# Acquisition of copulas *ser* and *estar* in Spanish: learning lexico-semantics, syntax and discourse[1]

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## 1. Introduction

Although there are a very large number of proposals in the literature to account for the complex distribution of the copulas *ser* and *estar* in Spanish and Portuguese (Bello 1951; Gili Gaya 1955; Querido 1976; Luján 1981; Lema 1995; Schmitt 1992, 2004; Maienborn 2000, 2003), very little is known about children's acquisition of these two highly frequent copula verbs. The only acquisition study we are aware of is on natural and elicited production by Sera (1992). To our knowledge nothing has been published on children's comprehension of these copulas and therefore we don't even have preliminary comprehension data that could help us in answering basic questions such as the following: (i) do young children have problems interpreting the distinctions between *ser* and *estar* when both options are grammatical? (ii) if their performance is not adult-like, do they default to one of the copulas and if so, which one?

Our paper aims at providing preliminary answers to these two questions. We present the results from two studies on children's comprehension/acceptance of the copulas *ser* and *estar* followed by adjectival predicates in particular contexts.[2] Study 1 examined children's ability to use the pragmatic implicatures associated with each of the copulas in the context of permanent vs. temporary properties via Picture Matching Tasks (PMT). Study 2 is an Acceptability Judgement Task (AJT) that attempts to verify the extent to which children are aware that lexical and syntactic properties of certain adjectives and/or preceding discourse are crucial pieces of information for determining which copula should be used.

As we will see below, because the choice between the two copulas is governed by an intricate set of factors that go from semantic and syntactic properties of certain adjectives to semantic and/or pragmatic factors that involve larger discourse contexts, the acquisition of the copulas can be used as a testing ground for proposals that have been made concerning children's different abilities to incorporate syntactic, semantic, pragmatic and discourse information in comprehension at different stages in their development.

More specifically, in study 1 we will investigate Noveck's (2001)[3] hypothesis that children first master the logical meaning of expressions and only later compute the implicatures associated with different items. In study 2 we will investigate the hypothesis that children have more trouble incorporating discourse information than syntactic and semantic information by asking children to judge the acceptability of *ser* and *estar* when different types of information (discourse or syntactic or semantic) must be taken into consideration.

On a more general level, our results show that 4-5 year-olds have not yet mastered the *ser* and *estar* distinction in comprehension. The results also provide empirical support for both hypotheses: children do not always use the implicatures associated with particular items to make a choice between two elements, although they seem to distinguish between the two copulas. Second, in the AJT, children had a lot of trouble incorporating discourse information to judge the acceptability of sentences with *ser* and *estar*, but again were more willing to accept *estar* in the inappropriate context than vice-versa.

This paper is organized as follows: section 2 will provide a brief description and analysis of the properties of *ser* and *estar*; section 3 provides the acquisition background against which our results should be discussed; section 4 presents study 1; section 5 presents study 2 and section 6 summarizes the results.

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[2] With DP complements *ser* is categorically chosen and with locatives *estar* is used in almost all cases in Chilean Spanish. We also thank Alan Munn and Ana-Teresa Perez-Leroux for their suggestions. Mistakes are ours.

[3] See also Noveck et al 2002, in press; and Baratgin & Noveck 2000.

## 2. Basic properties of *ser* and *estar*

Traditionally, *ser* is associated with permanent properties and *estar* with temporary properties. As noted by Maeinborn 2003, these traditional accounts seem to imply something about the way humans think about the universe: *ser* tends to be associated with permanent and essential properties, while *estar* tends be associated with temporary and accidental properties. However, the permanent vs. transitory distinction is not a grammatical principle, but a tendency, as noted by many grammarians: we find permanent properties with *estar* (1) and accidental properties with *ser* (2).

