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The comprehension and production of subject-verb agreement in Spanish as a first language

TESIS

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P R E S E N T A

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“One language sets you in a corridor for life. Two languages open every door along the way”

Frank Smith

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Abstract

Child learners of Spanish, a language with a rich and uniform verbal agreement paradigm, initially produce subject-verb agreement around their second year of life (Durán, 2000; Grinstead, 2000 as cited in Miller &Schmitt, 2009 p.7). While the early production of agreement marking is variable, the erroneous use of person/number markers is low, representing less than the 5% of the total agreement forms (Bel, 2001 as cited in Montrul, 2004). In comparison to the production studies, recent research has suggested that comprehension of agreement morphology is surprisingly late. A study by Pérez-Leroux (2005) found that Dominican Spanish-speaking children are unable to use verbal agreement to interpret number on the subject until around five years of age. This finding suggests an asymmetry between comprehension and production in the early acquisition of L1 agreement.

The objective of this study is to determine whether the comprehension/production asymmetry reported by Pérez-Leroux (2005) is found in child speakers of a dialect of Mexican Spanish, in which number in noun phrases is consistently marked, unlike Dominican Spanish, a variety with high levels of aspiration and elision of number inflection in noun phrases.

The present study was a replication-extension of Pérez-Leroux (2005). This study aims at contributing new evidence regarding the production and comprehension of subject-verb agreement marking by children learning Mexican Spanish as a first language. The particular linguistic variety which is the focus of this study is spoken in Quintana Roo, a Mexican state in the Yucatan Peninsula, which has been understudied and does not share the same phonological features as Dominican Spanish. The participants were 28 Spanish-speaking children between the ages of 3 and 6 who attended a private preschool and primary school in a town in Quintana Roo, Mexico. Children were tested using two different tasks: a guided production task and a picture-choice comprehension task. To elicit exemplars of subject-verb agreement, children watched excerpts from animated films (one video with single subject and one with two or three subjects) and were asked to describe what the

character(s) do(es) on a regular day. In the picture-choice comprehension task children had to select one picture from a pair of pictures (one with single subject and the other with two or three subjects all performing the same action) on the basis of an audio-recorded sentence. The results of the oral guided production task showed that children produced both the singular subject-verb agreement marker, V-Ø, and the plural subject-verb agreement marker, V–*n* as early as age 3. However, children demonstrated to comprehend the meaning of subject-verb agreement marking around until they reached the ages of 5 and 6 years. These findings lend support to the earlier observations by Pérez-Leroux (2005) that there is an asymmetry between the comprehension and production of L1 Spanish subject-verb agreement morphology early in development.

Chapter 1: Introduction

1.1Background and relevance of this study

Recent research on the early production and comprehension of the subject-verb agreement marker of the present tense third person singular suggests that there is an asymmetry between production and comprehension of this marker in several languages. Children acquiring different languages like English (Fraser, Bellugi, & Brown, 1963; Keeney and Wolfe, 1972; Johnson, de Villiers & Seymour, 2005) and German (Brandt-Kobele & Höhle, 2010) have shown this asymmetry. This phenomenon has been less investigated in L1 Spanish-speaking children (Pérez-Leroux, 2005).

One of the first studies to address this asymmetry between production and comprehension in L1 English was Fraser, Bellugi, and Brown, (1963), where it was shown that, while children between 3 and 4 years old were able to produce the subject-verb agreement markers *–s / -∅* at low rates, they had difficulty in comprehending the information carried by these markers. Similarly, Keeney and Wolfe (1972) and Johnson de Villiers and Seymour (2005) wanted to find out when children are sensitive to the third person singular-s in comprehension. They found that 5 to 6 year-old children were sensitive to the third person -s, while in contrast, children under 4 years old were not.

In L1 German, Brandt-Kobele and Höhle (2010) wanted to determine if 3 to 4 year-old children could recover the information expressed by the third person plural verb inflection. They found that children were able to recover the number information provided by the verb morphology alone.

In L1 Spanish, Aguado-Orea (2004, 2005) , Casla (2005) , Pine (2005) and Rujas (2008) (as cited in Aguado, Casla, Rujas & Mariscal, 2011, pp. 73-91) studied children under 3 years to determine whether children had knowledge of the plural subject-verb agreement marker V-*n* when they were already

producing it. They found that the verbs marked with *–n* produced by young children were variable and with lower frequency than adults.

Brandani (2010), Bel and Rosado (2005), and Guasti (1993/1994) carried out a longitudinal study in Romance languages. They studied children under 3 years focusing on the development of subject-verb agreement morphology in Spanish, Catalan and Italian as an L1. They found that children have knowledge of agreement and inflections but tend to omit or avoid plural marking.

The only study which examines comprehension in L1 Spanish is Pérez-Leroux (2005). In her study she wanted to investigate if 3 to 6 years old children can recover the information expressed through the 3rd person plural agreement marker *-n* inflections. She found that the only age group that demonstrated to use the information expressed by verbal agreement where older learners who were between 5 to 6 years old.

In this study I explored whether L1 Mexican Spanish speaking children produce the morphology and comprehend the information carried by subject-verb agreement in the early ages of acquisition. To this end I conducted a replication-extension study of Pérez-Leroux (2005).

1.2 Objective

Given the findings from L1 studies on the acquisition of English and Spanish subject verb agreement, this study tested the comprehension and production of L1 Spanish-speaking Mexican children, with the goal of exploring the issue of subject-verb agreement. The objective of this study was to determine whether children who can produce the third person plural agreement marker in present indicative can also comprehend the meaning of this marker.

1.3 Research questions

The following research questions lead the present study:

1. Do Mexican Spanish-speaking children aged 3 to 6 show comprehension of inflection, such that they can infer the number of a sentence's subject from the verbal inflection alone?
2. Is receptive knowledge of comprehension related to productive use of subject-verb agreement?

1.4 Rationale

There are several reasons for carrying out the present study. First, once I started reading the literature and familiarizing myself with this topic, I became interested in carrying out this piece of research. Second, few studies have investigated the comprehension and production of subject-verb agreement in Spanish as a first language. While the existing literature focuses mostly in the production of subject-verb agreement marking in the early ages of the acquisition of Spanish as a first language comprehension studies are rare, excepting Pérez-Leroux (2005).

1.5 Relevance of the study

This study hopes to contribute to the linguistic field with new information about the comprehension and production of subject-verb agreement in Spanish as a first language. The relevance of the present study lies in the fact that it looks into both the comprehension and production of a variety of Mexican Spanish. One of features of this study is that, in comparison to Dominican Spanish (the variety studied by Pérez- Leroux (2005)), in Quintana Roo Spanish there is no omission of the plural marker –s on nouns due to phonological- reasons. The results of the present study could potentially be useful to linguists and language educators. In the case of linguists, the data will help to discard that the findings reported by Pérez-Leroux (2005) are due to the qualities found in the Dominican Spanish input that children are exposed to and, possibly, it can provide

evidence that the phenomenon under study is the result of a developmental stage in the acquisition of Spanish in general. Moreover, the present study contributes with data from another variety of Spanish to identify the possible comprehension/ production asymmetry reported by Pérez-Leroux (2005).

Educators could use language teaching materials that raise awareness of the meaning of number agreement markers could be developed to sensitize children in the early stages of acquisition of verb-related morphology. The aim of this kind of intervention would not be to skip the observed developmental stages or speed up the acquisition process but to enhance the phonological saliency of the subject-verb agreement marker.

Before we go through studies of production and comprehension of subject- verb agreement markers in L1, we will explain in brief four theories that attempt to explain language acquisition.

1.6 Theories of language acquisition

Several existing theories of language acquisition have tried to explain how children are in principle capable of acquiring their first language and describe how language emerges in the early years of life.

The aim of this section is to briefly present four theories that attempt to explain L1 acquisition and to identify the specific theory which guides this study.

According to Guasti (2002), the task of acquiring a first language is extremely complex. However, children seem to accomplish this task without any difficulty. Four linguistic accomplishments that children attain early in life are described below.

1. **Children acquire language without explicit teaching**

Children seem to acquire their first language without explicit teaching. Language emerges spontaneously by hearing the language around them. Even

though, parents sometimes try to correct them, children seem to resist correction.

2. Children acquire language on the basis of positive evidence

The linguistic information available to a language learner can take two forms: positive or negative evidence. Negative evidence consists of information provided to a learner concerning the incorrectness of a form. An example of negative evidence is offered next. This example was originally presented in McNeill (1966, p. 69, as cited in Guasti, 2002, p.3).

(1) Child: Nobody don't like me.
Mother: No, say “nobody likes me”.
Child: Nobody don't like me.
(eight repetitions of this dialogue)
Mother: No, now listen carefully; say “nobody likes me”.
Child: Oh! Nobody don't likes me.

A classic example of this phenomenon is the conversation above between a mother and her child trying to correct her production of double negatives. The mother provided information about the ungrammaticality of double negatives in English. Even though, the mother tried to correct the double negative by identifying the error and presenting the corrected version of the sentence, the child seemed not to be influenced by correction, refusing to correct herself and making the same error.

Positive evidence, on the other hand, consists of all the forms that actually occur and to which the child has access. Children learn language on the basis of positive evidence, rather than negative evidence (Guasti, 2002, p.3).

3. **Children acquire language under varying circumstances and in a limited amount of time**

Any child is in principle able to acquire language. However, they do so within a limited amount of time under very differences circumstances: quantity and quality of care-takers input, access to non-verbal cues (e.g., the presence and salience of a word's referent, whether it is being looked at, pointed to, or manipulated by the adult interlocutor) (Cartmill et al. 2013, p. 1). Despite this, by the age of five they will master most of the constructions of their language, and possess a large vocabulary.

4. **Children acquire language in identical ways across different languages**

Acquiring a language is a process that all children go through. This process is similar across different languages. In the first six to eight months of life, children start babbling (repetition of sequences of syllables like *bababa*). Then at about age 10 months, they start to produce their first words. When they reach the age of two to three years, they will speak and use infinitive verbs in main clauses and this process developmental will be similar in many languages (Guasti, 2002).

The notion of grammar

Guasti (2002) defines grammar as a "psychological entity, not an inventory of sounds, morphemes, inflections…" (p.5). To clarify this concept consider the following example.

(4) *Going Alan theater to is the.

Even though the sentence (4) is comprehensible, it is ungrammatical in English because the order of the utterance is not appropriate. Conversely, we recognize that a sentence in (5) is grammatically correct in English, even though it is nonsense.

(5) Colorless green ideas sleep furiously.

These examples show that our linguistic knowledge (i.e. grammar) allows us not only to understand but also to establish whether a sentence is correct or not in our language.

Another example of the kind of knowledge provided by a speaker's grammar is given in example (6). This sentence is correct but only if it is used to express that Bob loves someone else, because the word "him" can only refer to another person rather than himself. However, the words "Bob" and "him" can actually mean the same person in the sentence (7).

(6) Bob loves him.

(7) Bob knows that his father loves him

Grammar, then, consists of a set of unconscious constraints that allow us to decide whether a sentence is correctly formed. Even before the age of five, children can, without having had any formal instruction, consistently produce and interpret sentences that they have never encountered before.

Where does language come from?

How do we know that a sentence is incorrect or inappropriate, so that it cannot have a given meaning or is ambiguous? Four hypotheses have been proposed involving imitation, reinforcement, association procedures, and Universal Grammar.

Language learning through imitation

According to this theory, children are able to imitate or repeat everything they hear from adults. However, an asymmetry between what they hear and what they produce contradicts this hypothesis.

First, children do not seem to be influenced by caretaker speech. Newport, Gleitman, and Gleitman (1977 as cited in Guasti, 2002 p. 11) have reported that in their speech, parents use questions (where is your toy?) or commands (put

your feeding bottle on the table!) most of the time and only 25% of their utterances are declarative sentences. In contrast, declaratives are the first kind of sentences that children produce.

Second, children produce sentences that they have never heard before from adults and this discredits completely this hypothesis. Indeed, children that are acquiring English, tend to overregularize irregular past tense verbs like “goed” instead of “went”, or “singed” instead of “sang”.

The evidence above demonstrates that the children go beyond the linguistic input and produce forms they have never heard before. These facts suggest that imitation does not play an important role in the language acquisition.

Language learning through reinforcement

According to this hypothesis, children learn language through the mechanism of reinforcing an association between stimulus and response. According to this view, children learn language because they are positively reinforced when they produce correct forms and negatively reinforced when they make errors.

Although this theory is simple, it does not explain how language is acquired or how babies have knowledge of grammar. For one thing, parents seem to pay more attention to *what* the child says rather than *how* the child says a given word or phrase. The example below illustrates how it is less likely for an adult to correct the ungrammatical utterance produced by a child, than to simply respond to what the child has said.

(8) Adam: Where penny go? (Adam, 2;5)
Mother: I don't know.
(9) Adam: Where penny go? (Adam, 2;5)
Mother: Didn't you drop your pennies on the floor?
Source: Guasti, 2002, p. 12.

In this example, the mother just answered to what Adam asked instead of correcting him. If only positive but no negative reinforcement is found in parental speech, this hypothesis cannot explain how children eventually develop correct adult grammars.

Language learning through association

Another hypothesis about how language acquisition takes place involves a connectionist approach. Connectionism is also known as parallel distributed processing or artificial neural networks. According to Li & Zhao (2013), this approach adopts the perspective that human cognition is an emergent property that is due to the interaction of a large number of interconnected processing units (neurons) that operate simultaneously, in parallel, in networks. In addition, connectionism supports that learning, representation, and processing of information are dynamic and distributed across neural networks. In simpler terms, learning consists of establishing associations between the input (stimuli) and output (response) patterns. Technically, once you present an input, the network will modify the weighted of its connections to produce a correct output.

To exemplify how learning occurs in connectionism, Guasti (2002, pp. 15-16) uses the case of the past tense in English as a first language. Connectionists argue that the acquisition of the past tense of regular and irregular verbs consist in learning associations between phonetic properties of verbal roots and the phonetic properties of their past forms and then generalizing this associations to verbs which sound similar.

Children find, identity and make associations based on structural patterns in their native language. A good example of this occurs when a child associates the phonetics of the verbs stems with the phonetics of their past tense forms. For example, the ending –alk [ɔ ː k] as in ”walk” and ”talk” is associated with the regular past tense ending -alked [ɔ ː kt] as in ”walked” and ”talked”; the consonant cluster pattern at the end of ”sing” and ”drink” i- nk, is associated with the past tense cluster [C-aŋ-C] [saŋ] / [draŋk]. Therefore, each time a child

hears a new verb with a specific phonetic pattern (input) they will associate it with an already known verb and produce its correct past tense form (output).

However, the connectionist approach fails to explain the types of errors that occur and do not occur in the process of acquiring English past tenses. Stromswold (1990 as cited in Guasti, 2002, p15) found that children overregularize main verbs like “have”, “do”, “be”, but they do not overregularize the auxiliary forms of these verbs. The examples below exemplify the types of errors that occur and those that do not.

Table 1: Errors produced and not produced by children

Occurring errors	**Non occurring errors**
I doed it rather	Doed you come?
I haved it	I haved eaten

Source: (Guasti, 2002, p.15)

This evidence shows that, while connectionism can explain some aspects of language acquisition, it fails in some aspects of acquiring rule verbs in past tense.

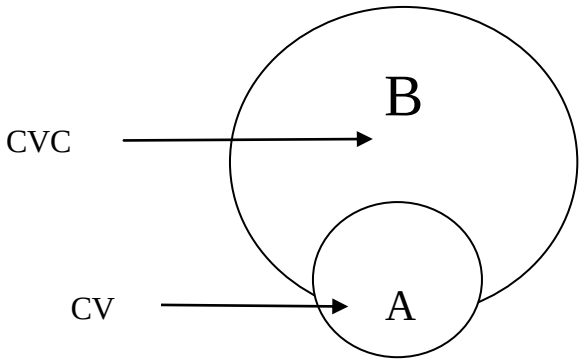
The innateness hypothesis

This theory claims that from birth all human beings possess rich linguistic knowledge as part of a common biology, a universal grammar (UG) consisting of a set of principles and parameters that define a space of human languages and the possible similarities and differences between languages (Mitchell & Myles, 2004).

The language that children are exposed to will serve as experience. The influence of the linguistic environment, constrained by this universal set of principles and parameters, will shape the emergence of spoken or signed language. Although every language seems different in the surface, they all share the same principles and can vary within certain parameters.

The principles and parameters model

There are two types of constraints: principles and parameters. These two properties help to make languages uniform. Principles are the invariant properties of all languages in the world, which make the similarities between the languages possible. Lexical categories, nouns, verbs and adjectives, are universal properties that are found in any language. The subset principle and the subjacency both are, as well, examples of UG principles. The subset principle states that "[w]henever there are two competing grammars generating languages of which one is a proper subset of the other, the learning strategy of the child is to select the less inclusive one. (Dell 1981, as cited in Carreira (1991, p, 5).



To illustrate de subset principle, the diagram above shows the acquisition of syllabic systems that allow only CV-type syllables (A) which define languages that are in subset relation to those that allow both CV and CVC syllables (B).

The subjacency principle, on the other hand, is defined as a universal constraint on movement rules.

