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Subject-Verb Agreement Comprehension in Child Catalan

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ABSTRACT

The present study aims to provide evidence for early subject-verb agreement in Catalan-speaking children through a picture selection task. It follows a series of studies previously developed in the field where asymmetries between production and comprehension on agreement were found (Johnson et al., 2004; Pérez-Leroux, 2005). Results in English seemed to hint that children were not understanding subject-verb agreement by the age of four or five because English has a weak morphological system. However, results on Caribbean Spanish, which possesses a robust morphology set for agreement, branched out into a deeper issue: an asymmetry on production and comprehension of number agreement in favour of an early production. That conclusion challenges the general idea of comprehension preceding production in language acquisition. Catalan and Spanish share a robust morphology system. However, Catalan results presented in this study challenge those previously obtained. Participants on the study did not present any type of comprehension delay. Percentages on mean accuracy in pointing towards the matching pictures were very high in general. While the younger group obtained a 79% of total accuracy between singular and plural sets, the older group was accurate on an 87% of answers. These results go together with recent studies on agreement comprehension other researchers have developed through *eye-tracking* techniques (Brandt-Kobele and Höhle, 2010; González-Gómez et al., 2017). Recent data seems to indicate that, in fact, asymmetries are found due to comprehension tasks being too demanding for children to perform. This study offers an explanation to these contrasts as the result of methodological problems, rather than grammatical asymmetry. Obstacles for children to focus on a certain element may hinder the emergence of linguistic knowledge on the task, especially for younger groups. Results show not only that Catalan-speaking children understand and produce agreement at early ages but also that, under simpler comprehension tasks, children offer a higher level of linguistic knowledge.

***Keywords*:** language acquisition, subject-verb agreement, comprehension task, methodological procedures, asymmetries on agreement.

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1. THEORETICAL BACKGROUND

1.1. Parameter setting in Language Acquisition

In *The Managua Lectures*, Chomsky raised the question on how the system of knowledge of language arises in the mind or brain. For language acquisition, the question derived into how a child can know so much about grammar if he has not been directly taught. Through the idea of Universal Grammar (UG), Chomsky set the foundations of the study on language acquisition: a part of language is innate and unique to humans. Specifically, children are born with mental capacities to acquire a language and build its grammar. Although the principles of UG can account for all human languages, each of them is characterized by independent parameter values. These parameters establish the properties of a language in particular and children under that target language must set them in proper order. Therefore, the parameter values set on Catalan would not be the same as those set in English, but the innate faculty of language would be identical.

Wexler (1998) defined the Very Early Parameter Setting (VEPS) hypothesis. According to VEPS, children set the correct parameters of their target language at an early stage of their learning. This would mean that parameter values are already available when children start producing multiple words combinations. Plural marking, number inflection, word order, verb movement or the availability of a null subject are all parameters that are set from the earliest stages and are observable from the very beginning, although maturation may obscure the fact.

1.2. On asymmetries between comprehension and production

Asymmetries between comprehension and production in language acquisition have been largely studied. Generally, research has always provided evidence for stating that comprehension precedes production. The pattern seems quite clear: children map relevant meanings of lexical and syntactic categories into memory. Later, they are able to access all the relevant information needed in production (Clark, 1993). Research on early production shows that, once children start producing recognizable words, they are usually targeting an answer that is required around them. This would mean that, whenever children are producing a sentence, prior to that they have achieved comprehension. This

is also consistent with the idea of VEPS taking place before production starts. Comprehension, as well as parameter setting, is already set before children start talking.

Asymmetries on early comprehension and later production of singular and plural nouns in English were studied by Anisfeld and Tucker (1967). Basically, their idea is that production requires information to be stored in memory in order to produce meaningful utterances. For comprehension, they conclude that it seems easier to draw generic conclusions without a big database stored in memory. Clearly, both processes depend on phonological forms, semantic information and syntactic rules. However, children seem to use different strategies in production and comprehension. According to Clark and Hecht (1983), whereas comprehending is about inferring what the speaker is intending and relating it to conceptual elements you already own, production depends on the intention the speaker might give and all the articulatory systems required.

Recent studies, however, have shown that asymmetries between comprehension and production with early comprehension are not so clear. Importantly, evidence on earlier production was found. The best-known example could be the Delay of Principle B Effect, according to which, at least in English and Dutch, children did not seem to adhere to the Principle B of Binding Theory. This principle states that pronouns such as *her* cannot be bound within its governing category (Chomsky 1981). Acquisition research showed that although children at the age of six mastered Principle A (an anaphor is locally bound to its antecedent), Principle B seemed not to be applied in all cases (Chien and Wexler, 1990; Grodzinsky and Reinhart, 1993).

On the other hand, for production, Bloom et al. (1994) encountered well-formed constructions with the pronouns *myself* and *me,* which seemed to indicate that children have the ability of distinguishing between a reflexive and a pronoun. Many researches have accounted for these differences by the means of extralinguistic fa performance difficulties or task effects' (extra-grammatical factors, it has also been found that the Delay of the Principle B Effect is not universal, i.e. it is not found on all languages. For instance, it is not found on many Romance Languages. French (Hamann, 1997), Spanish (Baaux et al., 1997), Italian (McKee, 1992) and Catalan (Escobar and Gavarró, 2001) are all languages with clitic production for which evidence of a comprehension delay is much more limited.

Differences between two types of languages have been explained by stating that in Romance, clitics and full DP appear in different syntactic positions, while in Germanic languages they share them (Rooryck and Wyngaerd, 2001).

Hendriks and Koster (2010) also provided several factors which may explain why this early production and late comprehension could occur. Firstly, it could be based on the comprehension experimental task being too demanding. Notice how production is often examined with spontaneous production, but comprehension tasks require rules and instructions that might be challenging for children. At a very young age, a picture selection task would require children not only to examine two pictures, but also compare them and reach a conclusion. A second explanation could be the lack of pragmatic knowledge children have. Because of that, it is important to distinguish between knowledge of grammar, which is innate, and the use of grammar, which must be performed. Asymmetric acquisition, therefore, might widen up due to what must be learned. The final explanation Hendriks and Koster (2010) give is the existence of two different grammars, one that accounts for comprehension and the other that accounts for production. However, if a child possesses two grammars, one for production and another one for comprehension, this would mean he needs to set parameters independently. Nevertheless, his input is still the same. A more parsimonious explanation would involve one single grammar.

1.3. Early production of subject-verb agreement

Agree is one of the fundamental operations of the computational system of the language faculty. Subject-verb agreement is one instance of it, whereby a finite Tense (T) establishes a relation with the subject of the clause. According to Adger (2002), the specification of a finite T would require the following:

T [tense, case feature, uninterpretable N feature]

The subject is in charge of valuing its case feature with the cause feature on T (nom. in Figure 1). Other features are also conveyed, such as the φ-feature, which stands for plural (pl) in the example in Figure 1. In the case of *v*, it contains an uninterpretable inflection feature, which is determined by the features that T already contains. What T contains is actually what the subject has previously valued. The agreement occurs because the φ-

feature on T and the uninterpretable inflection feature of *v* interact (in the case of Figure 1, the plural feature). Once case and tense are valued, the subject moves to specifier to check the uninterpretable N feature that is required for the operation to be fully achieved.

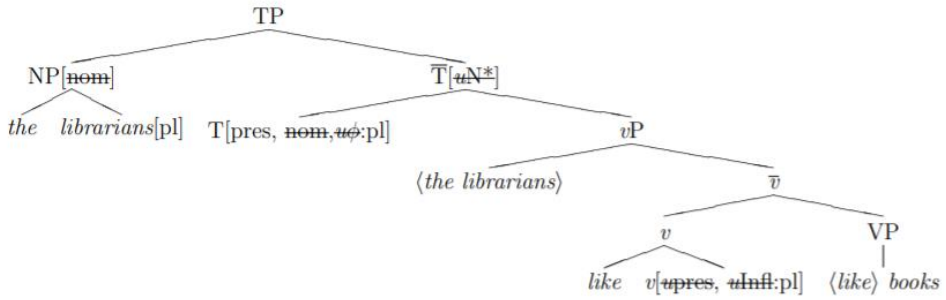


Figure 1. Example of agreement derivation in Adger (2002: 180)

Inflectional morphology is variable crosslinguistically. For instance, English has a very weak inflectional system, as the only agreement overtly found is in the present tense through the third person singular /-s/. Brown (1973) provided evidence for English-speaking children producing third person singular /-s/ on verbs between the ages of 2;2 and 3;10. The acquisition of inflection in English must be taken into account by the Optional Infinitive Stage (Wexler, 1994), where children had not yet matured into acknowledging tense occurs in finite clauses. Children produce inflected verbs from early age, but because they are under the Optional Infinitive Stage, evidences of non-inflected verbs in finite clauses can be found. Nevertheless, Optional Infinitive Stage is still compatible with agreement acquisition. Catalan and Spanish, on the other hand, present a robust inflectional system, with suffixal morphological markers that gives inflection in person, number and tense.

(1) Catalan present tense inflection of *jugar* (‘to play’)

/ʒuɣu/	/ʒuɣ ə/	/ʒuɣ ð
jug-o	jugu-e-s	jug-a
play-1SG	play-TV[1]-2SG	play-3SG

[1] TV stands for. The analysis assumed here is that of Mascaró (1986).

/ʒuɣɛm/	/ʒuɣɛm/	/ʒuɣ ʁ/
jugu-e-m	jugu-e-u	jugu-e-n
play-TV-1PL	play- TV-2PL	play- TV-3PL

(2) Spanish present tense inflection of *cantar* (‘ t o s i n g ’)

/kanto/	/kantas/	/kanta/
cant-o	cant-a-s	cant-a
sing-1SG[2]	sing- TV-2SG	sing-TV
/kantamos/	/kantais/	/kantan/
cant-a-mos	cant-á-is	cant-a-n
sing- TV-1PL	sing- TV-2PL	sing- TV-3PL

Notice how the verbal forms in (1) and (2) can occur on their own, without an overt subject, as Catalan and Spanish are both null subject languages. In a sentence containing an overt lexical subject, person and number could be retrieved not only from the verb but also from the DP both in the determiner article *el* (masc-SG), *la* (fem-SG), *els* (masc-PL), *les* (fem-PL) and in the *-s* morpheme that marks plurality on nouns. See, for example, the sentence in (3). Plurality is found in all elements of the sentences. On the DP, *les* and *nenes* are both plural in themselves. The number is also expressed by the verb. In this case, the third person plural is expressed by the marker *-n.*

(3) Les nenes llegeixen.
D-Fem-PL girls read-3PL
‘ T h e g i r l s r e a d

Although clearly the morphological system has higher complexity, there is evidence to the effect that children whose target languages are Catalan or Spanish are constantly producing subject-verb agreement at the early stages of acquisition. Neither of these

[2] Martínez Celdrán (1975) remarks that on the first- and third-person singular in this inflection, the thematic vowel gets eliminated if it appears before the morpheme -o.

languages have an Optional Infinitive Stage, so inflection is found consistently from early on. In his longitudinal study of spontaneous production of Catalan- and Spanish-speaking children, Torrens (2002) reports that children by the age of 1;10 are already producing inflected verbs with very few errors (see Table 1). Thus, the emergence agreement in production is found very early on acquisition.

	Correct	Error	Correct %
Martí (1;9 – 2;2)	88	0	100%
Guillem (1;9 – 2;2)	51	3	94,4%
Josep (1;9 – 2;1)	49	3	94,2%
Gisela (1;19 – 2;2)	31	1	96,8%
Total 1st period	219	7	96,9%

Table 1. Production of subject-verb agreement in Torrens (2002) study on the first period examined.

In addition, Grinstead (2000) provides further evidence that the early production of inflection in Catalan-speaking children includes the present (4a), the imperative (4b), the gerund (4c) and the participle (4d). Again, this seems to indicate there is no evidence that Catalan- or Spanish-speaking children struggle with inflection at the very early stages of production. If comprehension precedes production, then it is expected for children to fully understand inflected verbs.