(1) Maria está muerta. ESTAR
Maria is dead

(2) Maria fue simpática hoy. SER
Maria was nice today

More recent analyses of the distribution of *ser* and *estar* try to derive this tendency from syntactic, semantic and/or pragmatic differences that are independently motivated. Depending on where the distinction between *ser* and *estar* is encoded, we can divide the accounts into three main groups: (i) syntactic-semantic, (ii) semantic and (iii) pragmatic accounts.[4]

SYNTACTIC-SEMANTIC ACCOUNTS: According to Diesing (1992) and Lema (1995), *ser* and *estar* are the lexical exponents of the individual and stage-level distinction, respectively. The distinction between stage-level and individual-level predicates is in turn semantic and syntactic, since stage-level and individual-level predicates differ not only in their semantics (presence vs. absence of an event argument), but also in terms of their mapping into the syntax.[5]

SEMANTIC ACCOUNTS: Other researchers have proposed a semantic account of the distinction that has, of course, pragmatic consequences. Schmitt (1992, 2004)[6], for example, proposes (with much of the traditional literature) that the distinction is aspectual in nature. While *estar* denotes a subevent of the type STATE, *ser* is devoid of aspectual content, i.e., it is unspecified for a subevent type (STATE, EVENT) and therefore can appear in various different contexts. The propensity of *estar* to appear with temporary predicates and *ser* with permanent properties arises through implicatures associated with the fact that *ser* encodes no aspectual properties, i.e. does not contribute to the assertion of an eventuality type.

PRAGMATIC ACCOUNTS: Finally, the purely pragmatic accounts can be exemplified by Clements (1988) and more recently Maeinborn (2003). According to Maienborn, although semantically identical, these copulas differ in that *estar* presupposes a discourse anchorage while *ser* does not: this difference will allow the speaker to mark different perspectives on a predication in a particular discourse.

For the purposes of this paper, we assume Schmitt's (2004) account of the distinction between *ser* and *estar*. Below we will describe some of the properties of these copulas that are relevant for our experiments and can serve as evidence in support of the idea that while e*star* is a STATE, *ser* is underspecified for aspectual/event properties.

When we examine the two copulas with adjectival predicates, the first thing to note is that most adjectives can appear with both copulas, as illustrated in (3a,b). The second crucial property is that (3a) implies a temporariness that (3b) does not. (3b) has a generic reading (atemporal reading). (3a) is asserting that the property of being spotted holds at the topic time (time of the assertion)..

(3) a. El dálmata está moteado ESTAR
The Dalmatian ESTAR.3sg spotted
'The Dalmatian is spotted.'

[4] The survey here has no intention of doing justice to the huge literature on the topic. Its goal is to exemplify avenues that have been taken in the analysis of *ser* and *estar*.

[5] For arguments against a stage-level vs. individual-level distinction for the Spanish/Portuguese copulas see Schmitt 1992, 1996).

[6] See also Luján (1981) for an alternative account.

b. El dálmata es moteado. SER
The Dalmatian SER.3sg spotted
'The Dalmatian is a spotted animal.'

Following Schmitt (2004), we would like to argue that the temporariness associated with *estar* predicates comes from implication. In order to explain this we need to examine how states have been defined in the literature.

Santos (1991) notes that there are at least two working definitions of states in the literature: states have the property of being true at moments in time or states are atemporal. The adherents of the view that states are true of moments in time are dealing mainly with what Santos calls temporary states (*stand, remember*, etc.). The other view treats states as atemporal, in opposition to events, which presuppose time to be actualized. Here the examples used are *equal, know physics, believe that*, etc.

Following Schmitt 2004, we suggest that, while the first definition of states is appropriate for *estar*, the second definition is appropriate for *ser*, since *ser* is actually underspecified for temporal/aspectual information. The idea here is that being atemporal actually means not being a state or an event.

If *estar* denotes a STATE and STATES can be thought of as asserting that property P holds at *t* by implication (because there is another option in the language that is not asserting that P holds at time *t*) we can arrive at an interpretation in which things should be different before or will be different after.