The examples below come from the telegraphic stage of development, where children combine three or more lexical categories. The utterances (10) (11) (12) and (13) below exemplify noun verb combinations.

English

Intended meaning	Child utterance
(10) The car makes noise	Car make noise
(11) Dinosaur says gronk	Dinosaur say gronk

Source: (Cho & O'Grady, 2001, p. 447 and p. 361, respectively)

Spanish

Intended meaning	Child utterance
(12) Papá, ábreme la puerta	Papá, abre puerta
(13) Mamá, quítame el gorro	Mamá, quita gorro

Source: (Ojea, 2001, p. 421)

Parameters are points where there is a limited choice of settings depending on which individual language is involved. Parameters are linked with the way functional categories such as determiners, complementizers, grammatical morphemes such as agreement (subject-verb), number (plural) and tense (past) marking is realized or not across languages.

Parametric differences are responsible for the surface variations between languages such as word order or morphology. The way a language is structured can then vary from one language to another. The movement of a verb from a declarative to an interrogative utterance is a parameter found in some languages. Parameters are thus responsible for the sentence structure or syntax of a language. A child will set the parameters specified by the UG depending on the language that he or she is exposed to (Guasti 2002, p.18)

The difference in the obligatoriness of the production of subjects in a given language is an example of a parameter called the prodrop or null subject parameter. Prodrop languages such as Spanish allow for subjects of an

utterance to be unexpressed. On the other hand, non-prodrop languages such as English obligatorily require the expression of subjects.

Another parametric difference is found in the headedness of phrases. English and Spanish, for example, are known as head-first because the head of the phrase always appears before its complements.

(14) The picture is hanging on the wall
"La foto está colgada en la pared"

The head verb "está colgada" (is hanging) occurs before the verb complement "la pared" (the wall) "la pared" and the preposition "en" (in) comes before the prepositional phrase complement "la pared" (the wall).

Japanese is a head-last language, because the complements precede the head within the phrase.

(15) E wa kabe ni kakatte imasu
The picture wall on is hanging)
"The picture is hanging on the wall"
Source: (Cook & Newson, 1996, as cited in Mitchell & Myles, 2004, p. 68)

The head verb "kakatte imasu" occurs on the right of the verb complement "kabe ni" and the postposition "ni" (on) comes on the right of the prepositional phrase complement "kabe" (wall).

The aim of this section was to briefly present four theories that attempt to explain L1 acquisition and to identify the specific theory which guides this study. The theories outlined are:

1. Language learning through imitation
2. Language learning through reinforcement
3. Language learning through association

4. The innateness hypothesis

The theory that is adopted in the present study is the innateness hypothesis. I assume that the UG is the system of principles, conditions, and rules that are elements or properties of all human languages as well as the parameters or the variation across languages (presence or absence of functional categories).

UG provides children with a grammar they can use to process input. More specifically, UG is involved in the present study in the form of parameters. Properties of the input help children establish functional categories present or absent in her L1, which are evidenced through morphology. Inflections, such as the plural subject-verb agreement morpheme *–n*, are a reflex of parameters.

The next section reviews the literature related to the production and comprehension of subject-verb agreement morphology in English and Romance languages.

Chapter: 2 Review of Literature

2.1 The morphology of Spanish and English

According to Leonard, (as cited in Pye, 2001 p. 3), children learning English as an L1 spend more time and effort to dominate its morphological system while children learning Spanish as L1, manage much more complex verbal inflections with less difficulty. This is arguably due to the fact that Spanish has a morphological rich verb inflection system, while English has a poor one.

Spanish nouns are inflected for number and gender, and within the noun phrase there is agreement among the noun, determiners, and adjectives. The examples presented in (16) and (17) are taken from Montrul (2004, p. 32).

(16) Es**os** niñ**os** travie**sos.**
Those-masc-pl boy-masc-pl naughty-masc-pl
"Those naughty boys"

(17) Un**a** manzan**a** roj**a.**
a-fem apple-fem red-fem
"A red apple"

Spanish verbs are inflected for person, number, tense, aspect and mood. Verbs are classified into three classes, "-ar", "-er" and "–ir", depending on the thematic vowel of the infinitive ending (Montrul, 2004, pp. 89). The next table presents the person and number inflections in Spanish verbs.

Table 2: Person and number inflections in Mexican Spanish verbs with -ar ending

Person	Number	
	Singular	Plural
1st	(yo) brinco (Ø)	(nosotros) brincamos(mos)
2nd	(tú) brincas(s)	(ustedes) brincan(n)
3rd	(él/ella) brinca(Ø)	(ellos/ellas) brincan(n)

Besides verb morphology, Spanish nouns are inflected by the plural marker with the morpheme *–s*. The plural morpheme has three allomorphs /*s*/, /*es*/ and / *Ø*/. According to the morphophonological rules of Spanish, the words that end with unstressed vowels take the allomorph /*-s*/, those that end in a consonant, with the exception of words ending in "s", take /*-es*/; and finally multisyllabic words which end in "s" take / *Ø*/.

Spanish is a pro-drop language, a language that allows null nouns and pronouns, in other words, it does not require overt nouns or pronouns in determiner phrases. Nouns and pronouns can be omitted because the information is recoverable on the verb. Examples of sentences with explicit subject (18a and 21a), with pronoun subjects (19b and 22b), and null subjects are presented in (20c and 23c).

(18) a. María /Guillermo baila en la fiesta
(19) b. Ella/Él baila en la fiesta
(20) c. Baila en la fiesta

(21) a. Los albañiles/ Las artistas pintan la pared
(22) b. Ellos/Ellas pintan la pared
(23) c. Pintan la pared

Null nouns are possible with adjectives as in (24b), with prepositional phrases as in (25b), and with relative clauses as in (26b).

(24) a. Ese coche negro b. ese Ø negro
(25) a. Esa cuchara de madera b. esa Ø de madera
(26) a. Este libro que tiene fotos b. este Ø que tiene fotos
Source: (Montrul, 2004, p.36)

In English, verbs are only inflected in present and past tenses. In the present tense the third person is inflected by the morpheme *–s, -es* and in the past tense the verb is inflected by the morpheme *-ed* with the exception of the irregular ones.

Table 3: Person and number inflections in English verbs

Present simple		Past Simple	
Singular	Plural	Singular	Plural
I work	We work	I worked	We worked
You work	You work	You worked	You worked
He/She Works	They work	He/She worked	They worked

English on the other hand, is a non-pro-drop language in which nouns are obligatory. Hence, they cannot be dropped. (27b) and (28b) illustrate the ungrammaticality of null-subjects in English:

(27) a. The boy/ The girl walks to the school b. *walks to the school.
(28) a. She/ He drinks a glass of water b. *drinks a glass of water.

Once the Spanish and English morphology have been explained in detail, we will turn to some studies available in the literature that report on the productive acquisition of agreement markers by L1 child learners of English, as well as children acquiring Romance languages like Catalan, Italian and Spanish as a first language.

2.2 The production of agreement morphology in L1 English

Fraser, Bellugi, and Brown (1963) carried out a study with English speaking three years-old children whose aim was to determine whether comprehension precedes production in early stages of acquisition of English as a first language.

They used a picture description task to elicit irregular and regular nouns in sentences as in (29) and (30).

(29) a. “The sheep is jumping” b. “The sheep are jumping”
(30) a. “The boys draw” b. “The boy draws”

Figure 1: Illustration of the visual stimulus

Source: (Fraser, Bellugi, & Brown, 1963, Figure 1, p.124)

The child was twice told the names of the pictures but not which name went with which picture. After repeating the name of the pictures, the researcher pointed out to one picture and asked the child to name it.

The next table shows the production scores for singular and plural markers.

Table 4: Production scores for plural and singular subject-verb agreement markers: auxiliary be and *-s*

Verb forms	**Production**
Singular/plural forms of auxiliary *be* marked by *is/are*	7/24
Singular/plural forms marked by inflections *-s/Ø*	1/24

Source: (Fraser, Bellugi, & Brown, 1963, Table 5 p.131).

These results show that the agreement forms of the auxiliary verb *be* are more frequently used in oral production than the verbal inflection *-s* in child production. According to Brown, (1973); de Villiers and de Villiers, (1973); and Radford's (1990) seminal works, auxiliary forms of *be* emerge after the third person singular agreement marker /s/ on lexical verbs. Table 4 below presents the order of acquisition of eight morphemes from Brown's (1973) longitudinal study. Table 5 shows similar findings in the order of acquisition by de Villiers and de Villiers's (1973) longitudinal study.

Table 5: Ordering of grammatical morpheme acquisition for L1 learners of English in Brown (1978) and in de Villiers and de Villiers's (1973)

Brown´s table	De Villiers and de Villiers's table
1.Present progressive – ing	1.Plural –s 87.6%
2.Plural – s	2.Present progressive – ing 87.5%
3.Irregular past tense	3.Irregular past tense 70%
4.Possessive – 's	4.Articles *a/an* and *the* 60.2%
5.Copula be	5.Copula be 55.5%
6.Articles *a/an* and *the*	6.Possessive - ´s 50%
7.Third person singular present tense – s	7.Third person singular presente tense-s 44.7%
8.Auxiliary *be*	8.Auxiliary *be* 35%

Source: (adapted from Villiers & de Villiers, 1973, Table 2, p.271).

The table above shows similarities in the order of early acquisition of the third person singular present tense – *s* and the later acquisition of the auxiliary *be*.

The results obtained by Fraser at al. (1963) are not in line with the previous literature. The 3 year-old children in Fraser at al. (1963) should be expected to produce higher rates of both the auxiliary verb be and the verbal inflection –*s*.

A similar production study was led by Keeney and Wolfe (1972). These authors wanted to determine if children produce the third person singular marker in their spontaneous speech. They chose 46 native English speaking children, equal number of boys and girls from a nursery school, whose ages were between 3 to 4 years old. The methodology used was a storytelling task. The experimenter chatted informally with each child using a story and picture book as the focus for the conversation. The storytelling sessions were recorded for later analysis.

Table 6: Number of grammatical and ungrammatical utterances in spontaneous speech

	Noun Subject		Pronoun Subject	
Verb Type	Grammatical	Ungrammatical	Grammatical	Ungrammatical
Regular Singular	84.74%(100/118)	15.25%(18/118)	91.50%(194/212)	8.49% (18/212)
Regular Plural	89.43%(110/123)	10.56%(13/123)	98% (311/315)	1.26% (4/315)
Aux *be* singular	100% (33/33)	0	100% (82/82)	0
Aux *be* plural	100% (6/6)	0	100% (17/17)	0

Source: (Keeney, & Wolfe, 1972, Table 1, p.702)

As we can see from the results presented in Table 6, children's frequency and accuracy of production of subject-verb agreement marking with pronominal subjects was higher than with nominal subjects. Children also produced the auxiliary verb *be* more frequently and accurately than the *-s* inflection on main lexical verbs.

Keeney and Wolfe (1972), concluded that children at 3 to 4 years old are able to produce the inflection *–s*. However, Fraser, Bellugi, and Brown, (1963) could not demonstrate the production of the inflection *-s* because it was produced in low rates.

We will now turn on to reviewing the literature on the production of agreement morphology in Spanish, Catalan and Italian as L1.

2.3 The production of agreement morphology in L1 Spanish

Several studies have found that Spanish speaking children start to produce correct person and number verb inflections by age 2;5 (Durán, 2000; Grinstead, 2000; Félix-Brasdefer, 2006, as cited in Miller &Schmitt, 2009 p.7). That is, the production of subject verb agreement inflection emerges earlier in Spanish than in English.

As shown above, verbs in Spanish have different inflections for person and number, with the exception of the third person singular, which is a stem form.

Table 7: Person and number inflections in Mexican Spanish verbs with -ar ending

Person	Number	
	Singular	Plural
1st	(yo) brinco (Ø)	(nosotros) brincamos(mos)
2nd	(tú) brincas(s)	(ustedes) brincan(n)
3rd	(él/ella) brinca(Ø)	(ellos/ellas) brincan(n)

Longitudinal studies which examined the emergence of agreement in child under three years-old in Spanish have found similar patterns, with children showing person contrasts from the earliest ages examined, 1;7-1;8 (Bel 2001 as cited in Montrul, 2004; Bel & Rosado 2005; Durán 2000 as cited in Miller &Schmitt, 2009 p. 7). Table 8 illustrates this pattern of emergence.

Table 8: Emergence of person and number agreement in child Spanish

		Person and Number agreement					
		Singular			Plural		
Child	Ages	1st	2nd	3rd	1st	2nd	3rd
Emilio	1;9-2;6	24	5	56.5	6.5	0	8
Juan	1;9-2;5	18	7	72	0.7	0	2.3
María	1;7-2;6	32.5	8	52.5	2.5	0	4.5
Average		24.83	6.66	60.33	3.23	0	4.93

Source: (Bel, 2001 as cited in Montrul, 2004, Table 3.4. p.106)

Table 9 shows the percentage correct use of subject-verb agreement morphology in obligatory contexts.

Table 9: Person singular and plural in Spanish Bel and Rosado (2005)

	Singular			Plural		
Child	1st	2nd	3rd	1st	2nd	3rs
Emilio	28% (81/290)	6% (17/290)	66.2% (192/290)	44% (22/50)		56% (28/50)
Juan	18.38% (25/136)	7.35% (10/136)	74.26% (101/136)	25% (1/4)		75% (3/4)
María	35.12% (529/1506)	8.5% (129/1506)	56.3% (848/1506)	33.33%(38/114)		66.66% (76/114)

Source: (adapted from Bel & Rosado, 2005, Table 2 pp.39-40)

The table illustrates the general pattern of emergence. Some children produce 1st and 3rd person in singular first, while others already show 1st, 2nd and 3rd contrast from the very beginning. First and 3rd person plural forms emerge soon afterwards, while 2nd plural is the least produced form. Third singular is the most frequent form, followed by 1st singular.

The use of verbs inflected for agreement show evidence of productivity, since the same verb appears with different forms and different person forms were supplied to different verbs.

Bel and Rosado (2005) found that children produce erroneous subject-verb agreement forms. The table (10) presents the percentage agreement errors found in the corpus.

Table 10: Spanish errors in singular S-V

Child	Singular		
	1st	2nd	3rd
Emilio			2.75%(8/2905)
Juan	0.73%(1/136)	0.73%(1/136)	44.85(6/136)
María	0.26%(4/1506)	0.13%(2/1506)	3.98%(60/1506)

Source: (adapted from Bel & Rosado, 2005, Table 2 pp.39-40)

With regard to errors, Bel (2001, as cited in Montrul 2004, pp. 106) reported that they occur in very low percentages, in less than 5% of the total number of agreement forms. It is significant that when errors do occur, they involve 3rd person singular forms. Researchers do not consider these as errors since children from these ages talk of themselves in the third person. (31) and (32) exemplify child speakers' use of third person when speaking about themselves.

(31) No puede (meaning, *no puedo*) (Josep 2;6, Torrens 2002)
(32) *Siento, nene, siento (meaning, *siéntate)* (María 1;9, Bel 2001)

Finally, Spanish-speaking children correctly produce overt and null subjects, preverbal and postverbal subjects, and pronominal subjects with nominative case.

Examples from Josep (Torrens 2002, as cited in Montrul 2004, pp. 106)

(33) Tengo pupa. (1;11)
(34) Yo salto. (2;6)
(35) Tú (te) quedas. (2;4)
(36) Se ha caído el osito. (2;4)

Brandani (2010) used a corpus study aiming to determine whether L1 Spanish children have early knowledge about grammatical categories of person, number and subject-verb agreement in present indicative. The spontaneous and elicited production corpus from three L1 Argentine Spanish speaking girls was collected, in average, over a 9.7 month period. The spontaneous production corpus consists of 45 to 60 minute individual interviews in which each girl played freely with different toys and story books. On the other hand, the elicited production corpus was collected through three tasks that aimed at collecting descriptions of actions involving different verbs and number of actors involved: a picture description task, a charade game task, and a puppet task. The corpus was audio-recorded and transcribed.

Table 11 presents the names, ages and mean length utterance (MLU) measures of each of the child participants.

Table 11: Brandani corpus: child participants (2010)

Name	Age	MLU
Emilia	1;11 a 2;10	1.9 a 3.7
Renata	2;3 a 2;11	2.1 a 3.4
Julia	1;7 a 2;5	2.5 a 3.9

Source: (Brandani, 2010, Table 1. p.14)

The criteria for analysis used by Brandani (2010) were taken from (Pizzuto et al. 1992).

An inflection in Romance languages is taken as productive when:

1. The same verbal root appears in at least two inflectional forms.
2. The same inflectional morpheme is used at with least two different verbs.

The data in Brandani (2010) proposes two stages in the development of L1 person and number categories in Spanish. Stage 1 is characterized by the production person and number exclusively with singular referents. 3rd person is used predominantly, followed by 1st and 2nd person. Table 12 shows the distribution of person morphology.