(4) a. ‘ a r a c r e Pep (1;8)
now burn-3SG
‘ I t ’ s b u r n i n g n o w . ’

b . ‘ a j u d a Guillem (1;9)
help cl.(acc. 1SG)
‘ H e l p m e . ’

c . ‘ x x x d Pep (1;8)
‘ (u n i n t e l l i g i b l e) s l e e p i n g . ’

d . ‘ c a i g u Laura (1;10)
fall-participle-3SG
‘ F a l l e n . ’

1.4. Comprehension of subject-verb agreement

1.4.1. Evidence for English: Johnson et al. (2004)

As mentioned, English does not have an extensive inflectional morphology, apart from the third person singular, which corresponds to inflected /s/ on the verb (in contrast to no overt marker for all other person-number combinations). Consequently, agreement can be found. Previous studies had shown that agreement by means of third person singular /s/ is already produced in Mainstream American English (MAE) by the age of three. Fraser, Bellugi and Brown (1963) tested whether children had sensitivity to verbal plural markers through a picture selection task. The whole study developed Imitation Comprehension Production (ICP) tasks, which were compared. Children between the ages of 3;0 to 3;8 were tested to distinguish between sentences such as *the deer is running* and *the deer are running*. These examples were sought because the singular and plural form of the subject *deer* are homophonous. So, in order to infer agreement, children had to fully rely on the verb. The comprehension experiment was carried out by a picture selection task, where children were presented two pictures and they had to match the sentences they heard with the correct drawing. Results for the experiment were presented as in Table 2. Fraser, Bellugi and Brown (1963) concluded children did not struggle with agreement.

	Imitation	Comprehension	Production
Total	167	168	68
Correct	166	121	57

Table 2. Responses in Fraser, Bellugi and Brown (1963) for their Imitation Comprehension Production (ICP) experiment.

Following the methodology of Fraser, Bellugi and Brown (1963), Johnson et al. (2004) developed a similar test. The aim for the study was to look at the comprehension of the third person singular /s/ as a number agreement marker in MAE-speaking children. In order to infer the singular or plural only from the verb, all verbs began with an /s/ consonant cluster. In other words, this initial /s/ on the verb would be articulated with the plural /s/ on the subject so agreement was forced to be found exclusively in the verb.

(5) The duck swims on the pond.

The ducks swim on the pond.

The participants were sixty-two English-speaking American typically developing children aged 3-6 years. They were presented a picture selection task. Children had to choose between two pictures. For the example in (5), on one side children saw a picture of one duck swimming while on the other side they were presented with two ducks swimming (see Figure 2).

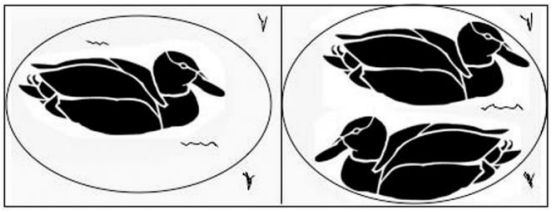


Figure 2. Picture stimulus presented to Johnson et al. (2

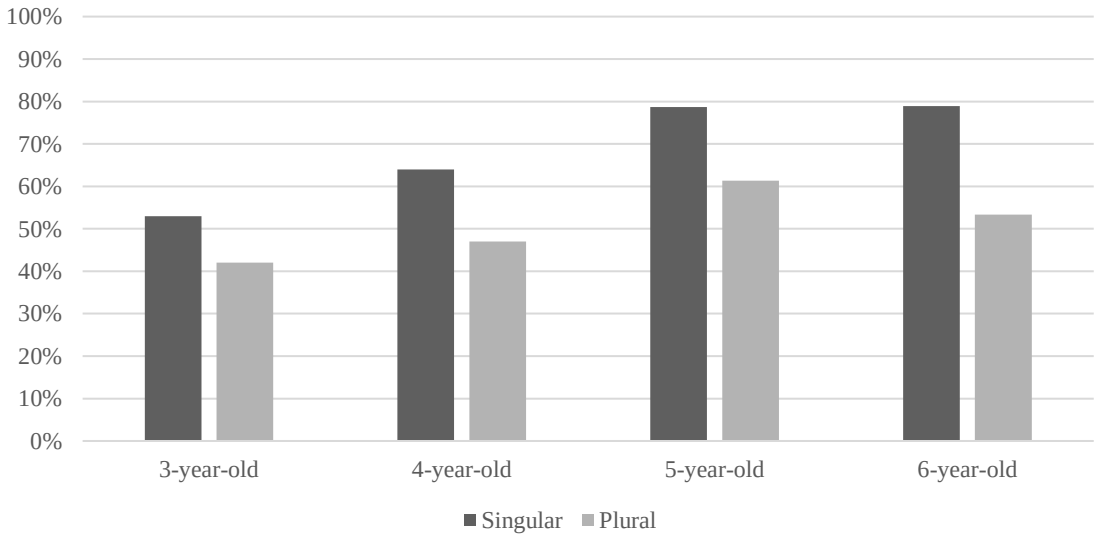
Results on mean accuracy for 3-year-olds children was 52% for singular and a 41% accuracy for plural sentences (see Table 3 and Figure 3). 4-year-olds performed better on singular sentences (64%), but percentage for plural sentences was still low (46%). For 5- and 6-year-olds children, singular was comprehended above 78% but plural seemed rather low. Accuracy was surprisingly low, even at older ages, if we consider the fact that subject-verb agreement occurs frequently in child-directed speech and spoken English in general. All in all, 'older groups showed signif
neither the 3-year-olds nor the 4-year-olds showed a significant s

al. 2004: 9). These results forced researchers to conclude that agreement in English seemed not to be mastered until the age of 5 in English.

Age group	**Percent of accuracy**	
	singular	**plural**
3-year-olds	M= 52.38	M= 41.90
	SD= 22.34	SD= 21.82
4-year-olds	M= 64.44	M= 46.67
	SD= 21.86	SD= 28.28
5-year-olds	M= 78.67	M= 61.33
	SD= 21.74	SD= 35.83
6-year-olds	M= 78.89	M= 53.33
	SD= 27.84	SD= 34.30

Table 3. Means by age for accuracy in Johnson et al. (2004).

Figure 3. Mean % accuracy for subject-verb agreement on Johnson et al. (2004)'s experiment



Johnson et al. (2004) provided two alternative explanations for these results. Firstly, there could be a grammatical computation problem relating to the fact that number marking on the verb stands for an uninterpretable feature that needs to be checked. Secondly, there could be an error on language processing. This would mean comprehension is delayed in English because plural is not systematically present.

> The complexity of the minimal paradigm in English 'present tense' not *just* a marker of singularity, or it would appear after first and second person singular as well. Perhaps given the conjunction of features needed, the child does not represent the regularity as one involving number at all.
>
> (Johnson et al., 2004: 11)

The only marker of verbal number that English has is third person singular /s/. So, for a child to master verbal agreement, he needs to understand the duality of /s/ occurs only for third person singular subjects. Moreover, plurality is not the encoded, much poorer accuracy the children in this s (Johnson et al., 2004: 11). Doubtlessly, these results seem to open a discussion about subject-verb agreement as a case of asymmetry between production and comprehension.

1.4.2. Evidence for Spanish: Pérez-Leroux (2005)

Following Johnson et al. (2004), Pérez-Leroux (2005) presented a similar study for Spanish. Spanish is a language with a strong inflectional morphology, which marks not only the singular, but also the plural (see (3)). Thus, if Spanish-speaking children performed above chance in their comprehension of subject-verb agreement, the English asymmetries would be due to its weak inflectional system.

In the Spanish experiment, twenty-three children from the Dominican Republic were tested. It is important to remark that Dominican Republic Caribbean Spanish has a very high rate of plural /-s/ deletion on nouns. For example, the pronunciation of *las casas* ('the houses') *la[s] casa[s]*. Therefore, Dominican Spanish forces children to rely on verb properties to recover the plurality, as *la casa* ('the house') similarly pronounced. Children were between 3-6 years old as well. The test consisted on a picture selection task, where participants were asked to choose the picture that matched what they heard. There were two conditions: sentences with a lexical subject (6), and

sentences with null subjects (7). The total number of items per conditions was not provided.

(6) a. El pato nada en el charco.
D-M-SG duck swim-3SG on D-M-SG pond
‘The duck swims on the pond.’
b. Los patos nadan en el charco.
D-M-PL ducks swim-3PL on D-M-SG pond
‘The ducks swim on the pond.’

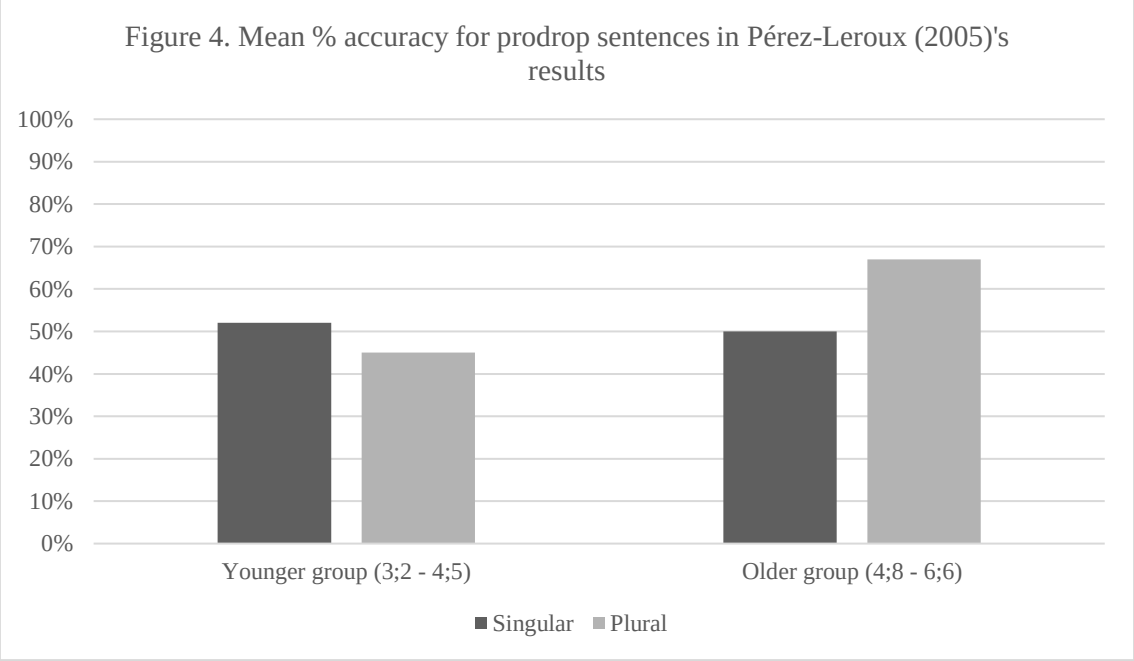
(7) a. Nada en el charco.
swim-3SG on D-M-SG pond
‘(He) swims on the pond.’
b. Nadan en el charco.
swim-3PL on D-M-SG pond
‘(They) swim on the pond.’