On the other hand, if SER is a state only by default, we should find cases in which *ser* predicates are bound in time or receive eventive interpretations depending on other elements in the clause. This is exactly what we find, as illustrated in (4).

(4) a El dálmata es moteado ahora. *ser*
The Dalmatian SER.3sg spotted now
'The Dalmatian is spotted now.'

b. El dálmata fue educado. *ser*
The DalmatiaLSER.perf.3sg educated
'The Dalmatian was educated.'

(3a) and (4a) are both compatible with a story in which a Dalmatian was born having no spots but later found someone to paint some spots on him (so that he might fit in better with the other Dalmatians). Here we have *ser* and *estar* allowing an interpretation of a temporally bound state. *Ahora* 'now' marks the time in which the Dalmatian became 'spotted'. In (4b), *ser* is in the perfective past and the interpretation is the well-known eventive interpretation known as the ACT BE interpretation (found in English mostly with the progressive).

Because *estar* asserts that P holds at t, *estar* predications can be a cautious way of describing a property when we are unsure about how permanent the property is. Querido 1976 (apud Maeinborn (2003)) gives a very good example. Imagine a situation in which a botanist discovers a new tree, whose leaves are at the time of the discovery, yellow. If he says that the leaves *estar* yellow, he is only committed to his observation, but if he says that they *ser* yellow, then there is an implication that yellow is a permanent/essential property (since we are using the aspectually empty copula).[7]

If upon encountering a Dalmatian, I am unaware that being spotted is one of its essential properties, the safest thing for me to report is that the Dalmatian *estar* spotted, which is still true, even if being spotted is an essential/permanent property. In other words, *estar* does not exclude essential properties in the context of direct perception.[8]

In sum, the temporary/permanent distinction is not what accounts for the uses of *ser* and *estar*. Note that in (4), in spite of the fact that we are using *ser*, we do not derive a permanent state.

There is another difference between *ser* and *estar* that may also be accounted for by this proposal, the fact that only *estar* can appear with adjectives that take of-complements (complements preceded by the preposition *de*), as illustrated in (5). If we assume that these adjectives must combine with subevents in order to license their arguments (see Schmitt 2004), then we can explain why *ser* cannot appear with predicates that must combine with adjectives with of-complements. *Ser* has no subevent type information, but *estar* does.

[7] Maienborn (2003) uses Querido's story to make a purely pragmatic proposal, different from ours.
[8] This will be crucial for the interpretation the results from Study 1.

(5) Juan *es/está aburrido de ver TV.
Juan is SER/ is ESTAR bored of watching TV
'Juan is bored of watching TV'.

In sum, by assuming that only *estar* is a real state, we can understand why *ser* is the malleable element. Moreover we can also begin to understand why only *estar* is compatible with adjectives with of-complements.

## 3. Acquisition background

What we know about the acquisition of *ser* and *estar* by Spanish speaking children comes from a production study carried out by Sera (1992). She argues that children use syntactic clues in order to determine which copula they should use. Specifically, she reports that the children in her study (as young as 3 years of age), used *ser* with NPs and *estar* with locative PPs just as adults do. However, children as old as 11 years of age, incorrectly used copula *estar* to locate events, showing that they were not sensitive to semantic clues. Sera also concluded that children, as well as adults, seem to classify adjectives as either holding a *ser* or an *estar* status. Young children used *ser* with adjectives that typically appear with *ser* in the adult grammar 78% of the time and use *estar* with adjectives that typically appear with *estar* 62% of the time. Unfortunately, Sera did not make any reference to the pragmatic dimension of copular use in Spanish.