Table 12: First stage: Distribution of Person verb morphology in Spanish present indicative

Child	1st person (sing)	2nd person (sing)	3rd person (sing)
Emilia	7% (11/154)	47.40% (73/154)	45.45% (70/154)
Renata	4.67% (5/107)	13.08% (14/107)	82.24% (88/107)
Julia	23.88% (64/268)	17.53% (47/268)	58.58% (157/268)

Source: (adapted from Brandani, 2010, Table 2. p.17)

Examples

(37) ¿me pongués el tutu? (Julia 2;0.12)

(38) ya me ponguiste (Julia 2;0.12)

(39) te ponguiste la pollera (Julia 2;0.12)

(40) me pongué el vestido (Julia 2;1.22)

(41) se pongó el pantalón (Julia 2;1. 23) (diary data)

Source: (Brandani, 2010, p. 17)

In this first stage, the use plural morphology is low and non-contrastive. Table 13 shows the distribution of singular and plural morphology.

Table 13: First stage: Distribution of Number verb morphology

Child	Singular	Plural
Emilia	29.17% (145/497)	28.12% (9/32)
Renata	20.72% (103/497)	12.5% (4/32)
Julia	50.10% (249/497)	59.37% (19/32)

Source: (adapted from Brandani, 2010, Table 3. p.19)

With regard to the types of subjects produced, Brandani (2010) found that the children in her corpus used both lexical subjects and null subjects from the start of data collection. However, there was a clear predominance of null-subjects. 80% of the utterances collected were headed by a null-subject. The utterances below exemplify the types of subjects used by Renata (2;3.8 y 2;3. 28)

(42) Tiene la pelota

(43) no buja (dibujar)

(44) se cayó

(45) está dibujando nena

(46) pació el oso (apareció)

(47) se cayó lápiz

Source: (Brandani, 2010, p. 19)

The first stage is also characterized by the production of a small percentage of person agreement errors (6% over all correct utterances). The predominant error involves the use of the third person singular when referring to themselves, instead of the first person form. Person errors are shown in the examples below:

(48) no quiere la media (por quiero) (Emilia 1;11.7)
(49) se cae (por me caigo) (Renata 2;3.28)
(50) dibuja acá, dibuja acá (por dibujo) (Julia 1;11.7)
Source: (Brandani, 2010, p.20)

This error type has been well documented in Spanish, as well as in other Romance languages (Guasti, 1993/1994; and Bel & Rosado, 2005).

Brandani warns that while the first stage takes place around the ages of 1; 7 and 2;4, there can be individual differences which can cause children to be in different stages regardless of being the same age. The mean length utterance for children in this stage is 1.9 to 2.5.

Stage 2 is characterized by a wider range of verbs produced with different person morphology. While the 3rd person is still predominant, the use of 1rst person morphology becomes more productive.

Table 14: Second stage: distribution of person verb morphology in Spanish present indicative

Girl	1st person	2nd person	3rd person
Emilia	15.71% (55/350)	10.57% (37/350)	73.71% (258/350)
Renata	18.79 (72/383)	16.18% (62/383)	65.01% (249/383)
Julia	22.99% (152/661)	13.61% (90/661)	63.38% (419/661)

Source: (Brandani, 2010, Table 4. p.21)

Children begin to produce plural verb morphology. There is a contrast between singular and plural verb morphology. However, singular forms are more frequently used than plural forms. During this second stage, the children in the corpus use the same verbal root with different person and number inflections.

(51) ¿te gusta la naranja? (Emilia 2;5.27)
(52) me gustan las zapatillas (Emilia 2;5.27)
(53) va a chocar el azul (Renata 2;9.11)
(54) los dos se chocaron (Renata 2;9.11)
(55) suben y bajan (Julia 2;4.17)
(56) éste baja baja baja (Julia 2;417)
Source: (Brandani, 2010, p. 22)

The next table describes the complete children production in singular and plural in both stages.

Table 15: Production of singular and plural forms in stage 1 and 2

	Stage 1		Stage 2	
Child	Singular	Plural	Singular	Plural
Emilia	29.17%(145/497)	28.12%(9/32)	22.2%(284/1279)	33.77%(76/225)
Renata	20.72%(103/497)	12.5%(4/32)	32%(409/1279)	32.88%(74/225)
Julia	50.10%(249/497)	59.37%(19/32)	45.81%(586/1279)	33.33%(75/225)

Source: (Brandani, 2010, Table 5, p.23)

During the second stage, children stop producing the agreement error found previously. They do no longer use 3rd morphology to refer to themselves.

This stage is characterized by the production of an error in number agreement in small percentages (10% over all correct utterances). This error consists of the use of a plural subject with a verb with singular inflection (N_{pl} + V_{sing}). It is important to stress that all errors show this same unidirectional pattern. The examples below illustrate the number agreement error found in Stage 2.

(57) caió lápices arriba del papel (Renata 2;7.16)
(58) se caió todas (Renata 2;7.16)
(59) se cayó los lápices (Emilia 2;5.27)
(60) está los patos (Emilia 2;5.27)
(61) ¿adónde está sus juguetes? (Julia 2;3. 26)
(62) los pañales usa los bebés titos (chiquitos) (Julia 2;2.8)
Source : (Brandani, 2010, .p. 24)

It is interesting to note that while number agreement errors occur with both null and lexical subjects, it is more frequent when the subject is null. The examples below illustrate the number agreement error with null subjects found in Stage 2.

(63) Adult: ¿qué pasó?
Renata: vasos
Adult: ¿qué les pasó?
Renata: se caio (cayó) (Renata 2;7.16)

(64) Renata: autitos, autitos
Adult: ¿qué les pasó?
Renata: se lastimó
Adult: ¿qué hicieron los autitos?
Renata: es iguales (Renata 2;7.16)

(65) Adult: ¿qué les pasó?
Renata: no tiene zapato
Adult: ¿quién?
Renata: la nena y el nene (Renata 2;11.12)

(66) Adult: ¿qué pasó con los vasos?
Emilia: se cayó (Emilia 2;5.27)

(67) Adult: ¿acá qué hay?

Emilia: globos
Adult: ¿qué pasó con los globos?
Emilia: se desinfló (Emilia 2;5.27)

(68) Adult: ¿qué hay acá?
Julia: una nena y un nene
Adult: ¿y qué hacen?
Julia: se pintó (Julia 2;4.17)

(69) Julia: una nena y un nene
Julia: está llorando
Adult: ¿por qué?
Julia: porque quiere a su mamá
Adult: ¿y estos chicos?
Julia: también quiere a su mamá (Julia 2;4.17)

(70) Adult: ¿a estos que les pasó?
Julia: se cayó
Adult: ¿quién se cayó?
Julia: los señores esos (Julia 2;4.17)
Source: (Brandani, 2010, .pp. 25-26)

The second stage takes place around the ages of 2;4 and 2;11, although there may be individual differences. The mean length utterance for children in this stage is 2.6 to 3.9.

From these three studies, Bel (2001); Bel and Rosado (2005); and Brandani (2010) concluded that children produce singular agreement forms both with lexical and null subjects. Early in development, L1 Spanish-speaking children use singular S-V inflection contrastively. The 3rd person is produced in high frequency, followed by 1st and 2nd person. There is an absence of plural agreement forms. At this early stage, a typical agreement error appears when

children use the 3rd person singular to talk about themselves. However, these subject-verb agreement errors are discarded as such by all authors, given that children typically talk of themselves in the third person in the early stages of acquisition. Later in development, the use of plural agreement forms with lexical and null subjects emerges. There is evidence of the contrastive use of singular and plural agreement forms. At this later stage, self-reference is carried out by using the first person and not the third. Therefore, Person agreement errors disappear and are replaced by a low number of Number agreement errors (Brandani, 2010).

Aguado-Orea (2004, as cited in Aguado, Casla, Rujas & Mariscal, 2011 pp. 73-77) carried out an error analysis of agreement morphology using the longitudinal spontaneous speech data from the Madrid-Nottingham corpus (Aguado-Orea & Pine, 2004). This corpus presents data from two monolingual children. Data comes from one boy, Juan (from 1;10 to 2;5 years) and one girl, Lucia (from 2;2, years to 2;7 years).

His results showed that both children had fewer errors using the singular marker -*Ø* than the plural marker *–n* in indicative present. Juan produced 0.65% (13/1986) errors in third person singular over 33.33% (75/249) errors in third person plural. Lucia did not commit any errors (0/1016) in third person singular but for third person plural she produced 67.35% (33/49) errors. It is not possible to ascertain whether the errors produced by these children were errors of morpheme omission or cases of inappropriate use of agreement morphemes, since Aguado-Orea (2004, as cited in Aguado, Casla, Rujas & Mariscal, pp. 73-77) does not provide this information.

Casla, Aguado-Orea and Pine (2005, as cited in Aguado, Casla, Rujas & Mariscal, 2011, pp. 79-83) collected pseudo-experimental speech data through an elicitation task to study the use of the 3rd person plural marker with more detail. In this experimental elicitation the participants were 12 children whose ages ranged between 2;20 and 4;0 years old.12 adults served as controls.
The authors elicited agreement data by asking children two simple questions that would provide answers with plural and singular marked verbs “¿qué hace?”

"¿qué hacen?". To this end, they used an illustration from a children's book (Denou, 1994) in which many subjects were doing different actions. 24 questions were formulated with 12 singular morphemes and 12 plural morphemes.

Figure 2: Illustration of the visual stimulus used to prompt the production of agreement morphology

Source: Casla, Aguado-Orea and Pine (2005, as cited in Aguado, Casla, Rujas & Mariscal 2011, p.81).

In the results they found that children significantly produced more accurately third person singular forms (25.86%) than third person plural ones (13.71%) ($F=18.13$; g.1.=1; $p.<0.001$). This confirms that children between 3 and 4 years old produce the plural marker *–n* but they do not (yet) seem to have complete knowledge of it. Besides the verbs children produced, Casla, Aguado-Orea and Pine (2005, as cited in Aguado, Casla, Rujas & Mariscal, 2011, pp. 79-83) selected 12 verbs based on the visual stimulus from the study (Figure 2 above) as possible answers to establish an additional comparison. These verbs were divided in two groups: Six with high frequency and six with low frequency. They found that children used more verbs in present indicative when the questions made reference to a high frequency verb (27.4% of the contexts) than to a low frequency verb (12.13% of the contexts). However, no interaction was found between frequency and number.

Rujas (2008, as cited in Aguado, Casla, Rujas & Mariscal, 2011, pp. 83-85) studied the repetition of sentences containing 12 different actions by 36 Spanish-speaking children whose ages ranged from 2;3 to 4;2. The verbs selected for the repetition task were carefully selected. The author used verbs of high and low frequency use. The verbs of high frequency were “abrir” ‘to open’, “dormir” ‘to sleep’, “comer” ‘to eat’, “pintar” ‘to paint’ , “jugar” ‘to play’ and “beber” ‘to drink’ and the low frequency ones were “volar” ‘to fly’, “buscar” ‘to look for’, “leer” ‘to read’, “cortar” ‘to cut’, “oír” ‘to hear’ and “conducir” ‘to drive’. However, the criteria used to select those verbs on the basis of frequency were not stated. Each of these 12 verbs was used to create 24 sentences with two possible subjects, “la niña” ‘the girl’, and “las niñas” ‘the girls’. In total, children heard 24 sentences, containing singular and plural forms of each of the 12 verbs. The results show that 99.76% of the sentence repetitions containing a singular verb were repeated correctly, while only 40.88% of the sentence repetitions containing plural verbs were correct. There was a significant difference in the rates of accuracy in which plural and singulars forms were produced (F=144,85; g.1.=1; p.<0.05). However, there was no meaningful difference in function of the frequency of the verbs. Although children had heard 3rd person plural marked verbs like: “comen” ‘(the girls) eat’, “pintan” ‘(the girls) paint’ or “vuelan” ‘(the girls) fly’ as stimulus, they changed them into 3rd person singular forms: “come” ‘(the girl) eat’, “pinta” ‘(the girl) paint’ or “vuela” ‘(the girl) fly’.

As the previous studies have shown, the L1 Spanish-speaking children in Rujas (2008) have an early preference for the use of singular agreement markers over plural ones. Their production of the 3rd person plural agreement marker was low and when it did occur it tended to be inaccurately used. Rujas (2008) speculates that the low rate of plural agreement marking production is the result of a general strategy of avoidance.

In sum, the three previous studies show that children prefer using the singular agreement marker Ø over the plural agreement marker *-n*.

2.4 The production of agreement morphology in Catalan and Italian as L1

Besides the previous studies on the production of singular and plural agreement marker (*Ø – n)* L1 in Spanish, this review includes related production studies in two Romance languages, Catalan and Italian.

Bel and Rosado (2005) conducted a longitudinal study which focused on the development of subject-verb agreement morphology in Catalan as an L1. The longitudinal spontaneous data from 3 monolingual children taken from different corpus was studied.

Table 16: Child data: Bel and Rosado (2005)

Language	Child	Age	Source
Catalan	Júlia	1;9-2;6	Bel (1998)
	Pep	1;6-2,6	Serra-Solé (CHILDES)
	Gisela	1;10-2;8	Serra-Solé (CHILDES)

Source: (Bel & Rosado, 2005, Table 1, p.38)

The table below shows the agreement paradigm in present indicative in Catalan.

Table 17: Present tense of “parlar” (to speak)

(yo) parl-o	I speak
(tu) parl-es	You speak
(ell/ella/) parl-a	She/ He speaks
(nosaltres) parl-em	We speak
(vosaltres) parl-eu	You speak
(ells/elles/) parl-en	They speak

Source: (C. Barrachina Lison personal communication, May 27, 2015)

Bel and Rosado, (2005) used the CLAN programs Combo and Freq to first extract the utterances consisting of a lexical or null subject and a finite verb form, and then, established the absolute frequency of each agreement form for each child. A total of 935 utterances were obtained in Catalan.

Tables 18 show the percentage correct use of subject-verb agreement

Table 18: Person singular and plural in Catalan Bel and Rosado (2005)

	Singular			Plural		
Child	1st	2nd	3rd	1st	2nd	3rd
Gisela	23.5% (27/115)	16.5% (19/115)	60% (69/115)	33.33% (1/3)		66.66% (2/3)
Julia	8.7% (33/379)	12.66% (48/379)	78.62% (298/379)	33.33% (14/42)	4.76% (2/42)	62% (26/42)
Pep	29.7% (102/343)	6% (20/343)	64.5% (221/343)	39.62% (21/53)	7.5% (4/53)	52.83% (28/53)

Source: (adapted from Bel & Rosado, 2005, Table 3, pp. 40-41)

The table above shows that Catalan children produce 1st, 2nd and 3rd person singular verb forms. The most frequently produced agreement verb form is the 3rd person singular. The occurrence of plural agreement forms is limited; 1st and 3rd person plural forms are scarce; the 2nd person plural form is almost absent (there are only 6 in Catalan).

Bel and Rosado (2005) observed that the productive use of the different persons with different verbal roots increases gradually. Children were found to produce erroneous subject-verb agreement forms. The table 19 presents the percentage agreement errors found in the corpus.

Table 19: Catalan errors in singular S-V

Child	Singular		
	1st	2nd	3rd
Gisela			
Julia	0.52%(2/379)	0.52%(2/379)	15.83%(60/379)
Pep			4.03%(14/343)

Source: (adapted from Bel & Rosado, 2005, Table 3, pp.40-41)

As in Brandani (2010) study, children produced 3rd person singular verb forms when they were talking about themselves. The examples below show this agreement error. (PAR stands for father, JUL for Julia and Mar for mother)

Catalan

(71) A Júlia no tinc. [esconde la botella detrás de ella] (Júlia, 2;1a)
(72) PAR: I tu què vas fer quan el vas veure?
JUL: Ploraves. [% polales] (Júlia, 2;3)

(73) PAR: què vols fer aquí?
JUL: vol pujar. [% po putxar] (1;11b)
(74) MAR: Júlia, es pot saber què fas?
JUL: busca a titelles. (2;2)
Source: (Bel & Rosado, 2005, pp. 45-46)

In the utterances above, the children were talking about themselves. Bel and Rosado (2005) take this to suggest that these are not person agreement errors but deictic errors (p. 46). They argue that in order to establish a real error in agreement, the child has to use a lexical subject combined with a verb marked for person/ number agreement. Examples (75) (76) show how the children use the 1st person subject with a verbal inflected for a 3rd person.

(75) *Jo vol*. (Júlia, 2;5, p46)

(76) Yo no sabe tú, yo no sabe tú, yo no sabes (María, 2;6, p. 46).

Source: (Bel & Rosado, 2005)

Guasti (1993/1994) studied the longitudinal transcripts from 3 monolingual Italian children from the CHILDES database.

Table 20: Italian Child data from Guasti (1993/1994)

Child	Age	Source
Martina	1;8 – 2;7	Cipriani, et al. (1989) CHILDES
Diana	1;10 – 2;6	
Guglielmo	2;2 – 2;7	

Source: (Guasti, 1993/1994, p.3)

The table below shows the agreement paradigm in present indicative in Italian.

Table 21: Present tense of “parlare” (to speak)

(io) parl-o	I speak
(tu) parl-i	You speak
(lei/lui) parl-a	She/ He speaks
(noi) parl-aimo	We speak
(voi) parl-ate	You speak
(loro) parl-ano	They seak

Source: (Guasti, 1993/1994, Table 9, p.22)

The following table (22) presents the distribution of agreement forms across persons.