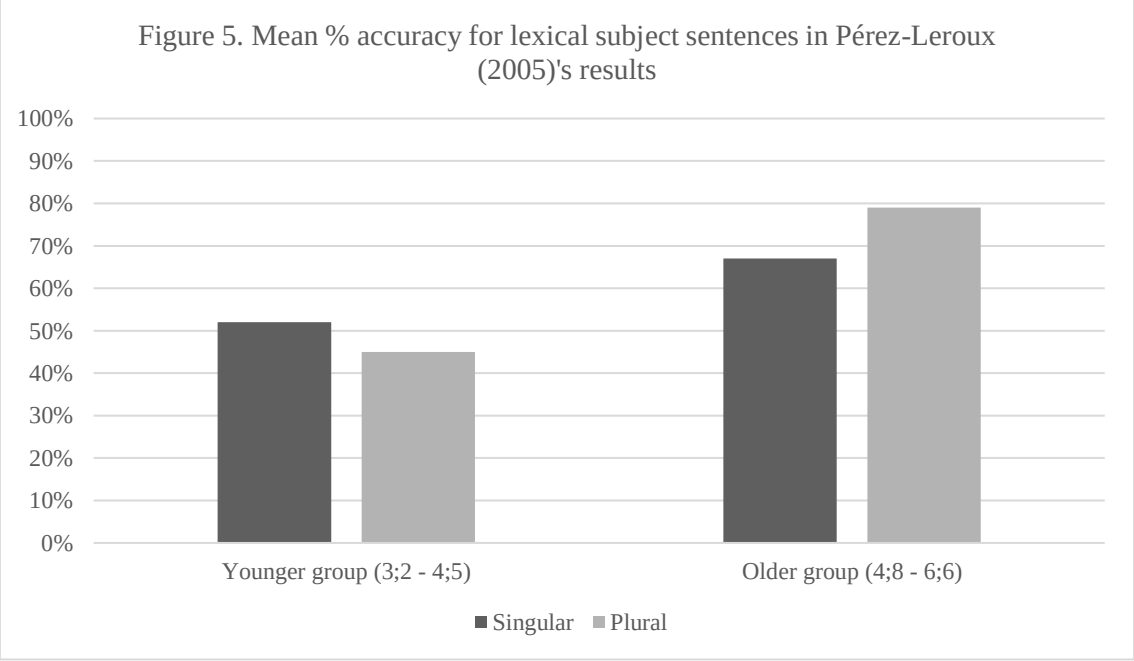
The obtained results were compatible with those of Johnson et al. (2004). Younger children (3- and 4- year-olds) were not able to discriminate. Older children were clearly more accurate than younger children, although percentages of correct answers for null-subject sentences at older ages were quite low as well (see Table 4, Figure 4 and Figure 5). For younger children, responses to sentences with null subjects and sentences with lexical subjects were at chance. However, older children seemed to perform better with lexical subjects. On both types of sentences, however, mean accuracy for plural sentences is slightly higher.

Lexical Subject	**Mean Accuracy SG**	**Mean Accuracy PL**
Younger group (3;2 – 4;5)	52%	45%
Older group (4;8 – 6;6)	67%	79%
Prodrop sentences	**Mean Accuracy SG**	**Mean Accuracy PL**

Younger group (3;2 – 4;5)	52%	45%
Older group (4;8- 6;6)	50%	67%

Table 4. Mean accuracy for all conditions in Pérez-Leroux (2005).





These results reinforce previously found asymmetries between comprehension and production. It seems that there is no distinction between the acquisition of subject-verb agreement on a rich verbal paradigm like the Spanish one and a weak paradigm like the English one. Pérez-Leroux (2005) points out the need for a theory of developmental asymmetries in comprehension and production.

> I suggest here that comprehension delays are explainable under theories that take layers of acquisition (distribution and syntax-semantics mapping) to be separate layers of development. A child could attain surface distributions that appear grammatical but maintain pockets of semantic underspecification. Areas of parametric variation, such as number, could be especially vulnerable to delay. Children could master the morphology and the syntactic distribution of number marking, without arriving at a complete understanding of where number is interpretable in the language.
>
> (Pérez-Leroux, 2005: 10).

Therefore, children would master the syntactic process of number agreement, but it would not mean they fully achieved the comprehension of plural marking. The fact that her results present such a low mean accuracy forces Pérez-Leroux to conclude that although produced sentences could superficially seem grammatical, there is not a deep grammatical understanding of agreement.

1.4.3. Further work on comprehension of subject-verb agreement

Other languages have been tested on the possible asymmetry on the subject-verb agreement paradigm. Legendre et al. (2014) present three different experiments: one in French, one in English and one in Spanish. Importantly, methodologies used in the experiments in Legendre et al. (2014) are not the same. Although French is tested by means of two tasks (a picture selection task and *eye-tracking*), English and Spanish were tested by only one system each.

For French, Legendre et al. (2014) provided evidence of children being able to distinguish singular from plural agreement already at 30 months of age. The experiments focused on subject-verb agreement French system based on liaison, exemplified in (8). By using this system, 'the agreement liaison between the final was re

consonant of the agreement prefix, /il/ or /iz/ and the following initial (Legendre et al., 2014: 23)[3].

(8) a. Il embrasse le gef. [**il**ẽbʁasləgef]
he kiss-3SG the (pseudonoun)
'He kisses the gef.'

b. Ils embrassent le tak. [**iz**ẽbʁaslətak]
they kiss-3PL the (pseudonoun)
'They kiss the tak.'

The research consisted of two different tasks. On a first task, children were shown a two-video screen while they heard sentences. On one side (left below), children could see a boy engaged in a one-action activity while the other boy was standing next to him. On the other side (right below), two boys were performing the action (see Figure 6).

Figure 6. Example video stimuli on Legendre et al. (2010)

Results showed that children were looking at the matching video when they heard the sentences. Pseudonouns seemed not to create difficulties in the comprehension task. These results show that French-speaking children seem to master subject-verb agreement at early ages.

[3] Although it may be referred as clitic subject, Legendre et al. (2010/2014) consider pronoun subjects as agreement prefixes, and the verb in French does not mark person agreement.

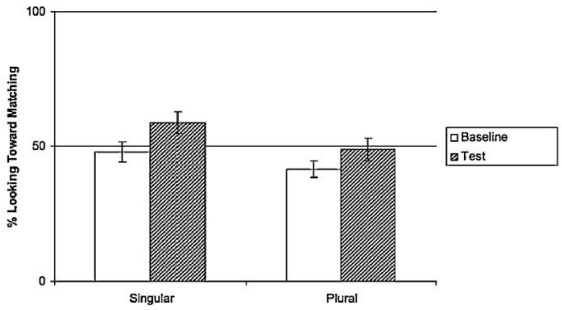


Figure 7. Mean % looking times (and SEs) towards the matching video in the French study on Legendre et al. (2014: 24)

On a second task, children were asked to point at the matching videos, while their eye movement was being tracked as well. Even performing such a task, children were still able to distinguish between singular and plural (see Figure 8). French data seems to imply that asymmetries on subject-verb agreement is not a universal phenomenon and crosslinguistic differences must be taken in consideration.

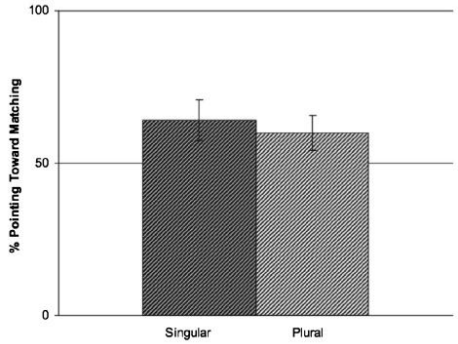


Figure 8. Mean % pointing (and SEs) towards the matching video at test in the French experiment on Legendre et al. (2014: 25).

A new study for English was conducted, as the French study clearly contrasted with what was founded in Johnson et al. (2004). As already mentioned, English number verbal agreement entirely relies on the third person singular /s/. They tested twenty-one English-speaking children (between 2;3 and 3;8 years old). Materials were identical to those on Legendre et al. (2010). They used ten actions verbs such as *catch* or *kiss* and twenty monosyllabic objects as those found in (8).

(9) a. The boys kiss the [dajt].

b. The boy kisses the [naj].

Children were presented a two-video screen and they were asked to point at the matching video of the sentence they heard while being eye-tracked. The results seemed to confirm what Johnson et al. (2004) initially found. Generally, children looked at the matching picture around 50% of the time. There were no performance differences between older and younger children: they all performed poorly (see Figure 9). These results replicated those early finding in subject-verb agreement comprehension in English.

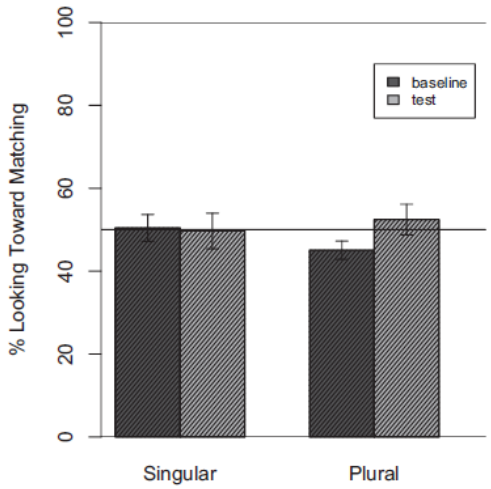


Figure 9. Mean % looking times (and SEs) towards the matching video in the English experiment on Legendre et al. (2014: 27).

A second experiment to contrast with the French results (Legendre et al., 2010) was run with thirty-one Mexican Spanish-speaking children. In this case, Spanish verbs are inflected with a suffix indicating person/number. The age range of participants was between 2;5 and 4;7 years old. They had the same visual stimuli as the French and English children and the task followed the same procedure. There was not a *eye-tracking* analysis for this experiment. There was only a covert subject condition, one in singular (8a) and the other one in plural (8b):

(10) a. Besa el micho.
kiss-3SG D-M-SG (pseudonoun)
‘ (H e) k i s s ė s t h e m i c h o

b. Agarran el duco.
catch-3PL D-M-SG (pseudonoun)
‘ (T h e y c a t c h t h e duco.’

While results on plural were above chance (M=59,68%, SD=25,92%), singular trials were at chance (M=48,66%, SD=24,26%). These results were similar to those of Pérez-Leroux (2005) (see Figure 10). Consequently, Legendre et al. (2014) concluded that Spanish-speaking children before t h e a g e o f 4 ; 8 ‘ a r e u n a b l e t o u s e u n i q u e l y t o d i s t i n g u i s h b e t w e e n t w o p o s s i b l

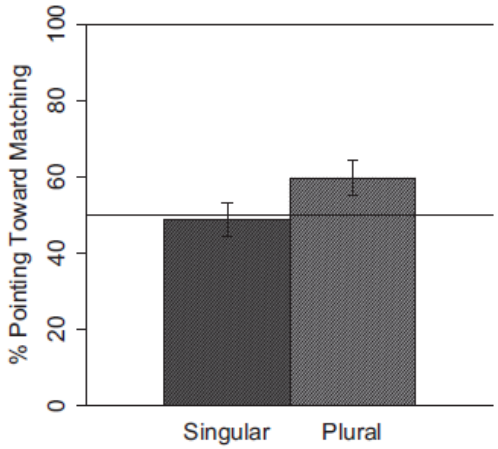


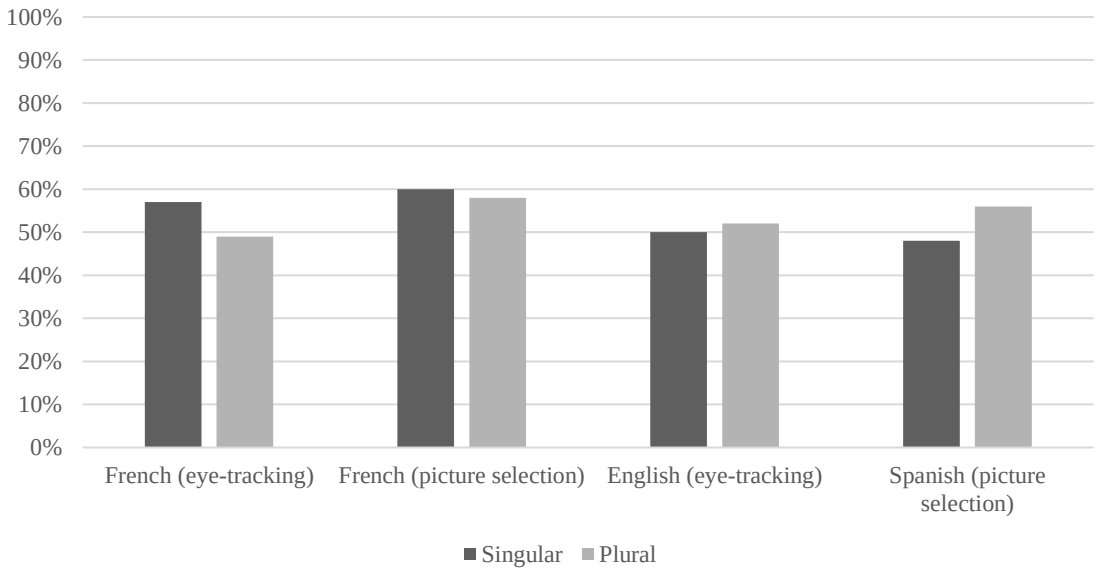
Figure 10. Mean % pointing (and SEs) towards the matching video in the Spanish experiment on Legendre et al. (2014: 30).

