. complex S, pronoun: 64% adult-like (for negative responses)

For French, Hamann et al. (1997) found, as in Spanish, that it is in the complex sentences eliciting negative responses that the childrens' interpretation contrasted sharply with the adults'.

- (21) a. (i) simple S, reflexive: 100% (for negative responses)
 (ii) simple S, pronoun: 94% (for negative responses)
 b. complex S, pronoun: 56% (for negative responses)

Further work on Italian by Berger is reported by Baauw et al. (1997) and is of particular relevance to our study, as Berger aimed at comparing strong pronouns and clitics, which in Italian can both appear in object position:

- (22) a. Il ragazzo lo sta indicando.
 the boy him(cl) is indicating
 b. Il ragazzo sta indicando lui.
 the boy is indicating him

Her results indicate that ‘children allowed coreference much more often with constructions with strong pronouns (...) than constructions with a clitic pronoun.’ (Baauw et al. 1997:20).

These results are quite strikingly similar to the results of our experiment. In all cases, low adult-like performance is found in languages with clitics in the complex sentence.

Norwegian pronouns have also been argued to be clitics (Hestvik and Philip 1997) and, in actual fact, sentences in which these pronouns appear as coarguments of the verb are correctly interpreted by children (in simple sentences, 90% adult-like with a non-quantificational antecedent, 99% adult-like with a quantificational antecedent). However, it is unclear how to analyse the results found with non-coarguments of the verb, effected by the anti-subject orientation of Norwegian pronouns (see Hestvik and Philip 1997).

In conclusion, a considerable body of research substantiates now the idea that pronominal clitics behave in a different way from strong pronouns in the acquisition of referential properties. In the same way, Chien and Wexler’s findings for English considered in (1) have been replicated for a considerable number of languages (see Avrutin and Wexler 1992 and references therein). Thus two language groups emerge, depending on the way the so-called delay of principle B-effect manifests itself.

The results of Experiment I together with those reviewed in this section point to two generalisations which no analysis should miss. First, there is a correlation between the absence of principle B-effects in simple sentences and the presence of clitics, and the presence of principle B-effects and the presence of strong pronouns. Secondly, some complex constructions display principle B-effects in all languages, where ‘complex constructions’ is to be understood as applying to a subset of predicates including ECM

predicates. Experiment II has been designed to limit the scope of the complex constructions which allow principle B-effects to surface.

5. *Experiment II*

Experiment II was set up to compare the interpretation of clitics in small clause structures of the type in Experiment I (ECM) with restructuring verbs, aspectual or modal. If, as argued in Picallo (1990) these kinds of verbs do not subcategorise for an embedded clause, and as in Cinque (1999), they appear as part of the functional projection of a sentence, according to our analysis they cannot give rise to any delay of principle B-effect. This follows from the lack of any empty pronominal in the structure subject to coreference by Rule I. As shown below, this prediction is fulfilled. If, contrary to this, a delay of principle B-effect had been found, we would have had good reason to argue for a different analysis of restructuring verbs.⁴

The experimental procedure followed was very much the same as for Experiment I, as were the materials. Each child was shown pictures, consisting of 8 fillers, and 12 test conditions. Each of the test conditions consisted of an accusative clitic included in the main clause of a complex verbal predicate (containing an ECM perception verb or a restructuring verb). The materials were counterbalanced as to (i) whether the adult affirmative or negative response was elicited, (ii) whether a reflexive or non-reflexive action was depicted, and (iii) whether

⁴ There is a sharp contrast in adult Catalan (and Spanish) between the ECM constructions with a perception verb and the sentences with restructuring with regard to the possibility of an overt preverbal subject of the infinitive:

- (i) a. La nena veu *l'àvia* fer bombolles.
the girl sees the grandmother make bubbles
'The girl sees the grandmother blow bubbles.'
- b. ?La nena la veu *a ella* fer bombolles.
the girl her(cl) sees P her make bubbles
'The girl sees her blow bubbles.'
- (ii) *La nena vol *ella* fer bombolles.
the girl wants her make bubbles
'The girl wants her to blow bubbles.'

The presence in the sentences (i) of fully referential DPs may be taken as further evidence for a null referential pronominal in the same position for ECM constructions with a perception verb.

a pronominal or a reflexive clitic occurred in the target input. The method for scoring the children's responses was identical to the scoring method used in Experiment I.

The subjects were 16 Catalan speaking children (mean age: 4,6, range: 4,0 to 4,11); this age range was chosen in order to exclude children having acquired a fully adult-like system, which was found to happen between the ages of 5 and 6 according to the results of Experiment I. As in Experiment I, each child was interviewed individually.

The constructions tested were, together with those in (6c-d) above, (i) sentences with an aspectual verb and a reflexive clitic (23a), (ii) sentences with an aspectual verb and a pronominal clitic (23b), (iii) sentences with a modal and a reflexive clitic (23c), and (iv) sentences with a modal and a pronominal clitic (23d).

- (23) a. La mare es comença a eixugar.
the mother self starts to dry
'The mother starts drying herself.'
- b. L'àvia la comença a eixugar.
the grandmother her starts to dry
'The grandmother starts drying her.'
- c. La nena es vol eixugar.
the girl self wants dry
'The girl wants to dry herself.'
- d. La nena la vol tocar amb la mà.
the girl her wants dry with the hand
'The girl wants to touch her with the hand.'