Table 22: Distribution of correct use of person inflections Guasti (1993/1994)

Child	1st person	2nd person	3rd person	1st plural	3rd plural
Martina	34.8% (157/450)	11.33% (51/450)	53.77% (242/450)	25% (7/28)	75% (21/28)
Diana	35.25% (208/590)	17.11% (101/590)	47.62% (281/590)	42.85% (9/21)	57.14% (12/21)
Guglielmo	39.5% (72/182)	10.43% (19/182)	50% (91/182)	65% (13/20)	35% (7/20)

Source: (adaptep from Guasti, 1993/1994, Tables 10, 11, 12, pp.22-23)

Table 22 shows all singular inflections emerge earlier and are more frequently used than plural ones. The most frequently used person inflection was the 3rd person singular, followed by 1st person and 2nd person singular. Plural inflections appeared late and marked 1st and 3rd person. The second plural was never observed in the period examined by Guasti (1993/1994).

The following table (23) presents the distribution of agreement errors across persons.

Table 23: Distribution of incorrect use of Person inflections Guasti (1993/1994)

Child	1st person	2nd person	3rd person
Martina	-	-	1.77%(8/ 450)
Diana	-	-	1.35%(8/590)
Guglielmo	0.54%(1/182)	1.09%(2/182)	1.64%(3/182)

Source: (Guasti, 1993/1994, Tables 10, 11, 12, pp.22-23)

As table 23 shows there were few agreement errors. In the corpus, the percentage of subject verb agreement errors was around 1% for Martina and Diana, and 3% for Guglielmo.

Guasti (1994/1995) points out that some of these errors involved the third person plural inflection. The examples below illustrate this error type. (M stands for Martina, A for adult, and G for Guglielmo).

(77) A: cosa fanno . I tati?
What do 3PL the children
What are the children doing?
M: Mangia
Eat-3sg
(they) eat
(Martina 1;10)

(78) ep mucchine mangia.
ep cows eat-3sg
(Martina 1:10)

(79) A: i topolini cosa fanno?
The mouses what do 3-PL
As for the mouses, what are they doing?
M: gioca.
Play-3sg
(they are playing)
(Martina 1;11)

(80)(le noci) non mi piace.
(The walnuts) Neg to + me like 3sg
I don't like (the walnuts)
(Martina 2;7)

(81) I bambini ep gioca
The children ep play-3sg
The children are playing
(Diana 1;11)

(82) È caccato I giucattoli
Is fallen the toys
The toys falls
(Diana 2;6)

(83) Cosa fa questi gattini?
What do- 3sg these kittens?
What are these kittens doing?
(Guglielmo 2;5)

Source: (Guasti, 1994/1995, pp.25-26)

Another type of error involved the use of a 3rd person inflection with a first person subject. This type of error was produced by Martina´s mother. It is exemplified in 84 and 85.

(84) La Martina ha battuto la testa.
"Martina hit the head"
(85) Cosa prende Martina?
What does Martina take?

Source: (Guasti, 1993/1994, pp 23)

Guasti (1993/1994) suggests that this error type could be due to the fact that children refer to themselves by their own name. That is, with a third person expression. Another factor is parental input. Often, parents and caretakers refer to the child using the third person.

From these two studies Catalan and Italian, it can be concluded that singular inflections emerge earlier than plural inflections. There is a contrastive use in the 1st, 2nd and 3rd person singular, with the 3rd being the most frequent form, followed by the 1st and 2nd person.

Plural inflections emerge later. The 3rd person is the most frequent, followed by the 1st person. The 2nd person plural is mostly missing. In terms of the types of subjects produced, children tend to use null subjects more than lexical subjects.

When subject-veb agreement is used, children tend to make certain kind of agreement errors. Children use the 3rd person singular when referring to themselves. This error was found in the three studies. Guasti (1993/1994) reported examples where parents use the 3rd person singular to talk to their

children. Bel and Rosado (2005) claim that this is not really an agreement error since the utterances produced by children show agreement between subject and verb. Instead, they point out that this type of error happens because children have not established the reference of deixis yet (Bel & Rosado, 2005, p. 47). Interestingly, once the plural inflections appear, children stop using 3rd person singular forms to refer to themselves.

A real agreement error would occur if children used a plural subject with a verb with zero marking (V + Ø). This kind of number agreement error is more frequently found in sentences with null subjects. Bel and Rosado (2005) and Guasti (1993/1994) reported that this error type is produced in very small percentages. Together these findings lead us to conclude that children have knowledge of agreement and inflections but tend to omit or avoid plural marking.

In conclusion, the studies on the early acquisition of subject-verb agreement in L1 Spanish, Catalan and Italian reviewed above reveal remarkable similarities in patterns of development.

In the next section we will discuss studies about comprehension of subject-verb agreement morphology in English, German and Spanish as an L1.

2.5 The Comprehension of subject-verb agreement morphology in L1

In contrast with the findings of studies on children's production of subject-verb agreement morphology, previous research has suggested that comprehension of agreement morphology occurs late and is not actively involved in sentence processing. This asymmetrical relationship between children's production and comprehension of S-V agreement morphology is against the general thesis in language acquisition that a learner must have competence in language comprehension before she or he can acquire competence in language production. Clark (1993) expresses this view.

> Logically, comprehension must precede production. How else can speakers know which words to use to convey a particular meaning? They must already have mapped the relevant meanings onto specific forms, and have these units represented in memory, to be accessed on subsequent occasions whenever they hear the relevant forms from others. (pp. 246).

In this section, I present some studies that have suggested that it is possible for production to precede comprehension.

Fraser, Bellugi, and Brown (1963) carried out a study that compared production and comprehension abilities to test whether comprehension precedes production in early language acquisition. They studied 12 monolingual English speaking children (6 boys and 6 girls) between the ages of 3;01 and 3;07 years old. To this end, they used the singular-plural distinction as marked by the auxiliary forms of *be*, *is* and *are* by inflection. Irregular nouns without plural marking like *sheep* or *deer* were used as subjects to avoid doubly marking the number information. The examples in (86) illustrate this:

(86) a. The <u>sheep</u> is jumping
b. The <u>sheep</u> are jumping.

In the case of inflections marked on lexical verbs (V+s and V+Ø), they used regular nouns. The sentences in (87) exemplify this:

(87) a. The boy draws
b. The boys draw.

Comprehension was tested using a picture-selection task with a pair of pictures differing in the number of subjects shown. The researcher showed two pictures and named them, but without reveling which name belonged to which picture. The child was asked to point to the picture named. To test production, children were asked to name the same pictures.

Figure 3: Illustration of the visual stimulus (Fraser et al., 1963)

Source: (Fraser, Bellugi, & Brown, 1963, Figure 1, p.124)

Comprehension was found to be ahead of production, such that the children had higher scores on the comprehension than on the production task.

Table 24: Comprehension scores for plural and singular subject-verb agreement markers: auxiliary be and *-s.*

Forms	Comprehension
Singular/plural forms of auxiliary be marked by is/are	12/24
Singular/plural marked by the *-s* inflection	7/24

Source: (Fraser, Bellugi, & Brown, 1963, Table 5 p.131)

The results showed that children had some difficulty with this contrast, compared with other inflectional and grammatical contrasts, although comprehension of the contrast was slightly ahead of elicited production.

Table 25: Comparison production/comprehension results

Verb forms	Production	Comprehension
Singular/plural forms of auxiliary *be* marked by *is/are*	7/24	12/24
Singular/plural forms marked by inflections -s/Ø	1/24	7/24

Source: (Fraser, Bellugi, & Brown, 1963, Table 5 p.131).

Keeney and Wolfe (1972) tested children's command of subject-verb agreement in English using a task similar to Fraser et al., (1963). Forty six native English speaking children, whose ages ranged from 3:0 to 4:11 participated in the study. To test comprehension, Keeney and Wolfe (1972) selected 16 frequently occurring monosyllabic verbs to construct the experimental sentences. Each verb was used to make 4 types of sentences using the auxiliary verb *be* and lexical verbs. With these 16 verbs, a total of 64 sentences were created using the noun “bird” as subject. Table 26 shows the experimental sentences.

Table 26: Design of experimental sentences

Subject number		Verb type	
		auxiliary *be*	lexical verb
Singular	*The bird*	*is singing*	*Sings*
Plural	*The birds*	*are singing*	*Sing*

Source: (Keeney & Wolfe, 1972, p. 700)

To control for (morpho) phonological factors, 9 of the verbs took the unvoiced sibilant /s/ as the number of inflection, such as (walk, hop, drink) and 7 of the verbs took the voiced sibilant /z/ such as (run, land, sing) as the number of inflection.

The experimental session consisted of three tests: a verbal, a pictorial and a sentence test. In the verbal test, the child heard the verb phrase “is singing” and had to respond orally with either the phrase “one bird” or “two birds”. In the pictorial test, the child once again heard the verb phrase but this time he or she had to point to one of a pair of pictures, one with a single subject and one with two participants all doing the same action. In the sentence test, the child heard the complete sentence “The bird is singing” and then had to point to the appropriate picture. Figure 4 shows an illustration of the visual stimulus.

Figure 4: Illustration of visual stimulus (Keeney & Wolfe, 1972)

In order to determine if the number of the stimulus verb had a statistically significant effect on the number of children pointing response, for each child the proportions of singular and regular responses were calculated and compared to their respective conditional proportions. A conditional proportion is the probability of an event occurring given that another event has already occurred. The pictorial test had two probabilities “one subject” or “two or more subjects”. Keeny and Wolfe (1972) estimated what the probability of children randomly pointing to a singular or plural experimental item containing either a regular (lexical) verb or a form of auxiliary *be*. The results shown in Table 27 (below) are interpreted as percentages.

Table 27: Conditional probabilities for the three comprehension tasks

	% regular(*Ø –s*)		% auxiliary *be* (*is/are*)	
Test	Singular	Plural	Singular	plural
Verbal	.60	.56	.57	.56
Pictorial	.54	.55	.53	.54
Sentence	.58	.59	.60	.59

Source: (Keeney & Wolfe, 1972, Table 3, p.703)

As Table 27 shows, in the pictorial test of verb comprehension, 199 or 54% of the total of 368 responses were correct. In the regular (lexical) verb condition, 54% of the correct responses were singular and 55% were plural. While for the auxiliary verb (*is/are*) condition, 53% of the responses were singular and 54% were plural. As a conclusion, there is no evidence that children understand the -s marker or the forms of auxiliary *be* as the only cue for subject number. It is interesting to note that the results of the pictorial and sentence tests were very similar. Especially if one considers that, in the sentence test, the child heard a complete sentence.

Even though, the task consisted of three tests, children did not appear to have comprehension of this marker. This supports the observation that children acquire the morphophonological forms of the verb to *be* earlier than lexical verbs in production prior to comprehension.

More recently, Johnson, de Villiers and Seymour (2005) carried out a study to discover when children are sensitive to the third person *-s* in comprehension. 62 European-American children from Massachusetts, USA, speakers of mainstream American English participated in the study. Table 28 presents the grouping of the participants in function of their age.

Table 28: Number of participants by age

Age groups	Number of participants
3 years old	21
4 years old	9
5 years old	14
6 years old	18

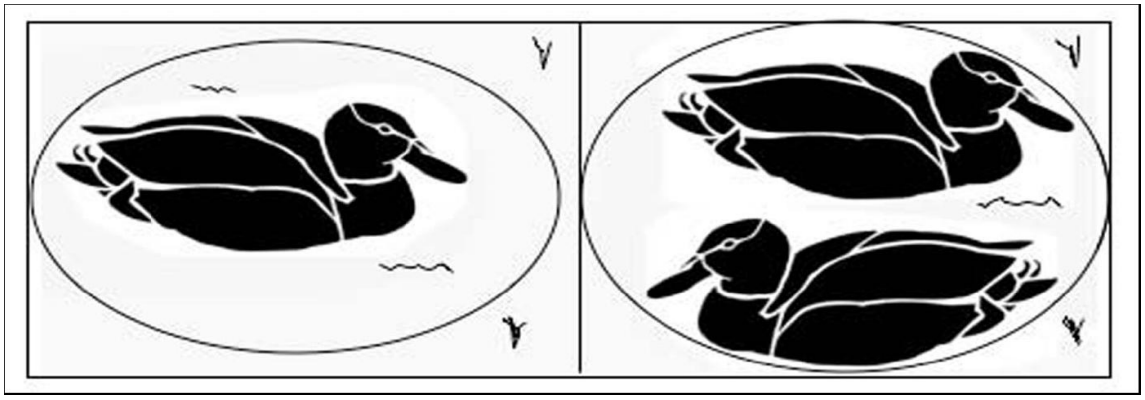
Source: (Johnson, de Villiers & Seymour, 2005, p.703)

The experimental sentences used in this study were designed to mask the plurality on the noun. The verbs began with a consonant cluster, whose first segment was an alveolar sibilant that was co-articulated with the plural /s/ on the noun in ordinary rapid speech- Example (88) illustrates.

(88) a. The duck swims on the pound.
b. The ducks swim on the pound

Children were administered a picture-choice comprehension task. Children saw a pair of pictures, one with a single subject and one with two or three subjects, all doing the same action. Figure 5 shows an example of the picture stimulus items presented to the participants: 'The duck swims in the water'/'The ducks swim in the water'

Figure 5: Sample visual stimulus (Johnson et al. 2005)



Source: (Johnson, de Villiers, & Seymour, 2005, p.322)

The participant was either told (89) or (90):

(89) 'Show me the picture where . . . the duck swims in the water'.
(90) 'Show me the picture where . . . the ducks swim in the water.'

If the child chose the single-subject picture in response to (89), the child was judged to be using the /s/ as an agreement marker with a single-subject. If, on the other hand, the child selected the multiple-subject picture in response to

(90), the child was judged to be using the /Ø/ as an agreement marker with a plural subject.

Not all the stimuli were marked in the same way for one set. Five of the stimulus items in each set were marked with third /*s*/ as in (89) and five were marked with the null or zero markers for plural subject, as in (90).

Table 29: Means and standard deviations by age for accuracy

Age group (years)		Percent of accuracy	
		Singular	Plural
3	**Mean**	52.38	41.90
	SD	22.34	21.82
4	**Mean**	64.44	46.67
	SD	21.86	28.28
5	**Mean**	78.67	61.33
	SD	27.74	35.83
6	**Mean**	78.89	53.33
	SD	27.84	34.30

Source: (Adapted from Johnson, de Villiers & Seymour, 2005, Table 1, p.324)

In the results, presented in table 29, they found that 5 year old children obtained 61% accuracy in plurals in contrast with 78% accuracy in singulars compared with 4 year old children who scored 46% accuracy in plurals in contrast with 64% accuracy in singulars. These results suggest that children from 4 to 6 tend to choose singulars over plurals. In conclusion, children produce the third person /*s*/ from the age of 3 years old but the comprehension of this marker occurs until they reach the age of 5.

The three studies reviewed so far concur in that children start producing the /*s*/ third person marker in the early ages. Keeney and Wolfe (1972) and Johnson et al., (2005) concluded that while children produced the number inflection –*s*, they did not comprehend it until they reach the age of 5. The results found by Fraser

et al. (1963) do not support this finding given that comprehension of *–s* was slightly ahead of production but the difference was not significant.

The comprehension agreement in L1 Spanish has just begun to be studied. Pérez-Leroux (2005) replicated the study by Johnson et al. (2005). The original experimental materials were translated to Spanish. The objective of the study was to determine if children could recover the information expressed in the inflections, through verbs marked with the 3rd person plural *–n* as only clue of this marker. The study was carried out in Santo Domingo, Dominican Republic. In Dominican Spanish there is a tendency to omit the plural marker *-s* in nominal phrases (articles, adjectives and nouns) in their normal speech. In fact, this variety of Spanish has the highest rates of deletion among all Caribbean dialects. This phonological variability is the result of a sociolinguistic alternation between omission, aspiration and deletion. Twenty-three children whose ages ranged age from 3:0 to 6:0 years participated in this study. To create the experimental stimulus, Pérez-Leroux (2005) used subject-drop sentences to mask the nominal expression of number, in which number would be solely expressed on the verb. Sentence tokens were then counterbalanced between a lexical subject presentation (91) and a pro-drop presentation (92).

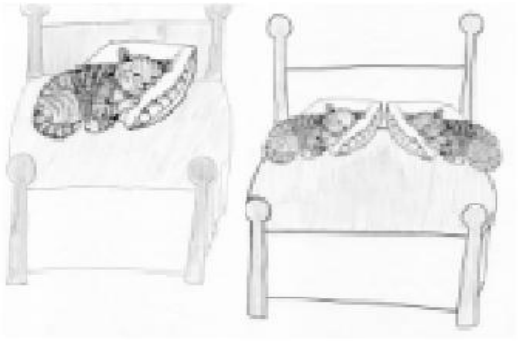
(91) a. El pato nada en el charco. a. Los patos nadan en el charco.
(92) b. Nada en el charco. b. Nadan en el charco.

Children were shown an untimed digital PowerPoint presentation of pairs of pictures accompanied by a voice recording of the sentence stimulus. Children were asked to choose the correct picture, depicting either a singular or a plural event, according to what was being said in the audio-recording.