These results suggest that ‘ -3-year-old Spanish-speaking children may be approaching sensitivity to the difference between 3rd p e r s o n s i n g u l a r a n d p l u r a l et al., 2014: 30). On the morphosyntax area there are also crosslinguistic differences that could affect the outcome of the experiment. Spanish agreement cue is suffixal, because the marker is added after the verb. In French, however, the agreement cue is prefixal, between the subject and the verb.

All in all, the authors conclude that delay on comprehension in SV agreement is not a universal feature. Their proposal builds on the perceptual differences and cue reliability in agreement morphology between languages. According to them, in English, /-s/ is very opaque and serves vaguely as a cue for agreement marking. In Spanish, /-n/ is not as ambiguous, but it clearly does not offer the same level of reliability as liaison in French.

Liaison /z/ in French serves 'a high perc
unambiguously signals plural morphology' (Legendre et al., 2014: 36).

Figure 11. Comparative % results on Legendre et al. (2014)



Later work by González-Gómez et al. (2017) addressed this phenomenon as well. Following their proposal, English results are accounted for by the lack of a robust morphosyntax both on plural and singular. The only marker it possesses is /-s/. On top of that, they claim present tense in English is usually constructed in the progressive form, which does not offer third person singular /-s/ reliability. Spanish results are also given an explanation: in Legendre et al. (2014) Spanish-speaking children were a bit older than French-speaking children. Encountering a pseudoword when a child is older could be more difficult to process than for a younger child.

> The age difference between these two populations, though, is likely to be correlated with different size of the lexicon. While toddler very often encounter unknown words, older children have a larger lexicon, and thus are likely to encounter unknown words less frequently. For these older children, the presence of pseudowords might have therefore been more likely to draw their attention, obscuring any sensitivity to the morphological differences.

(González-Gomez et al., 2017: 9)

González-Gómez et al. (2017) presented a comprehension task for subject-verb agreement in Mexican Spanish. Their proposal is based on the fact that some tasks might be too demanding for children to process. Consequently, they might block the linguistic knowledge children have. They carried out two different experiments. On the first one, forty monolingual Mexican Spanish-speaking children between the ages 3 and 5 were tested. Similarly to Pérez-Leroux (2004)'s task, children stimuli. However, instead of pictures, children were presented two videos. On one of them there was one boy performing an activity while the other stood next to him activeless. On the other side, both boys were performing the same activity. While children watched the screen, they heard short null subject sentences which contained a pseudonoun as the object:

(11) a. Agarra el miso.
grab-3SG D-M-SG (pseudonoun).
'(He) grabs the miso.'
b. Agarran el miso.
grab-3PL D-M-PL (pseudonoun).
'(They) grab the miso.'

Children pointed towards the matching videos at point (M_{total}=54,37% SD=15.90%). For singular, accuracy was lower (M=51.87% SD=27.96%) than for plural sets (56.88% SD=18,78). Basically, these results reinforced the idea that Spanish-speaking children do not master the subject-verb agreement at the age of 3 to 5 (see Figure 12).

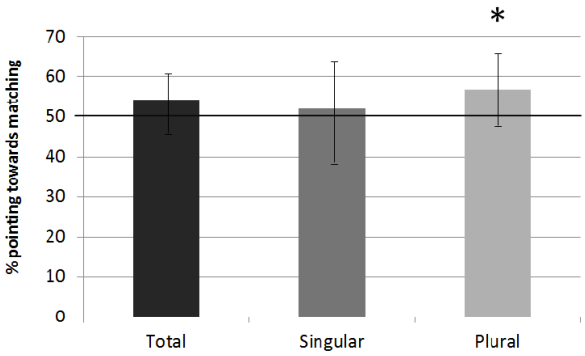


Figure 12. Mean % of pointing towards matching video (and SEs) on González-Gómez et al. (2017) experiment.

Because of that, they simplified the task by eliminating pseudonouns. On a second experiment, pseudonouns were systematically substituted for the word *objeto* 'object'. Again, forty monolingual Mexican Spanish-children from ages 3 to 5 years old were tested. The visual and auditory stimuli were identical (apart from the change on the object noun). The results changed: the total accuracy was above chance for the whole group (M_{total}=61.56% SD=18.64%) and also both in singular (M=60.63% SD=23.94%) and plural (M=62.50% SD=24.67%).

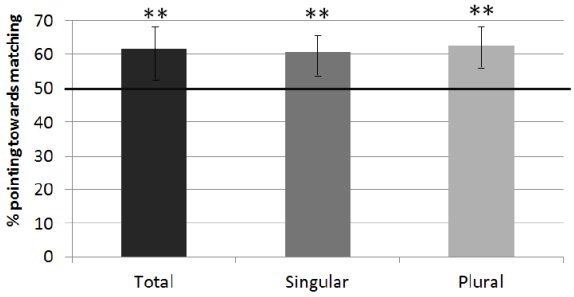


Figure 13. Mean % of pointing towards matching video (and SEs) on González-Gómez (2017)'s second experiment.

In another study, Brandt-Kobele and Höhle (2010) considered German-speaking children on the comprehension of verb inflection using *eye-tracking*. Their idea was that the results on Johnson et al. (2004) and Pérez-Leroux (2005) relate to method. In German, third person singular feminine pronouns (*sie* 'she') and third person plural pronouns (*sie* 'they') are homophonous. Because of that, the inflection marker is required in order to disambiguate the sentence.

(12) a. Sie fütter-t einen Hund.
pron-3SG feed-3SG a dog
‘She is feeding a dog.’

b. Sie fütter-n einen Hund.
pron-3PL feed-3PL a dog
‘They are feeding a dog.’

As seen in (12), verbs carry the information of plurality, both in the third person singular (*-t*) or in the third person plural (*-n*). On a first experiment, twenty-eight children from 3 to 4 years of age were tested. Similarly to what was done in Johnson et al. (2004) and Pérez-Leroux (2005), participants were shown two pictures: on one side they could see a one-actor picture and on the other side a two-actor picture (see Figure 14). Children had to look at the screen while an *eye-tracking* measures were taken. Their results were clear: children looked for a longer time to the correct picture (see Figure 15). Thus, 3 to 4 years old German-speaking children can infer ‘the number of an ambig from the number information of the verbal inflection (Brandt-Kobele and Höhle, 2010: 1918). The results contrast those in Johnson et al. (2004) and Pérez-Leroux (2005).

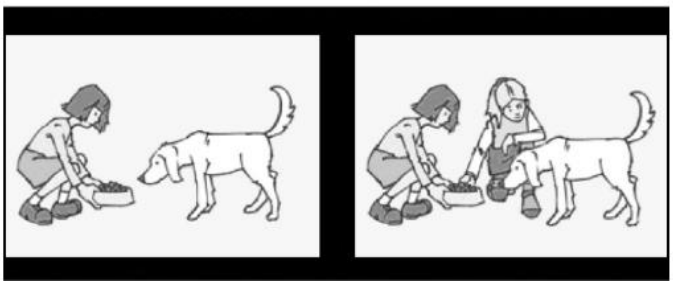


Figure 14. Set of stimuli presented in Brand-Kobele and Höhle (2010)’s German

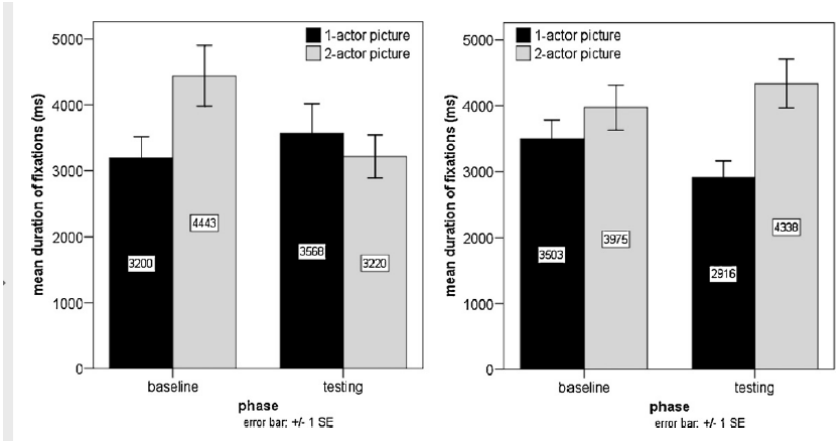


Figure 15. Mean looking times in the singular number condition (on the left) and plural number condition (on the right) on Brandt-Kobele and Höhle (2010)'s first experiment

In order to verify the impact of the method, a second experiment was run. Again, twenty-eight children (mean age=3;8) were tested. In this case, children had to perform a picture selection task as well, so that, apart from their eyes being tracked, they were asked to point at the matching picture. The mean accuracy on the pointing for singular sentences was 56.3% (SD= 26%) while for plural was a 48.5% (SD= 27.8%). However, *eye-tracking* results continued the same pattern as the previous experiment. These contrastive results show what González-Gómez et al. (2017) also point out in their study: there are different results depending on which methodological procedure is followed during a comprehension task (a picture selection task not only requires looking at the described picture, but also taking linguistic and visual information, comparing the pictures and making a final decision). It also shows that subject-verb agreement is acquired early in German.

2. A CATALAN STUDY ON SV AGREEMENT COMPREHENSION

The present study aims to test the performance of Catalan-speaking children in the comprehension of subject-verb agreement through a picture selection task. It follows Brandt-Kobele and Höhle (2010) and Gonzalez-Gómez (2017) in the emphasis on method: an easy task can get children to show grammatical knowledge in a comprehension task. On the other hand, if children are faced with a laboured task, it may obscure their linguistic knowledge. The expectation here is that Catalan-speaking children comprehend subject-verb agreement. Presenting a simple picture selection task, high accuracy is expected.

2.1. Method

Materials from Pérez-Leroux (2005) were translated and adapted to Catalan. As it has been mentioned earlier on, Catalan's agreement between the subject and the verb can be retrieved both by the plurality of the DP in the determiner article *el, la, els, les* and the plural marker *-s* on nouns (e.g. *gats* 'cats') and the verb itself. The verb tense used also correlates with the one used in Johnson et al. (2004) and Pérez-Leroux (2005): the present tense as in (1) above.

As opposed to both Johnson et al.'s (2004) and Pérez-Leroux's (2005) design, the present study included three different conditions with two different items for each: singular and plural. In the Spanish experiment there were two conditions: a lexical subject and a sentence with a null subject. In the Catalan study, the first condition was a sentence with an overt lexical subject, exemplified in (13). The second condition was a subject with an overt numeral, illustrated in (14). The third condition consisted of a sentence with a covert subject such as (15). All in all, stimulus consisted of 30 sentences, containing 10 sentences per condition (5 singular sentences and 5 plural sentences each).

(13) a. El gat dorm a terra.
D-M-SG cat sleep-3SG on floor
b. Els gats dormen a terra.
D-M-PL cat sleep-3PL on floor
'The cat sleeps on the floor.'

(14) a. Un gat dorm a terra.
D-M-SG cat sleep-3SG on floor
b. Tres gats dormen a terra.
D-M-PL cat sleep-3PL on floor

‘One cat sleeps on the floor.’ ‘Three cats sleep on

(15) a. Dorm a terra. b. Dormen a terra.
sleep-3SG on floor sleep-3PL on floor
‘(He) sleeps on the floor.’

Unlike in previous studies, a numeral subject condition is added (14). It is because, even if children struggle with subject-verb agreement on the other conditions, one could expect that they would perform well on the numeral one. The Serra-Solé database in CHILDES and Katsos et al.’s (2016) crosslinguistic study shows that children produce and comprehend cardinal numbers from early on. If children do not comprehend subject-verb agreement, it is expected they can still retrieve singularity or plurality from the numeral quantifier *un* (‘one’) and *tres* (‘three’).