Table (24) presents a percentage of all total correct answers to all test conditions:

(24) Percentage of adult-like responses with	ECM (<i>veure</i> 'see')	aspectual (<i>començar</i> 'start')	modal (<i>voler</i> 'be able to')
eliciting			
positive resp.	75%	93%	100%
negative resp.	31%	100%	100%
total	52%	96%	100%

We obtained a significant difference by t-test (two tails) between the positive responses to a verb like *veure* ‘see’ and the positive responses to a verb like *començar* ‘start’, where $p = .041$. On the same tests, we obtained a very significant difference between the negative responses to the perception and the restructuring verb conditions, $p = 0.000$ (*veure* vs. *voler*) and $p = 0.000$ (*veure* vs. *començar*). Taking into account both positive and negative responses, we may conclude that the prediction stated above is well borne out. That is, children manifest knowledge of the principles of binding and so correctly reject coreference by coindexation between a pronominal clitic and a local definite subject, namely in contexts of restructuring verbs, where it is assumed that there is only one thematic structure. Rule I cannot apply to restructuring verb structures, as there is no empty pronominal able to establish any coreference (restructuring verb structures constitute a single binding domain); as a consequence, no delay of principle B-effect is attested.

To conclude, we have observed a delay of principle B-effect in the acquisition of Catalan both in sentences with ECM small clauses and in sentences with locative PPs, and we have related this delay to the complexity of the processing of intrasentential coreference. Our analysis corroborates the knowledge of the binding principles by children, and rests on no stipulation regarding their grammatical knowledge in general. Constructions with the presence of clitics alone do not give rise to any delay of principle B-effect, and therefore the source of the misapplication of the rule of intrasentential coreference has been attributed to the presence of strong pronouns in a structure; while full pronouns are overt in the locative PPs, we postulate an empty pronominal in the ECM small clauses with perception verbs; this structure contrast with that of restructuring verbs, for which no embedded subject is proposed and for which, accordingly, no delay of principle B-effect has been found experimentally.

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Appendix

Target inputs for Experiment I

1	PY	La nena l'eixuga.
2	PY	La nena la toca amb la mà.
3.	PY	L'àvia l'assenyala amb el dit.
4	PN	L'àvia l'eixuga.
5	PN	La nena la toca amb la mà.
6	PN	La mare l'assenyala amb el dit.
7	ZY	La nena s'eixuga.

8	ZY	La nena es toca amb la mà.
9	ZY	La nena s'assenyala amb el dit.
10	ZN	L'àvia s'eixuga.
11	ZN	L'àvia es toca amb la mà.
12	ZN	La mare s'assenyala amb el dit.
13	DPY	La mare l'eixuga a ella.
14	DPY	La mare la toca a ella amb la mà.
15	DPY	La nena l'assenyala a ella amb el dit.
16	DPN	La mare l'eixuga a ella.
17	DPN	La nena la toca a ella amb la mà.
18	DPN	La nena l'assenyala a ella amb el dit.
19	DZY	L'àvia s'eixuga a ella mateixa.
20	DZY	La mamà es toca a ella mateixa amb la mà.
21	DZY	La nena s'assenyala a ella mateixa amb el dit.
22	DZN	La nena s'eixuga a ella mateixa.
23	DZN	La mamà es toca a ella mateixa amb la mà.
24	DZN	La nena s'assenyala a ella mateixa amb el dit.
25	CHPY	La nena la veu saltar a corda.
26	CHPY	La mare la veu ballar.
27	CHPY	La nena la veu fer bombolles.
28	CHPN	La nena la veu saltar a corda.
29	CHPN	La mare la veu ballar.
30	CHPN	La nena la veu fer bombolles.
31	CHZY	La nena es veu saltar a corda.
32	CHZY	La mamà es veu ballar.
33	CHZY	La nena es veu fer bombolles.
34	CHZN	La mare es veu saltar a corda.
35	CHZN	La nena es veu ballar.
36	CHZN	L'àvia es veu fer bombolles.
37	PPY	La mare assenyala cap a ella.
38	PPY	La mamà mira cap a ella.
39	PPN	L'àvia mira cap a ella.
40	PPN	La nena assenyala cap a ella.
41	PZY	La nena assenyala cap a ella mateixa.
42	PZY	L'àvia assenyala cap a ella mateixa.
43	PZN	L'àvia mira cap a ella mateixa al mirall.
44	PZN	La nena mira cap a ella mateixa.
45	filler	Tots els elefants porten un globus.
46	filler	Tots els nens porten paraigües.
47	filler	Tots els nens munten a elefant.
48	filler	Tots els nens munten a cavall.
49	filler	Un nen porta tots els paraigües.
50	filler	Un elefant porta tots els globus.
51	filler	Totes les girafes porten un globus.
52	filler	Tots els dinosaures porten un globus.
53	filler	Un nen porta tots els paraigües.
54	filler	Una girafa porta tots els globus.
55	filler	Tots els nens beuen llimonada.

56 filler Una girafa porta tots els globus.

Target inputs for Experiment II

1	VPY	La nena la vol tocar amb la mà.
2	VPN	L'àvia la vol tocar amb la mà
3	VZY	La nena es vol tocar amb la mà.
4	VZN	La mamà es vol tocar amb la mà.
5	CPY	La nena la comença a eixugar.
6	CPN	La mamà la comença a eixugar.
7	CZY	L'àvia es comença a eixugar.
8	CZN	La nena es comença a eixugar.
9	CHPY	La nena la veu fer bombolles.
10	CHPN	La nena la veu fer bombolles.
11	CHZY	L'àvia es veu fer bombolles.
12	CHZN	La nena es veu fer bombolles.
13	filler	La nena l'assenyala a ella amb el dit.
14	filler	La nena s'assenyala amb el dit.
15	filler	La mamà l'assenyala amb el dit.
16	filler	La nena s'assenyala a ella mateixa amb el dit.
17	filler	L'àvia l'assenyala amb el dit.
18	filler	La mamà s'assenyala amb el dit.
19	filler	La mamà l'assenyala a ella amb el dit.
20	filler	La nena s'assenyala a ella mateixa amb el dit.

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