The example below presents a sample experimental item; its corresponding visual stimulus is displayed in Figure 6.

(93) Audio recording: *Enséñame: duerme en la cama/duermen en la cama*.

Figure 6: Visual stimulus (Pérez-Leroux, 2005)



Source: (Pérez-Leroux, 2005, p.9)

The results obtained by Pérez-Leroux are shown in tables 30 and 31 below.

Table 30: Mean accuracy for plural and singular pro-drop sentences per age group in Spanish

Plural and singular pro-drop sentences			
Group	Range age	Mean accuracy Singular	Mean accuracy Plural1
Younger (N=11)	3;2 – 4;5	52%	45%
Older (N=12)	4;8 - 6;6	50%	67%

Source: (Pérez-Leroux, 2005, p.9)

Table 31: Mean accuracy for plural and singular sentences with lexical subject per age group in Spanish

Plural and singular sentences with lexical subject			
Group	Range age	Mean accuracy Singular	Mean accuracy Plural
Younger (N=11)	3;2 – 4;5	52%	45%
Older (N=12)	4;8 - 6;6	67%	79%

Source: (Pérez-Leroux, 2005, p.9)

In her results, Pérez-Leroux (2005) found that children between the ages of 3:2 to 4:5 moths did not demonstrate to have comprehension of the information expressed by the *-n* inflection on verbs. On the other hand, the older children, between the ranges of 4:8 and 6:6 months, demonstrated comprehension of the inflections through verbs marked with the 3 person plural *-n*. These results are very similar to the ones found in English by Johnson et al. (2005) and Keeney and Wolfe (1972). However, the findings reported are to be taken with caution

given that the methodology used is not reported in detail. There is no information as of whether a training session was administered before the experimental session or how many sentence stimuli were used per child, how much time she spent with each child. Questionable is also the minor difference found in the accuracy rates for plural and singular sentences with lexical subject and pro-drop subjects. Given the hypothesis tested, sentences with pro-drop subjects should be more difficult for children to understand given that the only source of information regarding the person and number of the subject in pro-drop sentences would be encoded exclusively in the verb, by the inflexion *–n*.

A recent study that has investigated the comprehension of subject-verb agreement comprehension a languages different from English and Spanish is the one by Brandt-Kobele and Höhle (2010), who wanted to determine if children used verb inflection as a cue to subject number in German. They studied 28 female children between the ages of 3;0 to 4;1. These children were all monolingual native speakers of German. In German the 3rd person singular and the 3rd plural are homophones, this makes sentences ambiguous and, at the same time, it ensures that children only use the verb inflection as a cue to subject number. Therefore, the only information available to children to determine subject number is verb inflection, *-t* for 3rd person singular and *-n* for 3rd person plural.

(94) a. Sie	fütter-t	einen Hund.
Pronoun-3SG	feed-3SG	a dog
She	*is feeding*	*a dog*.

(95) b. Sie	fütter-n	einen Hund.
Pronoun-3PL	feed-3PL	a dog
They	*are feeding*	*a dog.*

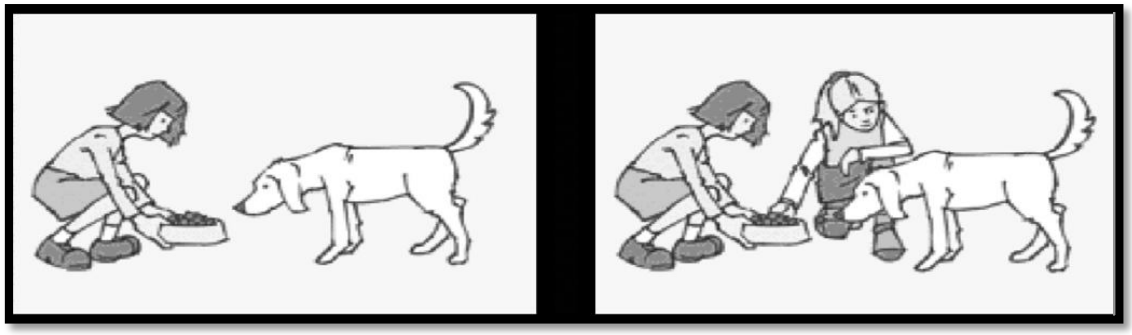
Source: (Brandt-Kobele & Höhle, 2010, p. 1913)

Brandt-Kobele and Höhle (2010) used four different frequent disyllabic verbs. Each verb was combined with two different objects to create eight experimental

sentences. The object noun phrase always contained an indefinite article. As in the previous studies, pairs of pictures were used but this time a different methodology was employed.

The figure below (7) illustrates the visual stimulus presented to the German-speaking children who participated in the study.

Figure 7: Illustration of visual stimulus (Brandt-Kobele & Höhle, 2010)



Source: (Brandt-Kobele & Höhle, 2010, p. 1914)

The authors carried out their study using eye tracking technology which records what the child is looking at on a screen with high accuracy. The procedure was composed of trials. In each trial one pair of pictures was presented side by side on the eye tracking monitor for 3s, followed by the phrase “Look here” to direct the child´s attention to the screen. Then, the screen turned black for 2s and here the test sentence was presented auditory. After the sentence presentation, the same pair of pictures reappeared again for 3s, which was again followed by a black screen for 1s, and then the trial ended automatically. Thus, a trial had duration of 10s. The inter trial interval lasted about 2s, during which the screen was blank. A short clip was presented after four experimental trials to attract children’s attention to the monitor. Before the experiment, there was a short story where the pictures were introduced and also they were told that three girls would perform some actions. This procedure was used for the experiment 2, with the difference that children had to point to the picture after listening to the sentence.

For the experiment 1, which uses the eye-tracking methodology, they concluded that children between 3 to 4 years old are able to infer the number of an ambiguous sentential subject from the number information of the verbal inflection. However, in the experiment 2, which used the traditional picture-choice comprehension methodology, they concluded that children between 3 to 4 years old could not make use of the number information provided by the verb inflection.

Brandt-Kobele and Höhle (2010) suggest one possible explanation for the contradictory results in experiment 1 and experiment 2. They claim that experiment 1, which employs eye tracking methodology, is less demanding than the experiment 2 (picture selection). In experiment 1, the child only had to listen to the sentence and simply fix their gaze on one of the pictures. On the other hand, in experiment 2 children also had to listen to the sentence but this time they had to point at the correct picture. These results suggests that the picture selection task demands further abilities from children such as storing linguistic and visual information in parallel, comparing the information and then making a decision.

In conclusion, the review of the literature regarding the comprehension of subject-verb agreement markers in English and Spanish reveal that, while children can produce these markers early, they do not seem to comprehend the meaning expressed by them.

Chapter: 3 Method

3.1. Participants

The participants in this study were 28 Spanish-speaking children between the ages of 3 and 6 who attended private preschool and primary schools in a town in Quintana Roo, Mexico. The two private schools were selected as research settings on the basis of convenience sampling. The researcher had access to the schools and the children due to the fact that his younger sister had been a student there. The school where the data was collected had on average 15 children per class. Each class was instructed by one teacher and one teaching assistant. The children in this study were those whose parents had granted consent in writing for them to participate. In total 7 children per class participated. While we acknowledge that the number of participants is low, it does allow for statistical analysis to be carried out (Larson-Hall, 2010). The criteria for inclusion in the study were that the children had no documented developmental disorders and were monolingual. Table 32 presents the grouping of the participants in function of their age and sex.

Table 32: Number of participants by age and sex

Number of child participants	Age	Sex
4	3;4 – 3;10	Female
3	3;2–3;6	Male
4	4;1– 4;7	Female
3	4;1– 4;8	Male
2	5;3–5;85	Female
5	5;1– 5;6	Male
2	6;5 – 6;6	Female
5	6;2 6;10	Male

3.2. Materials and design

Guided oral production task

The aim of the guided elicitation task was to elicit comparable oral data on the oral production of number agreement marking on verbs. The task was designed

in order to obtain data of first person singular, third person singular (Ø) and third person plural (-n) verb forms.

The task involved watching two one-minute excerpts from the well-known animated films: *Despicable me 2*, *Monsters Inc.*, *Brave* and *Barbie in The Nutcracker.*

The video excerpts were taken from *Youtube* and edited in *Windows Movie Maker* to last approximately one minute. Table 32 below provides a brief description of the video scenes. The video material and the retelling task were piloted with three children between the ages of 5 and 6. The piloting session confirmed that they were capable of verbally describing the characters and events portrayed in the clips.

Table: 33 Description of the video scenes

Animated film	Sequence description	Audio	Number of participants
Despicable me 2	The Minions have some difficulties when changing a light bulb.	Original audio, dialogue in Banana, an artificial language.	Multiple
Monster Inc.	Sulley, the monster, tries to throw off the human toys before someone else catches him.	Original audio, no dialogues, background music.	One
Brave	Merida rides her horse through a forest, shoots her bow and arrow and climbs up a rock near a waterfall.	Original audio, no dialogues, background music.	One
Barbie in the Nutcracker	Barbie and her little sister practice ballet together.	Original audio, no dialogues, background music.	Multiple

The guided oral production task consisted of three parts: a pre-viewing, viewing and post viewing component.

In the previewing task, the participants were asked to describe what they do on a regular day to elicit exemplars of the first person singular marker. Then,

participants were instructed to pay attention to a short video because they would be asked a question at the end. The participants were shown two short videos, one with a single participant and one with two or more participants. After viewing each of the videos once, the participants were asked what they think the character does or characters do, depending on the number of participants, on a normal day.

In the post-viewing task, the participants were presented with two still images of the characters in the videos and asked which of the characters they would like to be if they could swap lives with them for a day and why to elicit exemplars of the third person singular marker and the third person plural marker –n. At the end of the task the researcher asked the participants if they had any questions before the end of the task. See the appendices C in the page

The conversations between the participant and the investigator were recorded using the software Audacity and stored as digital MP3 files.

Picture-choice comprehension task

The goal of the picture-choice comprehension task was to test whether children can use the person *-n* marker on the verb as an indicator of number on the subject. To this end, the stimuli in the present study were designed to mask plurality on the noun, so the indicator to number is carried by the present tense verb. This was accomplished by using subject-drop sentences where number was only expressed on the verb. Sentence tokens were counterbalanced between a lexical subject presentation (96) or a pro-drop presentation (97).

(96) a. El pato nada en el charco. b. Lo**s** pato**s** nada**n** en el charco.

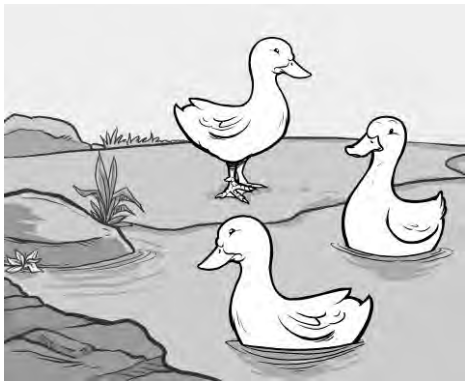
(97) a. Nada en el charco. b. Nada**n** en el charco.

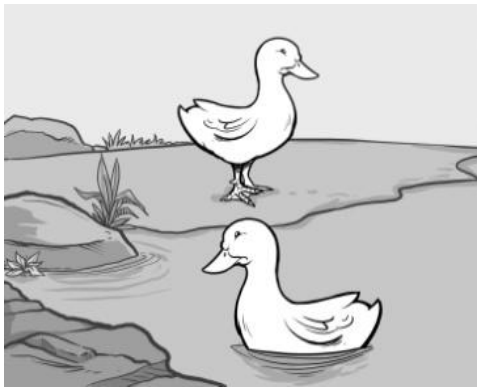
The listener can only disambiguate the stimulus by hearing the *-n* or zero *-Ø* marker on the verb (*nadan* versus *nada*). Two counterbalanced lists of stimuli are provided in Appendix D.2. The stimulus list consisted of 5 stimuli with *-n*

(plural marking), 5 stimuli with the verb not inflected (singular marking). 6 foils will be used with lexical subjects, three with list A and three with list B as distracters.

In the picture choice-comprehension task, the children saw a pair of pictures, one with a single subject and one with two or three participants, all performing the same action.

Figure: 8 Examples of picture stimulus presented to the participants





For example, the right-hand side illustration in Figure 8 (above) showed one duck swimming on a pond right; the left-hand side one showed a pair of ducks swimming on a pond. For that item, one set of participants was given the sentence stimulus:

(98) “Mira…nadan en el lago”

If the plural-subject picture was chosen, the child was judged to be using the *-n* as an agreement marker with a plural-subject, that is, by obligatory contexts for adult Spanish use. The other set was given the sentence stimulus:

(99) “Mira…nada en el lago”

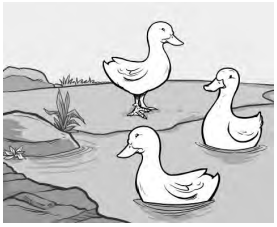
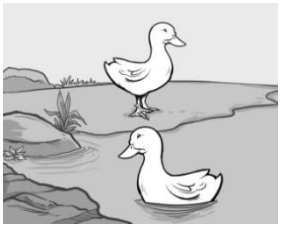
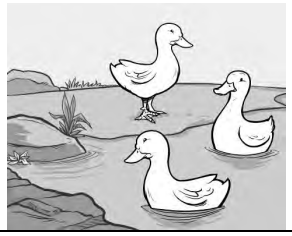
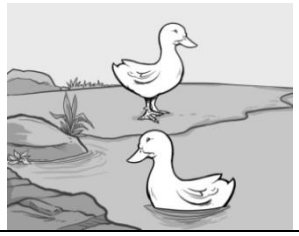
For this, the singular-subject picture was the choice that conforms to adult Spanish usage. Not all the stimuli were marked in the same way for one set. Five of the stimulus items in each set were marked with third *-n* as in (98) and five were marked with the null or -Ø marker for singular subject, as in (99).

Before the experimental test, each child was trained with a training set (Appendix D.3).

The sentence stimuli were presented on a multimedia PowerPoint presentation. The child's pointing responses were recorded by the experimenter on a score sheet.

In each trial, one pair of drawings was presented in the monitor for 3s, one with two or three subjects and one with a single subject both of them performing the action of the verb, accompanied by attention getting phrase "mira" (baseline phase). After that, the screen turned black for 2s, during which the test sentence was presented auditory. The sentences were aligned to the visual presentation such that the presentation of the acoustic stimulus ended exactly when the pictures reappeared for the testing phase. After the sentence presentation, the drawings appeared for 4s and here was the phase of gathering data of children's answer. In this phase the child had to select the picture which corresponds at the sentence. Then, the monitor turned black again for a 1s. Thus, a trail had duration of 10s. The inter-trial interval lasted about 2s, during which the screen was blank. Each child heard 13 sentences, 5 with marker *–n*, 5 with marker *-Ø* and 3 foils. Figure 9 exemplifies the experimental procedure.

Figure 9: A schematic example of the experimental procedure

Trial phase	Duration	Auditory stimuli	Left side of screen	Right side of screen
Baseline phase	3s	“mira”		
Sentence presentation	2s	“nadan en el lago”		
Testing phase	4s			
	1s			

The two tasks were administered individually to each child in a quiet room. Besides the child and the researcher, the teaching assistant of each group was present in the room at the time of data collection to help the children feel at ease.

3.3 Data analysis

The speech samples obtained from the guided oral production were coded and analyzed as follows:

1. The audio samples were transcribed using the standard CHAT format (Codes for the Human Analysis of Transcripts; MacWhinney, 2000) of the CHILDES project (Child Language Data Exchange System).

2. Once the transcriptions were completed, they were examined for analyzable verbal utterances following the criteria proposed by Ezeizabarrrena (1997, pp. 25).

a) Self-initiated utterances: non-imitative, non-repetitive, non-formulaic utterances containing a verb marker.
b) Productive utterances: an utterance is considered productive when either 1 or 2 is observed:
    i. Correct use in obligatory contexts of two inflected forms of the same verb, with two different morphemes: *romper Ø* / *rompo*.
    ii. Correct use in obligatory contexts of a non-cero morpheme affixed or cliticized to two different verbal roots: quiero/rompo, te doy/ te quito.
c) Regularized utterances: a marker is produced regularly in more than 65% of the obligatory contexts.

Utterances which do fulfill these criteria were excluded from the analysis. (100) is an example of an utterance excluded from analysis. In the transcripts, the abreviation INV stands for *investigador* and PAR for *participante*.

*(100)*INV: dime, ¿qué crees que hace él en un día normal?*
**PAR: él hace si y se le cuentan a su hija y y mueve su colita.*

Following a) above, the inflected verb “hace” was excluded because it was prompted by the researcher’s questions, and hence is imitative.

3. All the verbs were then identified and coded for verbal morphology (i.e., present, past, etc.) The instances of all verbs were extracted using the CLAN program *FREQ.* The *KWAL* program was used to examine the context in which

each morpheme was produced to calculate their use in obligatory context as either correct use, omission error, or commission error.