(16) a. ‘un, dos, tres…’ [= comptar trossos Alvar (2,7)
‘one, two, three…’ [=counting banana
b. INV: ‘quants caramels m’has donat?’
‘how many sweets have you given me
CHI: ‘tres’
‘three’

Not only we expect that children should be at ceiling with numerals but adding numerals to the task could perhaps draw their attention to number and therefore make them more aware of number contrasts in the other two conditions.

2.2. Participants

Participants were divided in three big groups: adults, three- to four-years old and five- to six-years old. Twenty-five Catalan-speaking children from the province of Barcelona were tested. All parents reported participants were typically developing children. Adults, as a control group, were previously tested through the same condition and task.

	Number of Participants	Age Range	Mean age
Younger group	13	3;1;15 – 4;11;23	3;8
Older group	12	5;2;19 - 6;4;2	5;6

2.3. Materials

Following Pérez-Leroux (2005) the overt lexical subject condition and covert subject condition consisted of a one-agent picture versus a three agent-picture, as seen in Figure 16. For the numeral condition, pictures were slightly different: on the singular set there was one individual performing the action and two others not performing it (e.g. standing). On the plural set, children could see an action carried out by three agents interacting with the same object (see Figure 17). The fact the three agents appeared in both the singular and the plural picture for the numeral condition was thought to force children to entirely focus on the verb. If they heard 'three dogs subject-verb agreement in order to comprehend what was the matching picture, as both contained three characters. No background was added, in order to eliminate any kind of distraction.

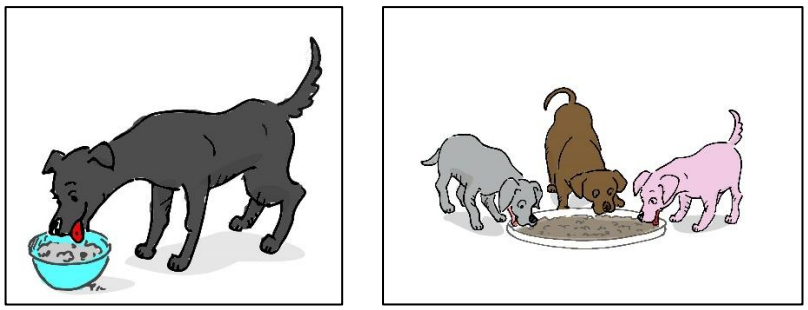


Figure 16. El gos menja / Els gossos mengen (The dog eats / The dogs eat)

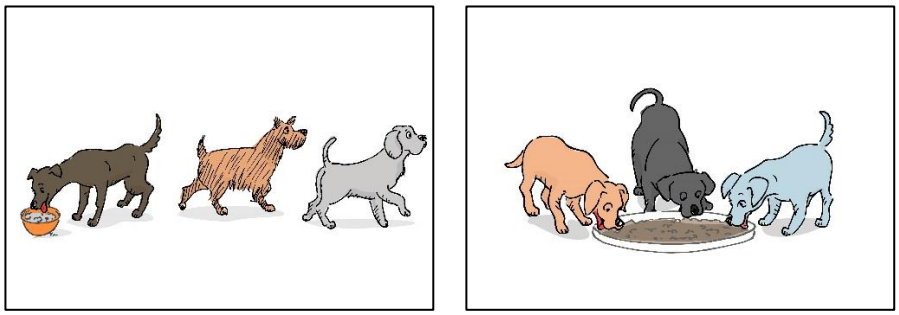


Figure 17. Un gos menja / Tres gossos mengen (One dog eats / Three dogs eat)

2.4. Procedure

Children and adults had to perform the very same picture selection task on a computer. There were two sets of pictures accompanied by a voice recording of the test sentences. Children were initially asked to describe and name elements that would appear later in the experiment, such as cats, dogs, girls or boys performing activities. During the test, participants were first presented with the two pictures and they were allowed to look at them for a few seconds. A recording was played with the test item. Then, they were asked to point at the picture that matched what they heard.

The experiment was produced with Windows software, through Crowdsignal, an online platform that could record the answer participants gave by pressing on the picture.

Due to covid-19 and its sanitary emergency, all adults and around half of the younger participants had to perform the task remotely. For participants that performed face-to-face, the experimenter sat down with him or her in a room while their parents sat in a corner. For those participants that performed the task remotely, parents of those children were given the proper instructions in order to carry out the experiment as an experimenter would have done it. Children wore headphones while their parents presented them the images, in such a way that parents ignored which sentence the children were hearing. Parents played the recording for children to hear. Children pointed at the picture and parents recorded the answer on the platform, by selecting the picture children chose.

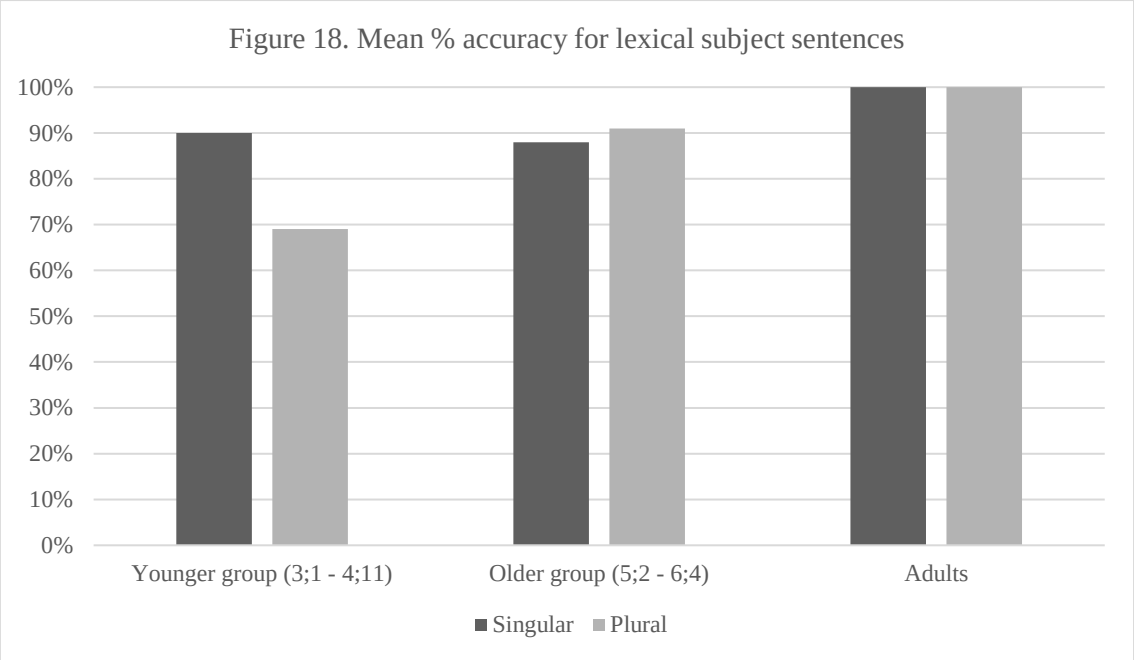
Written consent by participants (or the pa on-line platform, before the experiment started.

2.5. Results

Catalan-speaking children performed well in all three conditions. The mean accuracy percentage for the younger group across all conditions was at a 79% whereas for the older group was at an 87%. Thus, mean accuracy was generally high for both the younger and the older group (see Table 5 and Figure 18 for the results). On the lexical subject condition, the younger group pointed at the correct picture 114 times out of 130 responses. On the other hand, the older group, who gave a total of 120, got 108 matching responses.

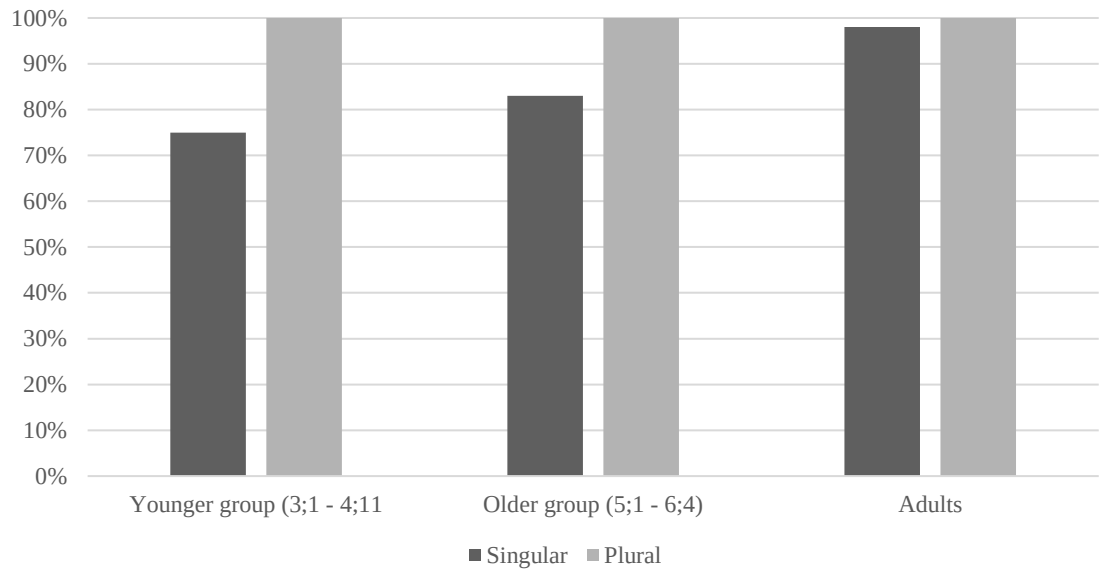
	Singular		**Plural**	
Lexical Subject	**Correct**	**Correct %**	**Correct**	**Correct %**
Younger group (3;1 – 4;11)	59 / 65	90%	45 / 65	69%
Older group (5;2 – 6;2)	53 / 60	88%	55 / 60	91%
Adults	150 / 150	100%	150 / 150	100%
Numeral Subject	**Correct**	**Correct %**	**Correct**	**Correct %**
Younger group (3;1 – 4;11)	49 / 65	75%	65 / 65	100%
Older group (5;2 – 6;2)	50 / 60	83%	60 / 60	100%
Adults	148 / 150	98%	150 / 150	100%
Covert Subject	**Correct**	**Correct %**	**Correct**	**Correct %**
Younger group (3;1 – 4;11)	52 / 65	80%	40 / 65	61%
Older group (5;2 – 6;2)	48 / 60	80%	49 / 60	81%
Adults	148 / 150	100%	147 / 150	98%

Table 5. Mean accuracy for all three conditions.



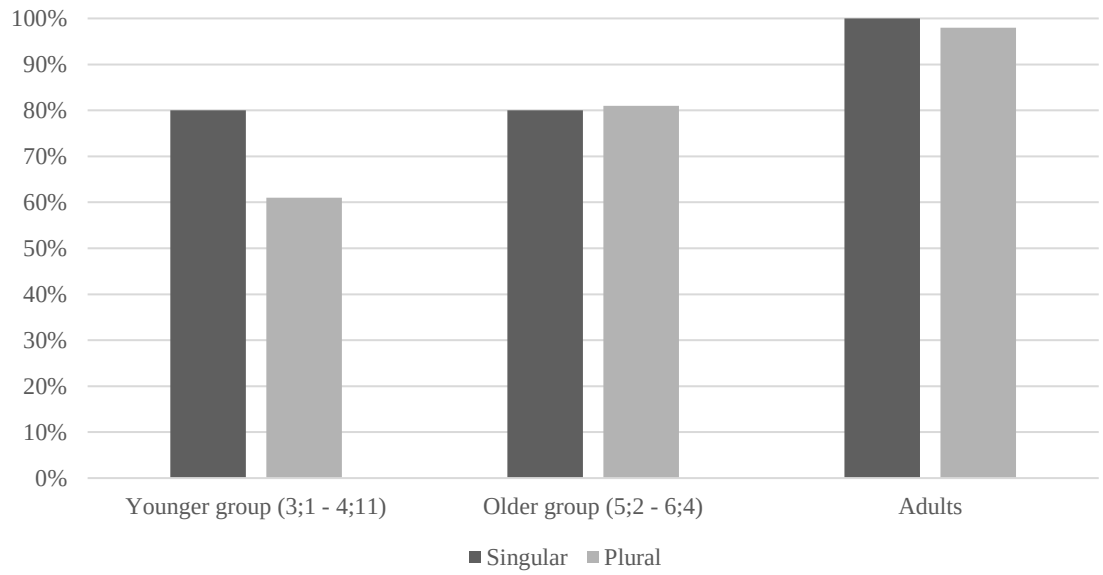
In the numeral condition, mean accuracy percentage was the highest (see Figure 19). In plural sentences, all three groups obtained a 100% of accuracy. The younger group got a total of 114 correct responses out of 130 sentences. From the total number of 120 questions, the older ones answer correctly 110 times (see Table 5).

Figure 19. Mean % accuacy for numeral subject sentences



Lastly, results on the third condition (null subject) were also good. Both older and younger groups understood both singular and plural sentences (see Figure 20). Initially, younger participants (3;1 to 4;11) had difficulties with null-subject sentences, and the experimenters noticed the recorded voice for plural prodrop sentences sounded more like a nasal vowel than a full-fledged nasal. Once the sentences were recorded again, performance improved. The younger group matched 102 sentences with their correct picture, out of the 130-total number of items. Results of the older group is also lower than in the other conditions, but they still matched correctly 97 times out of the total 120 sentences.

Figure 20. Mean % accuracy for covert subject sentences (prodrop)



The statistical analysis of these results had not been carried out for reasons of time.

3. DISCUSSION AND CONCLUSIONS

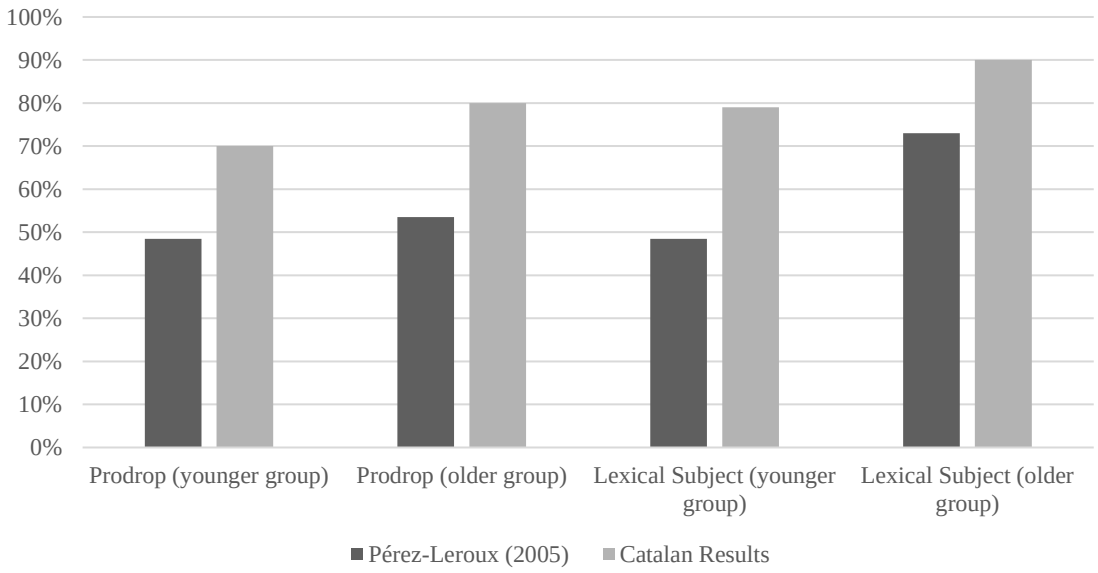
3.1. Discussion

As expected, it was the numeral subject condition which presented less difficulties, as younger and older children presented the higher results, all of them being 75% correct at least. On plural sentences, where they faced a three-agent picture interacting with the same object, participants were 100% accurate for all three groups (see Figure 18). Production data previously analysed coincides with what the comprehension study presents: children have a high understanding of plural NP and numerals by an early age.

If the results of the other two conditions are to be compared to those in Pérez-Leroux (2005), a salient difference is observable. Specially in younger ages, Spanish-speaking participants performed worse even if the age range was almost younger group was older than Pérez-Leroux (2005)'s group was, but S a bit older than In the statistical analysis, Pérez-Leroux (2005) group notices there is a significant effect of g accurate than , for Catalan older children performed better but the

statistical analysis is pending. The results of the two studies are graphically represented in Figure 21.

Figure 21. Spanish and Catalan mean % accuracy results



The results on Catalan seem to confirm what other research (Legendre et al., 2010) had already concluded: late agreement is not a universal feature of acquisition. Catalan results on this study go hand-in-hand with those previous publications. Compared to Legendre et al. (2014), however, procedures and methods are different. In their Spanish study, only a condition was used: null-subject sentences. Covert subject sentences appear to be, in fact, the lower percentage of accuracy in this study for the younger group (which coincides by age range with Legendre et al.'s Spanish experiment presented a pseudo-noun as object and, according to Gónzalez-Gómez et al. (2017), this could difficult processing. This would reinforce the idea that some task feature could block the emergence of linguistic knowledge instead of eliciting it. Numeral conditions in the present study, on the other hand, are an example that, given the correct booster, children perform well. Results on French and German showed that children performed above chance under *eye-tracking* analyses and not under complicated picture selection task. The Catalan results on agreement hint that the crosslinguistic

difference on the acquisition of agreement must be contemplated but may not be reliable. Catalan and Spanish both share a robust morphology system, but both got different results. The results of the present study lead us to the discussion of methodology procedures. According to results on *eye-tracking*, a picture-selection task would not be the best to test children on subject-verb agreement. although Catalan results seem to tell otherwise.

Methodological procedures also involve timing and materials. Although the amount of time children had on previous studies to analyse the pictures is unknown, in this present experiment children were presented the pictures for a few seconds before hearing the recording. This might serve as an explanation for the ease of the task. If children under pressure feel they do not have time to analyse what has been given to them, they are probably rushing to give an answer. Both children with an experimenter and children with their parents were given a key timing to analyse the images. During that time, they could pre-analyse what they were seeing and, once they figured it out, they could match the item sentence to the picture. On top of that, images were expected to be clear and direct, without any background that could add more processing steps for the participant. For that reason, new materials were produced. Although sharing some similarities, the materials from Johnson et al. and the new materials here (illustrated in Figure 22 and Figure 23) might have had an impact in the results. Here any distracting background on the picture was erased in order to facilitate the children understanding.

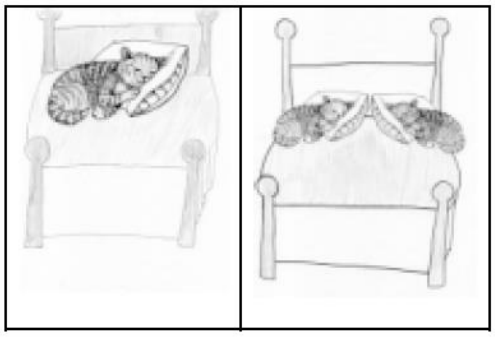


Figure 22. From Johnson et al. (2004). ‘The cat is sleeping on the bed’.

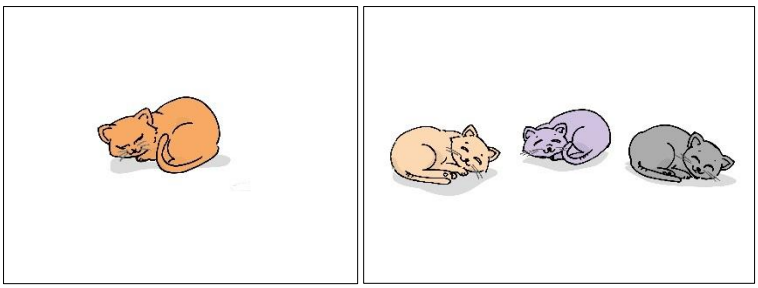


Figure 23. From the Catalan study. 'El gat dorm a ter
dormen a terra' (The cats sleep on the floor).

One possibly fact that distinguishes Johnson et al. (2004), Pérez-Leroux (2005) and this present study is the presence of the numeral condition in the experiment. These two previous studies do not clarify which were the distractors used in their method, but a lack or inexact use of those could be crucial in explaining the resulting differences.

3.2. Conclusions and further research

The present study presents evidence on the acquisition of agreement in Catalan. The results reported show that children, around the age of three, have a comprehension of agreement both in sentences with lexical subjects and sentences with null subjects. These results lead us to the conclusion, already reached in some previous literature, that late comprehension of agreement is not a universal feature. Thus, differences between studies may be due to agreement systems being crosslinguistically different or due to methodological procedures that hinder the emergence of knowledge of grammar in the experimental setting.

Subject-verb agreement comprehension studies suggest that comprehension studies are affected by more extra-linguistic factors than production ones. Therefore, the problem may have been that researchers have drawn conclusions on asymmetries between the two without previously analysing what were the different processes children were going through in each task. A combination between an *eye-tracking* and a picture selection task such as the one developed by Brandt-Kobele and Höhle (2010) should be developed in other languages, in other to see if the comprehension delay is an acquisition issue or a methodological oversight. More languages should be examined, both with weak

agreement systems like English and strong morphological inflection like Spanish or Catalan. Consequently, this would help provide an answer to the possible asymmetry between comprehension and production on subject-verb agreement.

Lastly, this study was a challenge since we had to find new ways to obtain data during lockdown, when children could not interact with the experimenter. New resources had to be thought of and prepared. The experimenter being unable to attend the test session was an unexpected event and instructions had to be as clear as possible for parents to administer it. Online resources ended up being the main resource for interacting with them and making sure the task was performed as it should. Obtaining data outside traditional procedures became the only option. Further research can help accommodate new ways of obtaining data in a timely fashion when educational centres are not as accessible as they used to be.

REFERENCES

Anisfeld, M., and Tucker, G. (1967) English pluralization rules of six-year-old children. *Child Development, 38*(4): 1201–1217.

Baaux, S., Escobar, A. and Philip W. (1997) A delay of principle B Effect in Spanish speaking children: The role of lexical feature acquisition. In *Proceedings of the GALA ô 9 7 C o n f e r e n c e o n* Edinburgh HCRC. *L a n g u a g e A c q u i s i t i o n .*

Bloom, P., Barss, A., Nicol, J. and Conway, L. (1994) Children's knowledge of locality conditions in binding and coreference: evidence from spontaneous speech. *Language*, 70: 53-71.

Borer, H. and Wexler, K. (1992) Bi-unique relations and the maturation of grammatical principles. *Natural Language and Linguistic Theory*, 10: 147-189.

Brandt-Kobele, O. and Höhle, B. (2010) What asymmetries within comprehension reveal about asymmetries between comprehension and production: the case of verb inflection in language acquisition. *Lingua*, 120: 1910-1925.

Brown, R. (1973) *A first language: The early stages*. Cambridge, MA: Harvard University Press.

Chien, Y. and Wexler, K. (1990) Children's knowledge of locality conditions in binding as evidence for the modularity of syntax and pragmatics. *Language Acquisition*, 1(3): 225-295.

Chomsky, N. (1981) *Lectures on Government and Binding*. Dordrecht: Foris.

Clark, E. (1993) *The lexicon in acquisition*. Cambridge studies in linguistics, vol. 65. Cambridge: Cambridge University Press.

Clark, R. (1974) Performing without competence. *Journal of Child Language*.,1; 1-10.

Escobar, L. and Gavarró, A. (2002) The acquisition of Catalan clitics and its implications for complex verb structure. In Lasser, I. (ed.) *The Process of Language Acquisition*, Peter Lang Verlag, Frankfurt. 99-114.

Fraser, C., Bellugi, U, Brown, R. (1963) Control of grammar in imitation, comprehension and production. *Journal of Verbal Learning and Verbal Behaviour,* 2(2): 121-135.