The data obtained from the picture-choice comprehension task were coded and analyzed as follows: Responses by the participants will be recorded online by the researcher in a data collection grid (Appendix D. 4) In total 13 items were heard, only the 10 experimental prodrop sentences were taken into consideration for the analysis (5 with singular marker – Ø and 5 with plural marker –*n*). A child received a score of 1 if he/she pointed to the plural-subject picture when the verb was inflected with –*n* marker V-*n*. In the same way, a child received a score 1 if he/she pointed to the singular-subject picture if the verb was inflected with a zero marker (V-Ø). If the child does not point to the correct one picture he/she will receive a score of 0. In total, each participant obtained a total score going from zero to ten when the verb was marked for third person /*n*/ and similarly, when the verb was marked for third person / Ø /. This score is taken to be a simple index of the accuracy with which the children take the /*n*/ to be a marker of a plural subject, and zero inflection /Ø/ as a marker of singular subjects.

To determine whether children can infer the number of a subject from the verbal agreement marker alone, a Pearson's chi-square analysis was conducted for each age group. The Pearson's chi-square test examines whether there is an association between two categorical variables (in this case subject verb-agreement marking (V-*n* vs. V-Ø) and type of picture (one vs. multiple actors).

Chapter 4: The production of subject-verb agreement morphology

The objective of this chapter is to present evidence of the oral production of subject-verb agreement marking by children learning Mexican Spanish as a first language.

4.1 The data codification

The data were collected from 28 Spanish-speaking children using the guided oral production task described in chapter 3 (p. 63). Each child was recorded individually in sessions that took from 5 to 7 minutes in an empty classroom. During each session, the regular class teacher was present in the room to aid the researcher. The teacher intervened exclusively when the child went off task. Once collected, the data obtained through the production task were transcribed. When the transcriptions were completed, they were examined for analyzable verbal utterances following the criteria proposed by Ezeizabarrrena (1997, pp. 25).

a) Self-initiated utterances: non-imitative, non-repetitive, non-formulaic utterances containing a verb marker.
b) Productive utterances: an utterance is considered productive when either (i) or (ii) is observed:

    i. Correct use in obligatory contexts of two inflected forms of the same verb, with two different morphemes: “romper Ø / rompo”
    ii. Correct use in obligatory contexts of a non-cero morpheme affixed or cliticized to two different verbal roots: “quiero”/”rompo”, “te doy”/ “te *quito*”.

c) Regularized utterances: a marker is produced regularly in more than 65% of the obligatory contexts.

Utterances which did not fulfill these criteria were excluded from the analysis

Example (101) contains an example of a verbal utterance excluded from analysis, where INV stands for *investigador*, PAR for *participante*.

*(101)*INV: dime, ¿qué crees que hace él en un día normal?*
**PAR: él hace si y se le cuentan a su hija y y mueve su colita.*

Following criterion i) above, the inflected verb "hace*"* was excluded because it was prompted by the researcher's questions, and hence is imitative.

The verbs "cuentan" and "mueve"*,* on the other hand, were included in the analysis because they were freely produced by the child and they are marked for subject-verb agreement.

All the verbal utterances were then identified and coded for verbal morphology (i.e., present, past, etc.). The instances of all verbs were extracted using the CLAN program *FREQ.* The *KWAL* program was used to examine the context in which each morpheme was produced in order to calculate use in obligatory context as either correct use, omission error or commission error. Using this procedure a total of 223 verbal utterances were identified, out of which 170 were kept for further analysis. 53 verbal utterances were excluded on the grounds that 15 were formulaic repetitions prompted by the researcher's questions, 13 consisted of non-finite forms (5 gerunds and 8 infinitives), and 25 contained other finite forms which were not directly under study (21 past tense forms, 4 subjunctive present forms).

4.2 Results

This section presents the production results in function of the four age groups under study: 3, 4, 5, and 6 year-olds.

Group I: three year-olds

Group I was made up of 7 children (4 girls and 3 boys), whose ages ranged from 3;5 to 3;10, with an age mean of 3;4. In order to maintain the participant's anonymity, each child was assigned with a consecutive number at the moment of testing. The distribution of the first age group is shown below.

Table 33: Child participants: 3 year-olds

Child participant ID number	Age	Sex
1	3;5	Female
2	3;8	Female
3	3;3	Male
4	3;2	Male
5	3;4	Female
6	3;6	Male
7	3;10	Female

Table 34 breaks down the oral production of subject-verb agreement marking in present indicative from the 3 year old group into number and person.

Table 34: Oral production of subject-verb agreement marking

Present indicative		
Singular		Plural
1st person	3rd person	3rd person
4	12	8

The examples below illustrate the verb production of the children from this age group: (102) 1st person singular, (103) 3rd person singular and (104) 3rd person plural.

102. (a) **Veo** tele. (2, 3;8)

(b) **Arreglo** el carro (6, 3;6)

(c) Me **quiero** disfrazar de ese el que tiene solo un ojo (6, 3;6)

103. (a) **Tiene** un caballito, aparte **mata** a los árboles. (1, 3;5)

(b) **Juega** el agua. (7, 3;10)

(c) **Sale** a correr. (6, 3;6)

104. (a) **Dan** vueltas y **bailan.** (1, 3;5)

(b) Los minions **pueden** ayudar. (6, 3;6)

(c) **Quieren** construir abajo de su casa de Grum. (6, 3;6)

Following the findings reported by Casla, Aguado-Orea and Pine (2005, as cited in Aguado, Casla, Rujas & Mariscal, 2011, pp. 79-83), we were interested in establishing whether there is a relationship between lexical frequency and subject-verb agreement marking. In the present study, the frequency of verb occurrence in speech was obtained to explore if there was a correlation between lexical frequency and agreement marking. In other words, the analysis was aimed to establish whether children use the singular zero marker -Ø and plural –*n* marker with low and high frequency verbs in oral speech.

The frequency data used in this study was taken from The TIP Conjugator, a database of over 14 000 inflected verbs (Carreras-Riudavets, Hernández-Figueroa, & Rodríguez-Rodríguez, 2010). The TIP Conjugator of Spanish verbs presents the full verb paradigm for each verb contained in its database. It also provides the lexical frequency of each verb, as established by the Corpus de Referencia del Español Actual (CREA) Rodríguez-Rodríguez, Carreras-Riudavets, and Hernández-Figueroa, (2009).

Table 35: Lexical frequency of verbs produced by 3 year-old children

3 year-old group				
Plural	Frequency		Singular	Frequency
bailan (x 3)	653		regaña	87
hacen	1,833		mata (x2)	4,452
quieren (x2)	10,960		corre	5,233
dan	15,044		mira	15,306
pueden	63,889		sale	16,201
			tiene (x2)	87,740
			está	92,930
			es(x3)	101,9669

Source: Carreras-Riudavets, Hernández-Figueroa, and Rodríguez-Rodríguez, 2010) and CREA (Real Academia Española).

Besides the finite verbs presented in the table above, children produced 13 non-finite forms, 8 with infinitive forms such as “correr” to run, “construir” to build ,

“ayudar” to help and 5 gerund forms such as “bailando” dancing, “jugando” playing,” corriendo” running.

(105) sale a **correr**. (6, 3;6)

(106) quieren **construir** abajo de su casa de Grum. (6, 3;6)

(107) los minions pueden **ayudar.** **(**6, 3;6)

(108) es su hermana **bailando**. **Jugando** porque mi mamá me regaña. (1, 3;5)

Group II: four year-olds

Group II was made up of 7 children (4 girls and 3 boys), whose ages ranged from 4;1 to 4;8, with an age mean of 4;4.

Table 36 presents the participants age and sex.

Table 36: Child participants: 4 year-olds

Child participant ID number	Age	Sex
8	4;6	Male
9	4;1	Male
10	4;1	Female
11	4;8	Male
12	4;5	Female
13	4;7	Female
14	4;4	Female

Table 37 breaks down the oral production of subject-verb agreement marking in present indicative from 4 year old group into number and person.

Table 37: Oral production of subject-verb agreement marking

Present indicative		
Singular		Plural
1st person	3rd person	3rd person
12	12	11

The examples below illustrate the verb production of the children from this age group: (109) 1st person singular, (110) 3rd person singular and (111) 3rd person plural.

109. (a) me **duermo**. **Trabajo.** (12, 4;5)

(b) **Veo** la tele. (10, 4;1)

(c) **Juego** con mi dinosaurio. (11, 4;8)

110. (a) La princesa **trabaja** y **pinta** sus cositas. (14, 4;4)

(b) **Baja** en el jardín y le **dice** a su mamá. (14, 4;4)

(c) Se **duerme**. (12, 4;5)

111. (a) **Comen** bananas. (11, 4;8)

(b) **Giran** y **dan** vueltas. (14, 4;4)

(c)**Van** al ballet… porque me **gustan** las bailarinas. (12, 4;5)

Table 38: Lexical frequency of verbs produced by 4 year-old children

4-year-old group				
Plural	Frequency		Singular	Frequency
asustan	221		pinta	1,235
giran	221		duerme	1,689
gustan(X4)	1,032		trabaja	2,098
comen(X2)	2,511		crea	2,618
dan	15,044		baja	6,075
Van	16,704		dice	45,948
Son	173,903		es	1,019,669

Source: Carreras-Riudavets, Hernández-Figueroa, and Rodríguez-Rodríguez, 2010) and CREA (Real Academia Española).

Besides the verbs presented in the table above, children produced 13 finite forms in past tense such as “vi” I saw, “eran” they were “se vistieron” they dressed, and “se dijo” she told.

(112) **Eran** bailarinas y las princesas se **vistieron** con sus vestidos. (25, 4;4)

(113) Que le **regañó** y le regañó y le **dijo** a su mamá. (25, 4;4)

Group III: five year-olds

Group III was made up of 7 children (2 girls and 5 boys), whose ages ranged from 5;1 to 5;8, with an age mean of 5;3.

Table 39 presents the participants age and sex.

Table 39: Child participants: 5 year-olds

Child participant ID number	Age	Sex
15	5;6	Male
16	5;1	Male
17	5;1	Male
18	5;8	Female
19	5;6	Male
20	5;1	Male
21	5;3	Female

Table 40 breaks down the oral production of subject-verb agreement marking in present indicative from 5 year old group into number and person.

Table 40: Oral production of subject-verb agreement marking

Present indicative		
Singular		Plural
1st person	3rd person	3rd person
24	21	16

The examples below illustrate the verb production of the children from this age group: (114) 1st person singular, (115) 3rd person singular and (116) 3rd person plural.

114. (a) **Como** pizza. (19, 5;6)

(b) **Manejo** bicicleta. (20, 5;1)

(c) **Juego** con mi perrito. (21, 5;3)

115. (a) Él **duerme** en la cama. (16, 5:1)

(b) Se **va** de vacaciones. (16, 5:1)

(c) **Pinta** un carro. (17, 5:1)

116. (a) Se **van** a la playa. (20, 5:1)

(b) Porque a mí no me **dan** miedo. (15, 5:6)

(c) **Construyen** aviones. (19, 5:6)

Table 41: Lexical frequency of verbs produced by 5 year-old children

5-year-old group				
Plural	Frequency		Singular	Frequency
construyen	212		juega(x2)	90
arman	216		cuida	551
bailan	284		pega	625
ayudan	899		pinta	1,235
trabajan	1,503		rompe	1,454
hacen	1,833		duerme	1,689
cuentan	3,009		llora	2,085
hablan	3,175		trabaja	2,098
ponen	5,536		mueve	2,639
dan	15,044		gusta(x2)	4,500
van (x3)	16,704		lleva (x2)	8,464
tienen(x2)	42,502		vive	8,732
Son	173,903		ve	15,226
			ayuda	20,918
			va (x2)	35,515
			está	92,930
			es	101,9669

Source: Carreras-Riudavets, Hernández-Figueroa, and Rodríguez-Rodríguez, 2010) and CREA (Real Academia Española)

Besides the verbs presented in the table above, children produced 4 finite forms in past tense such as “vi” I saw (118), “era” it was (119) and “dijo” she said (117). Also they produced 4 subjunctive present forms such as “salten” they jump (121), “hablen” they speak (120) and “atrapen” they catch (121).

(117) porque es que mi mamá **dijo**… que ya soy grande. (20, 5;1)

(118) porque esa ya lo **vi**; este no. (17, 5;1)

(119) el monstruo **era**…como se llama…era la niña. (19, 5;6)

(120) que le **hablen** para que otros muchachos lo **atrapen**. (15, 5;6)

(121) **salten** y que lo **atrapen**. (15, 5;6)

Group IV: six year-olds

Group IV was made up of 7 children (2 girls and 5 boys), whose ages ranged from 6;2 to 6;10, with an age mean of 6;4.

Table 42 presents the participants age and sex.

Table 42: Child participants: 6 year-olds

Child participant ID number	Age	Sex
22	6;3	Male
23	6;5	Male
24	6;2	Male
25	6;7	Male
26	6;5	Female
27	6;6	Female
28	6;10	Male

Table 43 breaks down the oral production of subject-verb agreement marking in present indicative from 6 year old group into number and person.

Table 43: Oral production of subject-verb agreement marking

Present indicative		
Singular		Plural
1st person	3rd person	3rd person
16	21	13

The examples below illustrate the verb production of the children from this age group: (122) 1st person singular, (123)3rd person singular and (124) 3rd person plural.

122. (a) me **despierto**, me **cambio**, **voy** a la escuela. (26, 6;5)

(b) **Tomo** leche. **Desayuno**. (22, 6;3)

(c) **Juego** en la parque con mi papá. (23, 6;5)

123. (a) **Juega** con su computadora. (22, 6:3)

(b) Ella **lanza** flechas… **Escala** montañas. (26, 6;5)

(c) **Asusta**… porque **está** muy bonito. (24, 6;2)

124. (a) **Van** al cine… **esperan** a su papá. (23, 6;5)

(b) **Hacen** una calabaza. (24, 6;2)

(c) Le **dan** leche a la bebé. (22, 6;3)

Table 44: Lexical frequency of verbs produced by 6 year-old children

6-year-old group				
Plural	Frequency		Singular	Frequency
barren	31		juega	90
giran	221		asusta	362
aspiran	298		prepara	677
gustan	1,032		lanza	3,135
esperan	1,471		gusta(x2)	4,500
trabajan(x2)	1,503		escala	7,768
hacen(x3)	1,833		toma	12,549
dan(x2)	15,044		sale	16,201
Van	16,704		tiene	87,740
			está	92,930
			es(x3)	711,119

Source: Carreras-Riudavets, Hernández-Figueroa, and Rodríguez-Rodríguez, 2010) and CREA (Real Academia Española)

Besides the verbs presented in the table above, children produced 4 finite forms with the same verb in past tense “vi” I saw.

(125) Ya **vi** la película. (26 6;5)

(126) Yo **vi** una película de terror antes. (24 6;2)

(127) Lo **vi** en el cine con mi mamá. (23 6;5)

The oral production data did not show evidence of agreement errors. The use of subject-verb agreement marking reached ceiling levels of accuracy.

4.3 Discussion

Previous studies presented in the literature review have demonstrated that children begin to produce the third person singular zero maker -*Ø* earlier than the third person plural –*n* and, when they do, they start to produce it around age 2.5. They also reported that children do make some agreement errors (Bel & Rosado 2005; Brandani 2010). In line with past findings, the results of the present study show that children produce both markers (-*Ø* and–*n*) as early as the age of 3.

Distribution of agreement marking

With regard to the distribution of agreement marking, 3 year-old children produced the 3rd person singular -*Ø* more frequently than the 3rd person plural -*n*. This same pattern was found in Bel & Rosado (2005) and Brandani (2010). Similarly, the 1st person singular was present but in low frequencies.

In the 4 year–old group, the distribution of agreement marking evens out: 3rd person singular -*Ø*, the 3rd person plural –*n* and 1st person singular are found in almost equal proportions in the production corpus.

At the age of 5 there is an increase in the production of the three person/number agreement markers. Children produced the 3rd person singular more frequently than the 3rd person plural. However, for this age group, the frequency of occurrence of the 1st person singular marker is ahead of both 3rd person forms. This is due to the fact that the children were very chatty in their personal life, which is a topic exploited in the first part of the guided oral production task.

The 6 year-old children produced high rates of the 3rd person singular -*Ø* form, followed by the 3rd person plural –*n* form. The 1st person singular was also found.

The role of verb frequency on agreement marking

Casla, Aguado-Orea and Pine (2005, as cited in Aguado, Casla, Rujas & Mariscal, 2011, pp. 79-83) found that children produced verbs marked for subject-verb agreement present indicative more frequently when prompted by a question which made reference to a high frequency verb (27.4% of the contexts) than to a low frequency verb (12.13% of the contexts). However, no interaction was found between frequency and number. However, our results do not suggest a frequency effect.

The 3 and 4 year-old group produced 24 verbs inflected with the third person singular marker -Ø and 19 verbs inflected with the third person plural marker –*n*, as shown in tables 33 and 35.

Among the verbs produced with a singular -Ø marker by these age groups, we can find those with low frequency such as “regaña”, “corre”, “pinta”, “duerme” and those with high frequency such as “es”, “dice, “está”, “tiene”. Similarly, the use of the plural –*n* marker is found on low frequency verbs such as “hacen”, “asustan”, “bailan”, “giran”, as well as those high frequency verbs such as son, “van”, “dan”, “pueden”.