González-Gómez, N., Hsin, L., Barrière, I., Nazzi, T. and Legendre, G. (2017) *Agarra, agarran*: Evidence of early comprehension of subject-verb agreement in Spanish. *Journal of Experimental Child Psychology*, 160: 33-49.

Grinstead, J. (2000) Case, inflection and subject licensing in child Catalan and Spanish. *Journal of Child Language*, 27: 119-155.

Grodzinsky, Y. and Reinhart, T (1993) The innateness of Binding and Coreference. *Linguistic Inquiry*, 23, n.1: 69-101.

Hamman, C. (1997) From syntax to discourse. subjects, infinitives and operators. Habilitation thesis, University of Tübingen, Tübingen.

Hendriks, P. and Koster, C. (2010) Production/comprehension asymmetries in language acquisition. *Lingua*, 120: 1887-1897.

Johnson, C. E. (1981) Children's questions thesis. Standford University.

Johnson, V. de Villiers, J. and Seymour, H. (2004) Agreement without understanding? The case of third person singular /s/. *First Language*, vol. 25(3): 317-330.

Katsos, N., C. Cummins, M-J. Ezeizabarrena, A. Gavarró, J. K. K. Grohmann, A. Skordi, K. Jensen de López, L. Sundahl, A. van Hout, B. Hollebrandse, J. Overweg, M. Faber, M. van Koert, N. Smith, M. Vija, S. Zupping, S. Kunnari, T. Morisseau, M. Rusieshvili, K. Yatsushiro, A. Fengler, S. Varlokosta, K. Konstantzou, S. Farby, M. T. Guasti, M. Vernice, R. Okabe, M. Isobe, P. Crosthwaite, Y. Hong, I. Balčiūnienė, Y. M. Ahmad Nizar, Asbjørnsen, J. von Koss Torkildsen, E. Hama Anđelković, M. Savić, Šuková, T. Barberán, D. Özge, S. Slančov Hassan, C. Y. Hung Chan, T. Okubo, H. van der Lely, U. Sauerland, & I. Noveck (2016) 'Cr-linguistic patterns in acquisition across *Proceedings of the National Academy of Sciences*, vol. 113, n.33: 9244-9249.

Keeney, T. and Wolfe, J. (1972) The acquisition of agreement in English. *Journal of Verbal Learning and Verbal Behavior*, 11: 698-705.

Lebeaux, D. (1988) Language acquisition and the form of the grammar. Doctoral dissertation. Massachusetts, University of Massachusetts.

Legate, J. A. and Yang, C. (2007) Morphosyntactic learning and the development of tense. *Language Acquisition*, 14(3): 315-344.

Legendre, G, Barrière, I. Goyet, L. and Nazzi, T. (2010) Comprehension of infrequent subject-verb agreement forms: evidence from French learning children. *Child Development*, 81(6): 1859-1875.

Legendre, G., Culbertson, J., Zaroukian, E., Hsin, L., Berrière, I. and Nazzi, I. (2014) Is children's comprehension of subject-verb agreement universally late? Comparative evidence from French, English and Spanish. *Lingua*, 144: 21-39.

Martinez Celdrán, E. (1975) Análisis morfofonémico de la vocal temática en la lengua española. *Thesaurus*. Boletín del Instituto Caro y Cuervo. TOMO XLVIII.

Mascaró, J. (1986) *Morfologia*. Barcelona: Enciclopèdia Catalana.

McKee, C. (1992) A Comparison of Pronouns and Anaphors in Italian and English Acquisition. *Language Acquisition*, 2(1): 21-54.

Pérez-Leroux, A. (2004) Number problems in children. *Actes du congrès annuel de l'Association canadienne de linguistique*.

Pérez-Leroux, A., Schmitt, C, Munn, A. (2004) The development of inalienable possession in English and Spanish. In: Reineke Bok-Bennema, Bart Hollebransdse, Brigitte Kampers-Mahne and Petra Sleeman (eds.) *Romance Languages and Linguistic Theory 2002*, Amsterdam: John Benjamins. 199-216.

Pinker, S. (1989) Learnability and cognition: The acquisition of argument structure. Cambridge, MA. MIT Press.

Rooryck, J. and Wyngaerd, G. (2011) *Dissolving Binding Theory*. New York: Oxford University Press.

Torrens, V. (2002) *La adquisición del tiempo y la concordancia*. Madrid: UNED.

Wexler, K. (1998) Very early parameter setting and the unique checking constraint: A new explanation of the optional infinitive stage. *Lingua*, vol. 106, 1-4: 23-79.

APPENDICES

I. Stimuli

Condition

1. Tres nenes dibuixen — Plural Numeral Subject
   three girls draw-3PL
   ‘Three girls draw’
2. El nen salta — Singular Lexical Subject
   the boy jump-3SG
   ‘The boy jumps’
3. Patinen — Plural Covert Subject
   skate-3PL
   ‘(They) skate’
4. Menja — Singular Covert Subject
   eat-3SG
   ‘(He) eats’
5. Corre — Singular Covert Subject
   run-3SG
   ‘(He) runs’
6. Dibuixen — Plural Covert Subject
   draw-3PL
   ‘(They) draw’
7. Un nen juga a pilota — Singular Numeral Subject
   one boy play-3SG to ball
   ‘One boy plays with the ball’
8. Els ànecs corren — Plural Lexical Subject
   the ducks run-3PL
   ‘The ducks run’
9. El nen dibuixa — Singular Lexical Subject
   the boy draw-3SG
   ‘The kid draws’
10. El gat dorm a terra — Singular Lexical Subject

the cat sleep-3SG on floor

‘ T h e c a t s l e e p s o n t h e f l o o r ’

11. Salten Plural Covert Subject

jump-3PL

‘ (T h e y) j u m p ’

12. Beu llet Singular Covert Subject

drink-3SG milk

‘ (H e) d r i n k s m i l k ’

13. Tres gats dormen a terra Plural Numeral Subject

three cats sleep-3PL on floor

‘ T h r e e c a t s ’s l e e p o n t h e f l o o r

14. Els gats beuen llet Plural Lexical Subject

the cats drink-3PL milk

‘ T h e c a t s d r i n k m i l k ’

15. La nena patina Singular Lexical Subject

the girl skate-3SG

‘ T h e g i r l s k a t e s ’

16. Els ocells volen Singular Lexical Subject

the birds fly-3PL

‘ T h e b i r d s f l y ’

17. Llegeixen Plural Covert Subject

read-3PL

‘ (T h e y) r e a d ’

18. Tres nens salten Plural Numeral Subject

three boys jump-3PL

‘ T h r e e b o y s j u m p ’

19. Vola Singular Covert Subject

fly-3SG

‘ (H e) f l i e s ’

20. Tres nenes llegeixen Plural Numeral Subject

three girls read-3PL

‘ T h r e e g i r l s r e a d ’

21. Un ocell vola — Singular Numeral Subject
one bird fly-3SG
‘One bird flies’

22. Un gos menja — Singular Numeral Subject
one dog eat-3SG
‘One dog eats’

23. Un ànec corre — Singular Numeral Subject
one duck run-3SG
‘One duck runs’

24. Tres nenes patinen — Plural Numeral Subject
three girls skate-3PL
‘Three girls skate’

25. La nena llegeix — Singular Lexical Subject
the girl read-3SG
‘The girl reads’

26. Juga a pilota — Singular Covert Subject
play-3SG to ball
‘(He) plays with the ball’

27. Un gat beu llet — Singular Numeral Subject
one cat drink-3SG milk
‘One cat drinks milk’

28. Els gossos mengen — Plural Lexical Subject
the dogs eat-3PL
‘The dogs eat’

29. Dormen a terra — Plural Covert Subject
sleep-3PL on floor
‘(They) sleep on the floor’

30. El nens juguen a pilota — Plural Lexical Subject
the boys play-3PL to ball
‘The boys play with the ball’

II. Individual results

(1 = correct answer; 0 = incorrect answer)

Younger group (3;1 – 4;11)

		3;1	3; 11	4;2	3; 10	3;11	3;8
Overt Det Subject							
Singular	El nen salta	1	1	1	1	1	1
	El nen dibuixa	1	1	1	1	1	0
	El gat dorm a terra	1	1	1	1	1	1
	La nena patina	1	1	1	1	1	0
	La nena llegeix	1	1	1	0	0	1
Plural	Els ànecs corren	1	1	1	0	0	0
	Els gats beuen llet	0	0	1	1	1	1
	Els ocells volen	1	1	0	1	0	1
	Els gossos mengen	1	0	1	0	1	1
	Els nens juguen a pilota	0	0	1	1	1	1

		4;9	4;5	4;6	4;11	3;7	4;5	3;10
Overt Det Subject								
Singular	El nen salta	1	1	1	1	1	1	1
	El nen dibuixa	1	1	0	1	1	1	1
	El gat dorm a terra	1	1	1	1	1	1	1
	La nena patina	1	1	1	1	1	1	1
	La nena llegeix	1	1	1	1	1	0	1
Plural	Els ànecs corren	1	1	0	1	1	1	1
	Els gats beuen llet	0	1	1	1	1	0	0
	Els ocells volen	0	1	1	1	1	1	1
	Els gossos mengen	0	1	1	1	1	1	0
	Els nens juguen a pilota	0	1	1	1	1	1	0

		3;1	3; 11	4;2	3; 10	3;11	3;8
Overt Num Subject							
Singular	Un nen juga a pilota	1	0	1	1	0	1
	Un ocell vola	1	1	0	1	0	1
	Un gos menja	1	1	1	1	1	1
	Un ànec corre	1	1	1	1	1	1
	Un gat beu llet	1	1	0	1	1	1
Plural	Tres nens dibuixen	1	1	1	1	1	1
	Tres gats dormen a terra	1	1	1	1	1	1

	Tres nens salten		1	1	1	1	1	1
	Tres nenes llegeixen		1	1	1	1	1	1
	Tres nenes patinen		1	1	1	1	1	1

		4;9	4;5	4;6	4;11	3;7	4;5	3;10
Overt Num Subject								
Singular	Un nen juga a pilota	0	1	0	0	1	0	0
	Un ocell vola	0	1	0	0	1	0	0
	Un gos menja	1	1	1	1	1	1	1
	Un ànec corre	1	1	1	1	0	1	1
	Un gat beu llet	1	1	1	1	1	1	0
Plural	Tres nens dibuixen	1	1	1	1	1	1	1
	Tres gats dormen a terra	1	1	1	1	1	1	1
	Tres nens salten	1	1	1	1	1	1	1
	Tres nenes llegeixen	1	1	1	1	1	1	1
	Tres nenes patinen	1	1	1	1	1	1	1

		3;1	3; 11	4;2	3; 10	3;11	3;8
Covert Subject							
Singular	Menja	1	1	1	0	1	1
	Corre	0	1	1	0	1	1
	Beu llet	1	1	1	1	1	1
	Vola	1	0	1	1	1	0
	Juga a pilota	1	1	1	1	0	1
Plural	Patinen	1	1	0	1	1	1
	Dibuixen	0	0	1	0	0	0
	Salten	0	0	1	0	0	1
	Llegeixen	1	0	0	0	0	1
	Dormen a terra	1	1	0	1	1	1

		3;1	3; 11	4;2	3; 10	3;11	3;8
Covert Subject							
Singular	Menja	1	1	1	0	1	1
	Corre	0	1	1	0	1	1
	Beu llet	1	1	1	1	1	1
	Vola	1	0	1	1	1	0
	Juga a pilota	1	1	1	1	0	1
Plural	Patinen	1	1	0	1	1	1
	Dibuixen	0	0	1	0	0	0
	Salten	0	0	1	0	0	1
	Llegeixen	1	0	0	0	0	1
	Dormen a terra	1	1	0	1	1	1

Older group (5;2 – 6;2)

		5; 7	5; 10	5;2	6;4	5;7	5;7
Overt Det Subject							
Singular	El nen salta	1	1	0	1	0	1
	El nen dibuixa	1	1	0	1	1	1
	El gat dorm a terra	1	1	0	1	1	1
	La nena patina	1	1	0	1	1	1
	La nena llegeix	1	1	1	1	1	1
Plural	Els ànecs corren	1	1	1	1	1	0
	Els gats beuen llet	1	1	1	1	1	1
	Els ocells volen	1	1	1	1	1	1
	Els gossos mengen	1	1	1	1	1	1
	Els nens juguen a pilota	1	1	1	1	1	1

		6;3	5;8	5;6	5;6	5;1	6;2
Overt Det Subject							
Singular	El nen salta	1	1	1	1	0	1
	El nen dibuixa	1	1	1	1	1	0
	El gat dorm a terra	1	1	1	1	1	1
	La nena patina	1	1	1	1	1	1
	La nena llegeix	1	1	1	1	1	1
Plural	Els ànecs corren	1	0	1	1	0	1
	Els gats beuen llet	1	0	1	1	1	1
	Els ocells volen	1	1	1	1	1	1
	Els gossos mengen	1	1	1	1	1	1
	Els nens juguen a pilota	1	0	1	1	1	1

		5; 7	5; 10	5;2	6;4	5;7	5;7
Overt Num Subject							
Singular	Un nen juga a pilota	1	1	0	1	1	1
	Un ocell vola	1	1	0	1	1	0
	Un gos menja	1	1	0	1	1	1
	Un ànec corre	1	1	0	1	1	1
	Un gat beu llet	1	1	0	1	1	1
Plural	Tres nens dibuixen	1	1	1	1	1	1
	Tres gats dormen a terra	1	1	1	1	1	1
	Tres nens salten	1	1	1	1	1	1
	Tres nenes llegeixen	1	1	1	1	1	1
	Tres nenes patinen	1	1	1	1	1	1

		6;3	5;8	5;6	5;6	5;1	6;2
Overt Num Subject							
Singular	Un nen juga a pilota	1	0	1	1	1	1
	Un ocell vola	1	1	1	1	1	1
	Un gos menja	1	0	1	1	0	1
	Un ànec corre	1	0	1	1	1	1
	Un gat beu llet	1	1	1	1	1	1
Plural	Tres nens dibuixen	1	1	1	1	1	1
	Tres gats dormen a terra	1	1	1	1	1	1
	Tres nens salten	1	1	1	1	1	1
	Tres nenes llegeixen	1	1	1	1	1	1
	Tres nenes patinen	1	1	1	1	1	1

		5; 7	5; 10	5;2	6;4	5;7	5;7
Covert Subject							
Singular	Menja	1	0	0	1	0	1
	Corre	1	0	0	1	1	1
	Beu llet	1	1	1	1	1	1
	Vola	1	1	0	1	1	1
	Juga a pilota	1	0	0	1	1	1
Plural	Patinen	1	1	1	1	0	1

	Dibuixen	0	1	1	1	1	1
	Salten	1	1	1	1	1	0
	Llegeixen	0	1	1	1	1	1
	Dormen a terra	1	1	1	1	0	1

		6;3	5;8	5;6	5;6	5;1	6;2
Covert Subject							
Singular	Menja	1	0	1	1	1	1
	Corre	1	1	1	1	0	1
	Beu llet	1	1	1	1	1	1
	Vola	1	1	0	1	0	1
	Juga a pilota	1	1	1	1	1	1
Plural	Patinen	1	0	1	1	1	1
	Dibuixen	1	0	1	1	1	1
	Salten	0	1	1	1	1	1
	Llegeixen	0	0	1	1	1	1
	Dormen a terra	1	0	1	1	1	1

Adults

		22; 11	25; 1	30; 5	18; 8	55; 9	52;5	23; 2	18; 6
Overt Det Subject									
Singular	El nen salta	1	1	1	1	1	1	1	1
	El nen dibuixa	1	1	1	1	1	1	1	1
	El gat dorm a terra	1	1	1	1	1	1	1	1
	La nena patina	1	1	1	1	1	1	1	1
	La nena llegeix	1	1	1	1	1	1	1	1
Plural	Els ànecs corren	1	1	1	1	1	1	1	1
	Els gats beuen llet	1	1	1	1	1	1	1	1
	Els ocells volen	1	1	1	1	1	1	1	1
	Els gossos mengen	1	1	1	1	1	1	1	1
	Els nens juguen a pilota	1	1	1	1	1	1	1	1

	32; 9	24; 1	22; 4	23; 3	22; 6	22; 11	53; 7
Overt Det Subject							

Singular	El nen salta	1	1	1	1	1	1	1
	El nen dibuixa	1	1	1	1	1	1	1
	El gat dorm a terra	1	1	1	1	1	1	1
	La nena patina	1	1	1	1	1	1	1
	La nena llegeix	1	1	1	1	1	1	1
Plural	Els ànecs corren	1	1	1	1	1	1	1
	Els gats beuen llet	1	1	1	1	1	1	1
	Els ocells volen	1	1	1	1	1	1	1
	Els gossos mengen	1	1	1	1	1	1	1
	Els nens juguen a pilota	1	1	1	1	1	1	1

		53; 8	22; 6	23; 3	22; 6	26; 5	25; 7	25; 9
Overt Det Subject								
Singular	El nen salta	1	1	1	1	1	1	1
	El nen dibuixa	1	1	1	1	1	1	1
	El gat dorm a terra	1	1	1	1	1	1	1
	La nena patina	1	1	1	1	1	1	1
	La nena llegeix	1	1	1	1	1	1	1
Plural	Els ànecs corren	1	1	1	1	1	1	1
	Els gats beuen llet	1	1	1	1	1	1	1
	Els ocells volen	1	1	1	1	1	1	1
	Els gossos mengen	1	1	1	1	1	1	1
	Els nens juguen a pilota	1	1	1	1	1	1	1

		23;8	22; 6	22; 9	23; 10	23; 3	22; 7	23; 3	57; 1
Overt Det Subject									
Singular	El nen salta	1	1	1	1	1	1	1	1
	El nen dibuixa	1	1	1	1	1	1	1	1
	El gat dorm a terra	1	1	1	1	1	1	1	1
	La nena patina	1	1	1	1	1	1	1	1
	La nena llegeix	1	1	1	1	1	1	1	1
Plural	Els ànecs corren	1	1	1	1	1	1	1	1
	Els gats beuen llet	1	1	1	1	1	1	1	1
	Els ocells volen	1	1	1	1	1	1	1	1
	Els gossos mengen	1	1	1	1	1	1	1	1
	Els nens juguen a pilota	1	1	1	1	1	1	1	1

		22; 11	25; 1	30; 5	18; 8	55; 9	52;5	23; 2	18; 6
Overt Num Subject									
Singular	Un nen juga a pilota	1	1	1	1	1	0	1	1
	Un ocell vola	1	1	1	1	1	1	1	1
	Un gos menja	1	1	1	1	1	1	1	1
	Un ànec corre	1	1	1	0	1	1	1	1
	Un gat beu llet	1	1	1	1	1	1	1	1
Plural	Tres nens dibuixen	1	1	1	1	1	1	1	1
	Tres gats dormen a terra	1	1	1	1	1	1	1	1
	Tres nens salten	1	1	1	1	1	1	1	1
	Tres nenes llegeixen	1	1	1	1	1	1	1	1
	Tres nenes patinen	1	1	1	1	1	1	1	1

		32; 9	24; 1	22; 4	23; 3	22; 6	22; 11	53; 7
Overt Num Subject								
Singular	Un nen juga a pilota	1	1	1	1	1	1	1
	Un ocell vola	1	1	1	1	1	1	1
	Un gos menja	1	1	1	1	1	1	1
	Un ànec corre	1	1	1	1	1	1	1
	Un gat beu llet	1	1	1	1	1	1	1
Plural	Tres nens dibuixen	1	1	1	1	1	1	1
	Tres gats dormen a terra	1	1	1	1	1	1	1
	Tres nens salten	1	1	1	1	1	1	1
	Tres nenes llegeixen	1	1	1	1	1	1	1
	Tres nenes patinen	1	1	1	1	1	1	1

		53; 8	22; 6	23; 3	22; 6	26; 5	25; 7	25; 9
Overt Num Subject								
Singular	Un nen juga a pilota	1	1	1	1	1	1	1

	Un ocell vola	1	1	1	1	1	1	1
	Un gos menja	1	1	1	1	1	1	1
	Un ànec corre	1	1	1	1	1	1	1
	Un gat beu llet	1	1	1	1	1	1	1
Plural	Tres nens dibuixen	1	1	1	1	1	1	1
	Tres gats dormen a terra	1	1	1	1	1	1	1
	Tres nens salten	1	1	1	1	1	1	1
	Tres nenes llegeixen	1	1	1	1	1	1	1
	Tres nenes patinen	1	1	1	1	1	1	1

		23;8	22; 6	22; 9	23; 10	23; 3	22; 7	23; 3	57; 1
Overt Num Subject									
Singular	Un nen juga a pilota	1	1	1	1	1	1	1	1
	Un ocell vola	1	1	1	1	1	1	1	1
	Un gos menja	1	1	1	1	1	1	1	1
	Un ànec corre	1	1	1	1	1	1	1	1
	Un gat beu llet	1	1	1	1	1	1	1	1
Plural	Tres nens dibuixen	1	1	1	1	1	1	1	1
	Tres gats dormen a terra	1	1	1	1	1	1	1	1
	Tres nens salten	1	1	1	1	1	1	1	1
	Tres nenes llegeixen	1	1	1	1	1	1	1	1
	Tres nenes patinen	1	1	1	1	1	1	1	1

		22; 11	25; 1	30; 5	18; 8	55; 9	52;5	23; 2	18; 6
Covert Subject									
Singular	Menja								
	Corre	1	1	1	1	1	1	1	1
	Beu llet	1	1	1	1	1	1	1	1
	Vola	1	1	1	1	1	1	1	1
	Juga a pilota	1	1	1	1	1	1	1	1
Plural	Patinen	1	1	1	1	1	1	1	1
	Dibuixen	0	1	1	1	1	1	1	1
	Salten	1	1	1	1	1	1	1	0

	Llegeixen	1	1	1	1	1	1	1	1
	Dormen a terra	1	1	1	1	1	1	1	1
		1	1	1	1	1	1	1	1

		32; 9	24; 1	22; 4	23; 3	22; 6	22; 11	53; 7	
Covert Subject									
Singular	Menja								
	Corre	1	1	1	1	1	1	1	
	Beu llet	1	1	1	1	1	1	1	
	Vola	1	1	1	1	1	1	1	
	Juga a pilota	1	1	1	1	1	1	1	
Plural	Patinen	1	1	1	1	1	1	1	
	Dibuixen	1	1	1	1	1	1	1	
	Salten	1	1	1	1	1	1	1	
	Llegeixen	1	1	1	1	1	1	1	
	Dormen a terra	1	1	1	1	1	1	1	
		1	1	1	1	1	1	1	

		53; 8	22; 6	23; 3	22; 6	26; 5	25; 7	25; 9	
Covert Subject									
Singular	Menja								
	Corre	1	1	1	1	1	1	1	
	Beu llet	1	1	1	1	1	1	1	
	Vola	1	1	1	1	1	1	1	
	Juga a pilota	1	1	1	1	1	1	1	
Plural	Patinen	1	1	1	1	1	1	1	
	Dibuixen	1	1	1	1	1	1	1	
	Salten	1	1	1	1	1	1	1	
	Llegeixen	1	1	1	1	1	1	1	
	Dormen a terra	1	1	1	1	1	1	1	
		1	1	1	1	1	1	1	

		23;8	22; 6	22; 9	23; 10	23; 3	22; 7	23; 3	57; 1
Covert Subject									
Singular	Menja								
	Corre	1	1	1	1	1	1	1	1
	Beu llet	1	1	1	1	1	1	1	1
	Vola	1	1	1	1	1	1	1	1

	Juga a pilota	1	1	1	1	1	1	1	1
Plural	Patinen	1	1	1	1	1	1	1	1
	Dibuixen	1	1	1	1	1	1	1	1
	Salten	0	1	1	1	1	1	1	1
	Llegeixen	1	1	1	1	1	1	1	1
	Dormen a terra	1	1	1	1	1	1	1	1