Together the 5 and 6 year old groups produced 42 verbs using the third person singular marker -Ø and 29 verbs using the third person plural marker –*n*, as shown in tables 40 and 43.

Among the verbs produced with a singular -Ø marker, we can find those with low frequencies such as “juega”, “gusta”, “prepara”, “asusta” as well as and those with high frequencies such as “es”, “está”, “va”, “tiene”. Similarly, the plural marker -*n* is found with low frequency such as “arman”, “construyen”, “ayudan”, “barren”, “aspiran” and high frequency verbs such as “tienen”, “dan”, “son”, “van”.

4.4 Conclusions

The results of the oral guided production task show that children produce both singular agreement marker -*Ø* and plural agreement marker –*n* as early as the age of 3. There was a predominant use of the 3rd person singular marker across all ages, followed by the 3rd person plural marker –*n* and then by the 1st person singular marker. This production bias could be due to the experimental materials used. The video-clips could have possibly limited the range of referents that prompted oral production. This possibility is, however, unlikely given that the literature reports a preference for the production of zero-marked forms. Children prefer to produce verbs with zero marking over verbs marked with agreement inflections. This tendency has been reported for L1 Spanish (Aguado-Orea 2004, 2005; Casla 2005; Pine 2005; and Rujas 2008, as cited in Aguado, Casla, Rujas & Mariscal, 2011, pp. 73-91) and L1 English (Keeney & Wolfe, 1972).

There is no evidence of the effect of verb frequency on verb agreement marking. Regardless of age group, children produced the singular -*Ø* and plural agreement markers -*n* with both low and high frequency verbs.

Chapter 5: The comprehension of subject-verb agreement morphology

The objective of this chapter is to determine whether children, who can produce the third person plural agreement marker in present indicative, comprehend the meaning of this marker.

5.1 Data coding

The data were collected from 28 Spanish-speaking children using the picture-choice comprehension task described in section 3.2 (p. 64). Each child was tested individually in an empty classroom, during sessions that took, on average, 6 minutes. During the session, the regular class teacher was present in the room to aid the researcher. The teacher intervened exclusively when the child went off task.

Participants' responses were recorded online by the researcher using a data collection grid to record the children's pointing behavior. The grid consists of 13 columns and 2 rows. These columns represent the total number of test sentences and the 2 rows represent the picture pairs (refer to Appendix D. 4, p. 102). In total 13 items were presented, the 10 experimental pro-drop sentences were taken into consideration for statistical analysis (5 with the singular marker – Ø and 5 with the plural marker –*n*). The 3 sentences with lexical subjects, which served as foils, were analyzed separately.

The data obtained from the picture-choice comprehension task were coded and analyzed as follows. A child received a score of 1 if she pointed to the plural-subject picture when the verb was inflected with –*n* marker (V-*n*). In the same way, a child received a score 1 if she pointed to the singular-subject picture when the verb was inflected with a zero marker (V-Ø). If the child did not point to the correct one picture, she received a score of 0. In total, each participant obtained a total score going from zero to ten when the verb was either marked for subject-agreement. This score was taken to be a simple index of the

accuracy with which the children take the /-*n*/ to be a marker of plural subject-verb agreement, and zero inflection (-Ø) as a marker of singular subjects-verb agreement. No points were given if the child failed to point to any of the pictures on the screen.

To determine whether children can infer the number of a subject from the verbal agreement marker alone, a Pearson's chi-square analysis was conducted for each age group. The Pearson's chi-square test examines whether there is an association between two categorical variables (in this case subject verb-agreement marking (V-*n* vs. V-Ø) and type of picture (one vs. multiple actors).

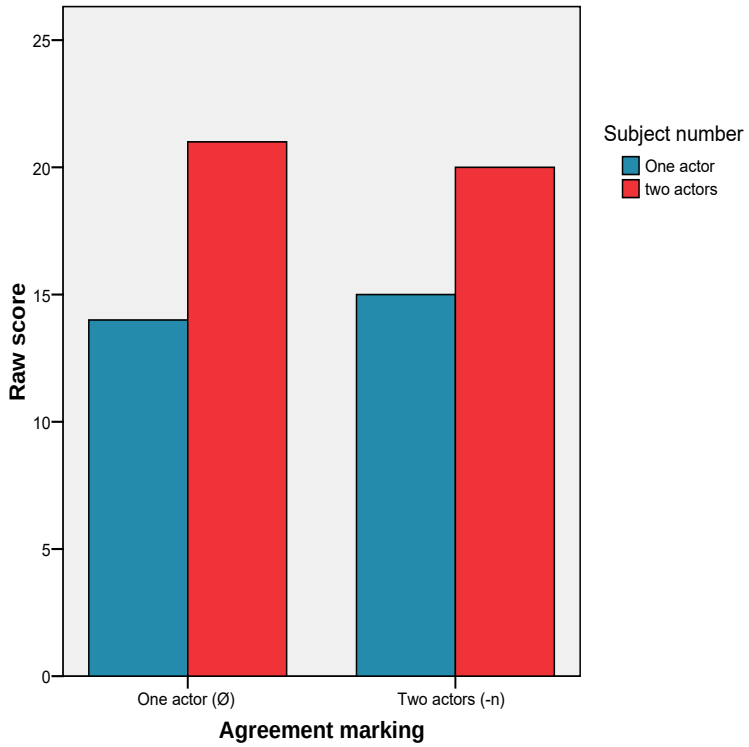
5.2 Results

The results for each age group are summarized in Tables 45 to 48 below. These contingency tables show the intersection of the categorical variables under study.

Table 45: Subject-verb agreement marking as a function of numerosity in 3 year olds

3 year-olds	One actor	Two or more actors	Rows totals
Singular V- Ø	14	21	35
Plural V-*n*	15	20	35
Column totals	29	41	70

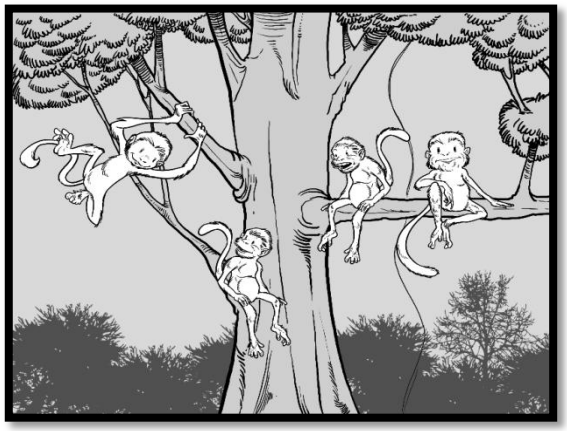
Bar chart 1 below shows subject-verb agreement marking as a function of numerosity in 3 year olds.

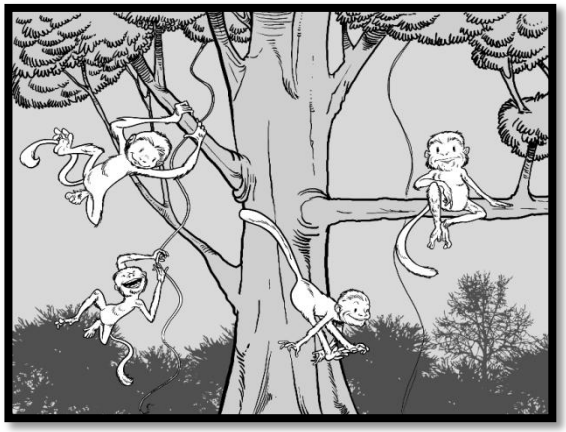


The result of the chi-square test indicates that for the three year olds there was no relationship between picture type and subject-verb agreement marking. (X^2 = .059, df = 1, *p*= .808).

Data analysis revealed that children in the 3 year-old group failed to point when presented with the illustration in Figure 10 (below) and aural sentence stimulus (utterances 128 a and b):

Figure 10: Illustration of problematic visual stimuli





Sentence stimulus

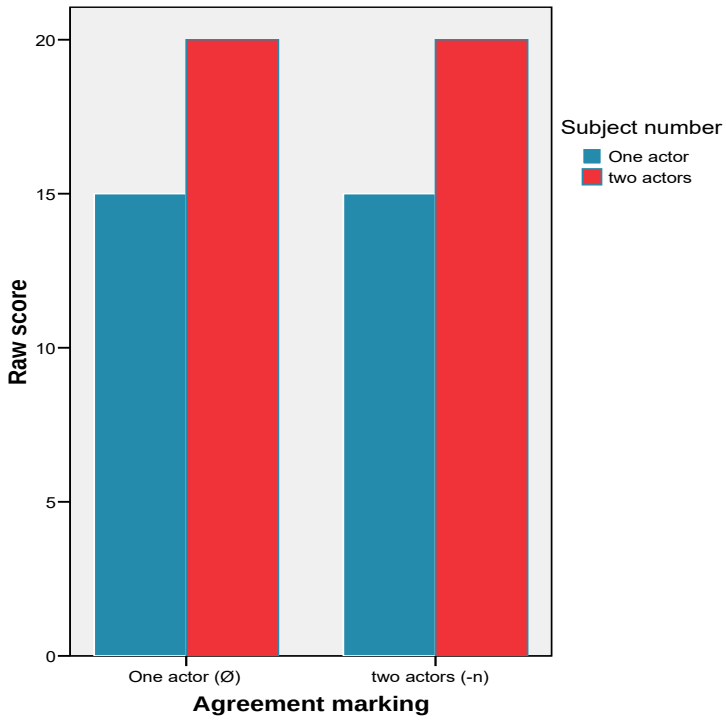
128 (a) Salta en la rama (b) Saltan en la rama

Younger children's failure to point to one of the pictures in these pair can be explained in terms of task demands. According to Brandt-Kobele and Höhle (2010, p. 1922), the picture selection tasks is excessively demanding for children because apart from the pointing gesture, it requires other abilities from children, such as storing linguistic and visual information simultaneously, comparing the information and finally making a decision. We suggest that the problem with this particular item lies in the density of the information presented in the visual stimulus. There are four actors involved, each different form one another. It is possible that the children could not make a decision because the visual information was too complex to compare it to the linguistic information and then make a decision.

We ran the statistical analyses including and excluding the children's scores for this problematic item to discard they affected the results for this age group. In both cases, the results were not significant. The children do not seem comprehend the meaning of the subject-verb agreement markers.

Statistical analysis, excluding the problematic item

The result of the chi-square test indicates that for the three year olds there was no relationship between picture type and subject-verb agreement marking. (X^2 = .000, df = 1, *p*= .100).



Statistical analysis, including the problematic item

The result of the chi-square test indicates that for the three year olds there was no relationship between picture type and subject-verb agreement marking. (X^2 = .059, df = 1, *p*= .808).

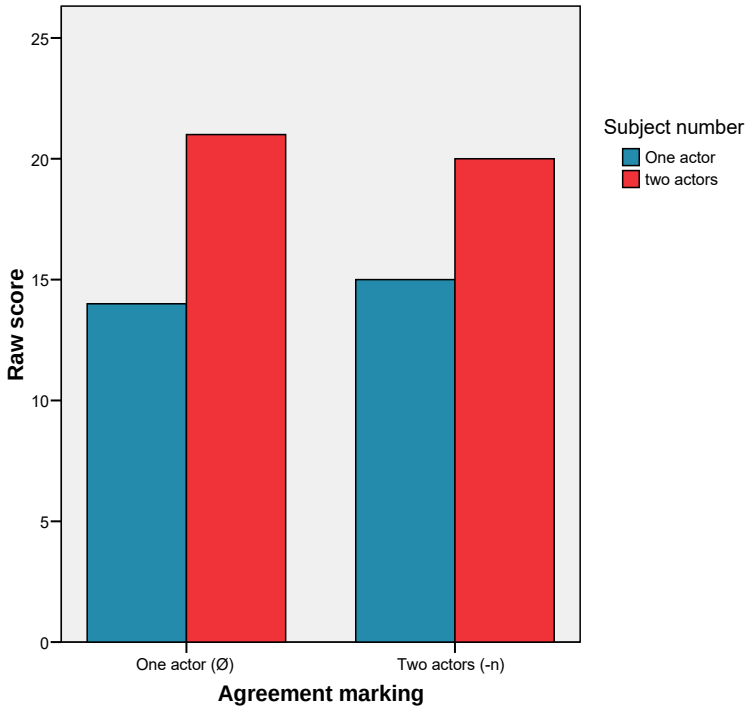


Table 46: Subject-verb agreement marking as a function of numerosity in 4 year olds

4 year-olds	One actor	Two or more actors	Rows totals
Singular V-Ø	17	18	35
Plural V-*n*	15	20	35
Column totals	32	38	70

The result of the chi-square test for the four-year old group shows that there was no relationship between picture type and subject-verb agreement marking (X^2 = .230, df = 1, p= .631).

Subject-verb agreement marking as a function of numerosity in 4 year olds is shown in bar chart 2.

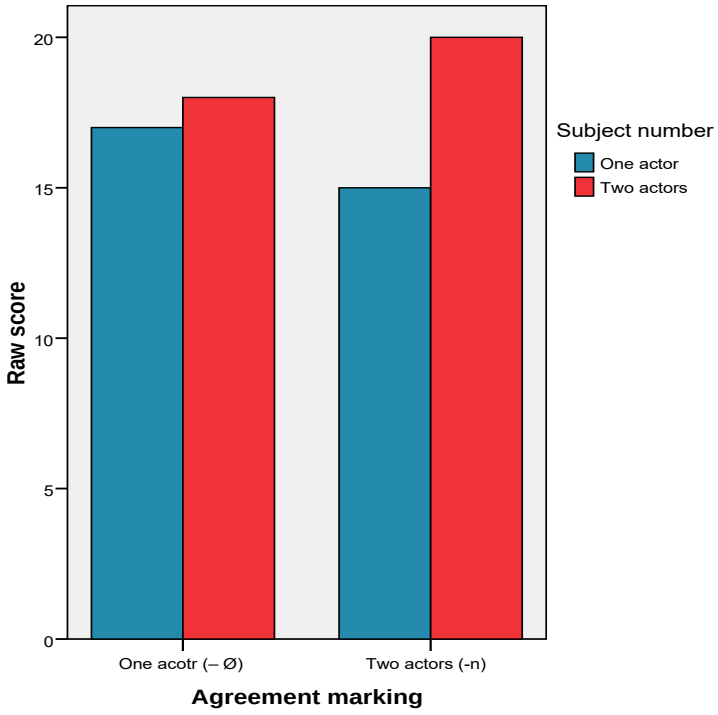


Table 47: Subject-verb agreement marking as a function of numerosity in 5 year olds

5 year-olds	One actor	Two or more actors	Rows totals
Singular V-Ø	29	6	35
Plural V–n	11	24	35
Column totals	40	30	70

The result of the chi-square test reveals a significant relationship between picture type and subject-verb agreement marking for the five-year-old group. (X^2 = 18.900, df = 1, p= .000).

Bar chart 3 shows subject-verb agreement marking as a function of numerosity in 5-year olds.

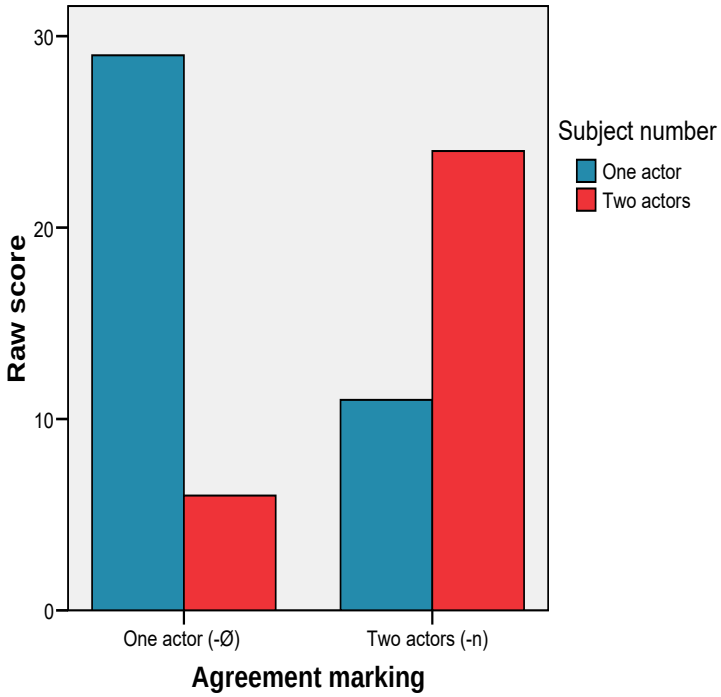
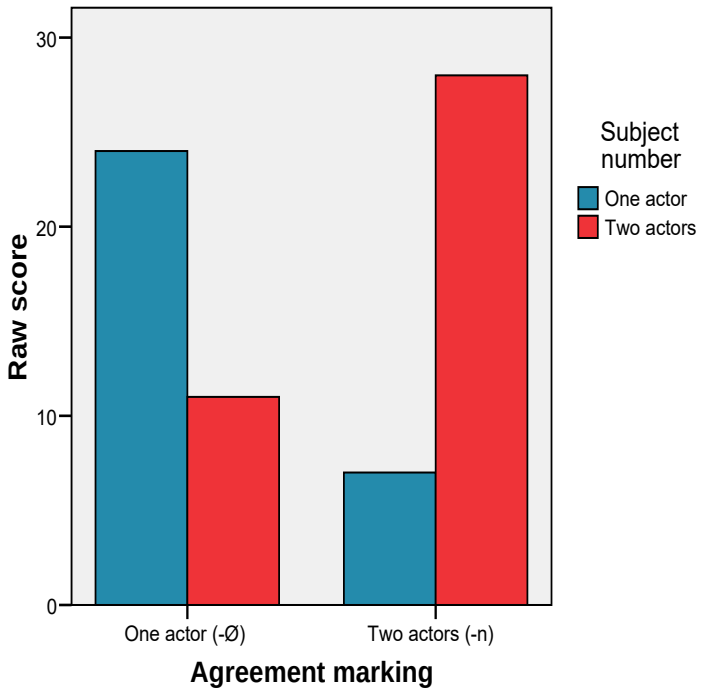


Table 48: Subject-verb agreement marking as a function of numerosity in 6-year olds

6 year-olds	One actor	Two or more actors	Rows totals
Singular V-Ø	24	11	36
Plural V-n	7	28	34
Column totals	31	39	70

The result of the chi-square test for the six-year-old group shows a significant relationship between picture type and subject-verb agreement marking. (X^2 = 16.733, df = 1, p= .000).

Subject-verb agreement marking as a function of numerosity in 6-year olds is shown in bar chart 4.



The table 49 summarizes the results found. It displays the results of the Chi-square tests and their significance levels across the age groups under study.

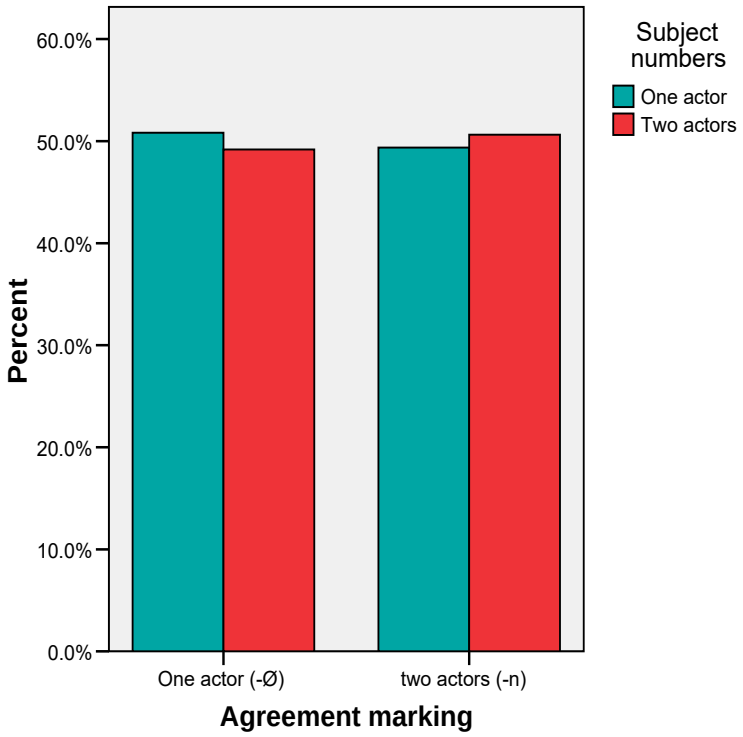
Table 49: Chi-square tests and levels of significance in function of age groups

Age groups	Level of significance
3 years old	(X^2 = .059, df = 1, *p* .808)
4 years old	(X^2 = .230, df = 1, p .631)
5 years old	(X^2 = 18.900, df = 1, ***p < .001)
6 years old	(X^2 = 16.733, df = 1, ***p < .001)

5.3 Discussion

In the present study, table 49 (above) and bar chart 5 (below) together show that children performed at chance level in the picture selection task. This finding is visibly clear in bar chart 5, which summarizes the results for age groups 3 and 4. Children were as likely to point to a picture with one actor when presented with a sentence bearing singular S-V agreement (V-*n*), as to point to a picture with multiple actors when presented with a sentence bearing plural S-V agreement (V-Ø).

Bar chart 5 summarizes the results for age groups 3 and 4

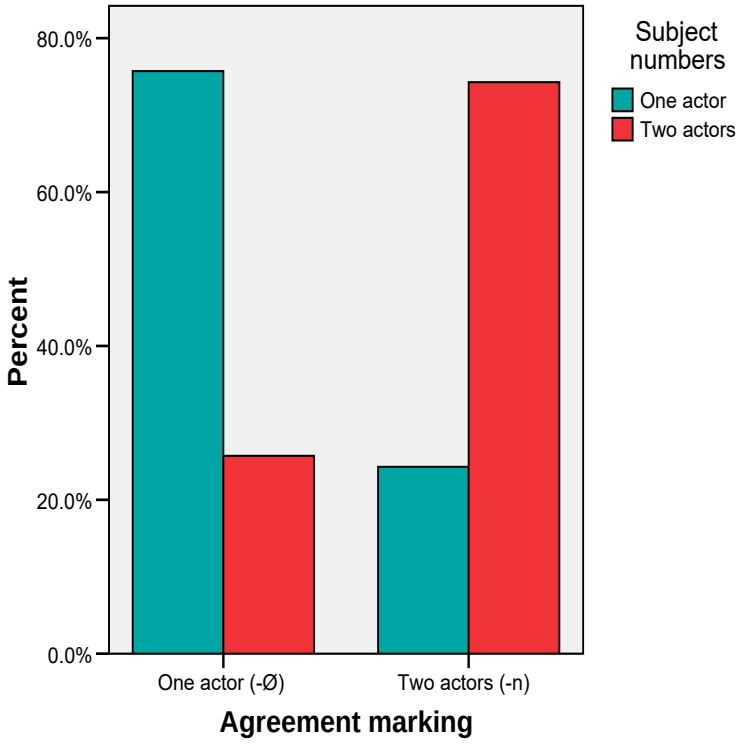


The results of the Chi-square test confirmed that for the three (X^2 = .059, df = 1, *p* .808) and four year olds (X^2 = .230, df = 1, p .631) there were no relationship between picture type and subject-verb agreement marking.

On the other hand, five-year-old children demonstrated comprehension of both agreement markers (V- *Ø, V- n)*. They were able to use the agreement

inflection on the verb to infer the number of the actors and point to the right picture. Table 49 (above) and bar chart 6 (below) show that these age group behaved differently form the other groups. Their performance in the picture selection task shows that they can use verb inflections alone to distinguish the Number.

Bar chart 6 summarizes the results for age groups 5 and 6



The result of the chi-square tests reveal there was significant relationship between picture type and subject-verb agreement marking which means that five (X^2 = 18.900, df = 1, ***p < .001) and six-year-olds (X^2 = 16.733, df = 1, ***p < .001) comprehended the information carried by subject-verb agreements inflections.

5.4 Conclusions

The results of the comprehension task are similar to the ones found in previous comprehension studies which have investigated the acquisition and development of subject-verb agreement in L1 Spanish (Pérez-Leroux 2005), L1 English (Fraser, Bellugi, & Brown, 1963; Keeney and Wolfe, 1972; Johnson, de Villiers & Seymour, 2005) and L1 German-speaking children (Brandt-Kobele and Höhle, 2010).

Children between the ages of 3 to 4 do not comprehend the syntactic meaning of plural subject-verb agreement marker *–n,* given that they could not use agreement inflection alone as a clue to select the correct picture. On the other hand, older children, around the ages of 5 to 6, showed comprehension of the meaning of subject-verb agreement marking, as evidenced by their pointing behavior.

Chapter 6: General discussion and conclusions

The objective of the present study was to determine whether the comprehension/production asymmetry reported by Pérez-Leroux (2005) is also found in child speakers of a dialect of Mexican Spanish.

To this end, we established a hypothesis in which we assumed that children who could produce the third person plural agreement marker in present indicative could also comprehend the meaning of this marker. This assumption led us to construct two research questions.

1. Do Mexican Spanish-speaking children aged 3 to 6 show comprehension of inflection, such that they can infer the number of a sentence's subject from the verbal inflection alone?

2. Is receptive knowledge of comprehension related to productive use of subject-verb agreement?

To answer the research questions above, we now turn to review the results of the production and comprehension studies.

The results of the oral guided production task show that children produced both the singular subject-verb agreement marker, V-Ø, and plural subject-verb agreement marker, V–*n* as early as the age of 3. There was a predominant use of the 3rd person singular marker across all ages (V-*Ø)*, followed by the 3rd person plural marker V–*n* and then by the 1st person singular marker V-*o*. Given the findings for production in the present study, we can conclude that children as young as age 3 have productive use of the subject-verb agreement paradigm in Mexican-Spanish.

This finding is in line with those from previous L1 Spanish acquisition, in which children are reported to produce the plural marker –*n* at around 2;5 years (Bel, 2001; Bel & Rosado, 2005; Brandani, 2010).

The results of the comprehension task show that children between the ages of 3 and 4 years old do not understand the syntactic meaning of subject-verb agreement marking. Based on their random pointing behavior in the picture selection task, they cannot use agreement inflection alone as a clue to select the correct picture.

On the other hand, children between 5 and 6 years old succeeded on performing the task. They could match the correct picture in a pair with a sentence bearing the relevant subject–verb agreement marking. They were using the plural marker V–*n* to select the correct picture. These findings are in line with those found in previous studies in Spanish (Pérez-Leroux 2005), English (Fraser, Bellugi, & Brown, 1963; Keeney & Wolfe, 1972; Johnson et al., 2005) and German (Brandt-Kobele & Höhle, 2010) where children comprehend subject-verb agreement when they reach age 5.

In conclusion, altogether these results support the existence of an asymmetry between production and comprehension in the acquisition of subject-verb agreement crosslinguistically (in English: Fraser, Bellugi, & Brown, 1963; Keeney & Wolfe, 1972; Johnson et al., 2005; in German: Brandt-Kobele and Höhle, 2010).

Some limitations of the study were identified. First, participants were not randomly selected, as they were sampled on the basis of convenience and availability. Second, all participants were drawn from private schools. Third, the number of participants in each age group was reduced. In future research it would be desirable to include learners attending both public and private schools; randomize the selection of participants; and increase the number of participants in each age group.

While the limitations above focus on the selection of participants, we identified a weakness in the design of the experimental stimulus. The visual information load and the number of objects in one of the pictures caused children to fail at the pointing task. Visual stimulus have to be carefully designed, selected and piloted to maximize the validity of the task.

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Appendices

Appendix A.

Consent form

Formulario de Consentimiento

Su hij@ ha sido invitad@ a participar en un estudio sobre la comprensión del español.

- Entiendo que la participación de mi hij@ consistirá en realizar dos pruebas, la primera consistirá en la descripción de personajes de videos cortos de películas animadas o caricaturas, y la segunda prueba seleccionará con base en una oración imágenes.
- Entiendo que todos los datos que proporcione mi hij@ serán confidenciales y se utilizarán solamente para fines de investigación.
- Entiendo que la identidad se mantendrá anónima.

He leído la información del documento de consentimiento. He tenido tiempo para hacer preguntas y se me ha contestado claramente. No tengo ninguna duda sobre la participación de mi hij@.

Acepto la participación de mi hij@ voluntariamente.

Nombre del padre o tutor del participante:

Firma del padre o tutor participante:

Nombre del investigador: Angel Adad Salazar Pombo

Firma del investigador:

Fecha: _____ de septiembre de 2013

Appendix B.
Linguistic background questionnaire

Datos del niñ@

Folio:

Información del participante:

Nombre completo del participante:

Fecha de nacimiento:

¿De dónde eres?:

Tus papás ¿de dónde son?

¿Hablas otro idioma?

En tu casa ¿Qué idiomas hablas más?

Appendix C.
Guided oral production task

Counterbalanced order of presentation of single subject vs. plural subject video clip.

Group A

Protocolo: Tarea de producción oral

Buenos días/tardes.

Gracias por acompañarnos.

Primero te voy a hacer una pregunta, platícame: ¿Qué haces en un día normal/común?

(Si el/la niño/a no produce un discurso considerable, ayudarle con otras preguntas como: ¿qué actividades haces por la mañana/tarde/noche? ¿Con quién comes? ¿A qué hora te duermes?)

Ahora, te voy a mostrar unos videos para que me hables de ellos.

Primero te voy a mostrar un video corto. Te pido que pongas atención porque al final te voy a hacer una pregunta. (Mostrar el primer video).

¿Qué crees que hace X (*el nombre de personaje*) en un día normal?

(Si el/la niño/a no produce un discurso considerable, ayudarle con otras preguntas)

Ahora te voy a mostrar otro video. En él se muestran varios personajes (*el nombre de los personajes*).

(Mostrar el video)

¿Qué crees que hacen los personajes (*el nombre de los personajes*) en un día normal?

Finalmente, al niño/a: oye me dijiste que en un día normal haces (mencionar alguna de las actividades que el niño enlistó al inicio) Si pudieras cambiar un día de tu vida con… (y)… ¿Cuál elegirías y por qué? (Mostrar una foto fija de ambos video clips con los personajes).

Bueno, antes de continuar dime ¿tienes alguna pregunta para mí?

Group B

Protocolo: Tarea de producción oral

Buenos días/tardes.

Gracias por acompañarnos.

Primero te voy a hacer una pregunta, platícame: ¿Qué haces en un día normal/común?

(Si el/la niño/a no produce un discurso considerable, ayudarle con otras preguntas como: ¿qué actividades haces por la mañana/tarde/noche? ¿Con quién comes? ¿A qué hora te duermes?)

Ahora, te voy a mostrar unos videos para que me hables de ellos.

Primero te voy a mostrar un video corto. Te pido que pongas atención porque al final te voy a hacer una pregunta. (Mostrar el primer video).

En él se muestran varios personajes (*el nombre de los personajes*).

¿Qué crees que hacen los personajes (*el nombre de los personajes*) en un día normal?

Ahora te voy a mostrar otro video. En este aparece solo un personaje.

(Mostrar el segundo video)

¿Qué crees que hace X (*el nombre de personaje*) en un día normal?

(Si el/la niño/a no produce un discurso considerable, ayudarle con otras preguntas).

Finalmente, al niño/a: oye me dijiste que en un día normal haces (mencionar alguna de las actividades que enlistó al inicio) Si pudieras cambiar un día de tu vida con… (y)…. ¿Cuál elegirías y por qué? (Mostrar una foto fija de ambos video clips con los personajes).

Bueno, antes de continuar dime ¿tienes alguna pregunta para mí?

Appendix D.

D1. *Comprehension production task*

Instrucciones para la sesión de práctica

1. Ahora te voy a enseñar unos dibujos de personas, animales y cosas.

2. Primero vas a escuchar la palabra “mira” y le vas a poner atención a los dos dibujos que aparecen en la pantalla. Después vas a escuchar una oración, cuando termine la oración quiero que señales con tu dedo uno de los dos dibujos, de acuerdo a la oración que escuchaste.

3. ¿Tienes alguna pregunta?, cuando estés listo por favor presiona esta tecla y pon mucha atención.

Al finalizar la sesión de práctica.

5. Muy bien, ahora vas a ver otros dibujos y vas hacer exactamente lo mismo,

6. Recuerda, primero escucharás la palabra “mira” y veras los dibujos después escucharas la oración y luego señalaras uno de los dos dibujos, de acuerdo a lo que dice la oración.

7. Cuando estés listo por favor presiona esta tecla y pon mucha atención.

D. 2. Counterbalanced lists of stimuli

Group A

Trial sentences

1. La avispa vuela en el aire
2. Los payasos actúan en el circo
3. El niño come un helado

Experimental sentences

1. Nada en el lago
2. Duermen en la cama
3. Salta en la rama

Foil: La avispa vuela en el aire

4. Canta en la valla
5. Fuman en la calle

Foil: Los payasos actúan en el circo

6. Patinan en el hielo
7. Habla en la conferencia
8. Barren en el patio

Foil: El niño come un helado

9. Para en el semáforo
10. Toman agua en el río

Group B

Trial sentences

1. Las avispas vuelan en el aire
2. El payaso actúa en el circo
3. Los niños comen un helado

Experimental sentences

1. Patinan en el hielo
2. Paran en el semáforo
3. Toma agua en el río

Foil: Las avispas vuelan en el aire

4. Nadan en el lago
5. Saltan en la rama

Foil: El payaso actúa en el circo
6. Duerme en la cama
7. Fuma en la calle

8. Hablan en la conferencia

Foil: Los niños comen un helado
9. Barre en el patio
10. Canta en la valla

D3. Training sentences

1. Los conejos saltan en el campo.
2. El perro escarba en la tierra.
3. Rebanan en pedazos el pastel.

D. 4. Data collection grid

	Imagen 1	Imagen 2
Par 1		
Par 2		
Par 3		
Par 4		
Par 5		
Par 6		
Par 7		
Par 8		
Par 9		
Par 10		
Par 11		
Par 12		
Par 13		