Since copula choice seems to trigger different implicatures, it is necessary to take into account the inferences that are associated with each copula. There is converging evidence for the appearance of logical meanings before implicit meanings in child language. Noveck (2001) investigated scalar implicatures (modals and quantifiers) and showed that children follow a developmental ordering in which logical meanings are learned before implicit meanings. He concluded that young children begin treating weak scalar terms logically before treating them more pragmatically. In another study, Noveck and Chevaux (2002) extend the empirical domain of this research to implicatures associated to *and* and again find similar results. Children prefer the logical interpretations first and only later add the implicatures associated to *and* (see also Crain et al (2002) and Gualmini et al (2000) for similar results, with a different interpretation).

A potential explanation for this failure to calculate implicatures could be associated with processing limitations. Grodzinsky and Reinhart (1994) suggest that the problem of incorporating the pragmatics of a situation is processing load.

Although *ser* and *estar* are in some contexts logically equivalent, the implicatures associated with the choice between *ser* and *estar* are quite different. Based on the hypothesis that children need to first master the meanings associated with the two copulas before pragmatics can adjudicate among the readings of particular sentences (Crain et al 2002), in study 1 we examine the acquisition of *ser* and *estar* in a context where, although both copulas are logically possible with both pictures, only one copula is felicitous with each picture if we take the implicatures into account. Our objective is to investigate whether children make the pragmatic inferences associated with *ser* vs. *estar* that would trigger a complementary distribution of the copulas. In our studies we address this issue and pose the following acquisition questions:

1. Do Spanish speaking children know the semantic and pragmatic principles that govern the choice of *ser* and *estar*?
2. Which copula is overused? *Ser* or *estar*?

Following Noveck (2001) we hypothesise that children, unlike adults, will have trouble making choices that are based purely on the implicatures associated with the copulas.

With respect to the second question, there are at least three competing hypotheses in the literature that make different predictions about which of the two copulas will be overused: (i) CHILDREN WILL OVERUSE *ser*. Roeper (1999) suggests that at first children may use the underspecified forms; (ii) CHILDREN WILL OVERUSE *estar*. Crain and Thornton (1998), however, suggest that children first choose the representation that is true in the smallest set of circumstances. One interpretation of this hypothesis for the *ser/estar* distinction would be to say that *ser* is true in a larger set of contexts since, being atemporal, it can be used to talk about generic statements which are vaguer than here-and-now statements. In this case, like our botanist, children should overuse *estar*.[9] (iii) CHILDREN WILL USE

[9] On the other hand, we could also say that *estar* is true in a larger set of contexts, since any time a generic statement holds, it can also hold of the same statement at some chosen time, but not vice versa. Given that *estar* has more

BOTH COPULAS EQUALLY. An alternative hypothesis would be that we would find chance behaviour if both copulas are possible. According to Grodzinsky and Reinhart (1993), chance behaviour is typical when children have problems incorporating the pragmatics due to a processing load. In other words, when the choice is not based on the grammar, they may perform at chance.

Another question we investigate is the ability of children to use certain cues (lexical, syntactic and/or contextual) in order to make decisions about the appropriateness of the two copulas. Avrutin & Wexler (1999) propose that incorporating discourse information is harder than incorporating syntactic information. If this is correct, we can hypothesise that children will have more difficulty selecting the correct copula when the choice of the copula depends uniquely on the context as compared to when there are other types of information (adjectives with or without complements, for example).

## 4. Study 1: Picture Matching Task. Experiment 1 and 2

Study 1 used a Picture Matching Task to test whether Spanish-speaking children know the pragmatic implicatures that force adults to prefer *ser* for permanent properties and *estar* for temporary properties. Study 1 consisted of two very similar experiments that differed in terms of whether the target stories presented to children mentioned the antonyms of the adjectives used in the experimental sentences or not.

The task of the child was to choose between two pictures, one depicting a typical (permanent) property of a character (tall giraffe, naturally spotted Dalmatian, etc.) and the other depicting an atypical (temporary) property (short giraffe standing on top of a table, Dalmatian with painted on spots (because he was born with no spots), etc.). After a short story that backgrounded each picture, children were asked either question (7a) or (7b) and responded by pointing to the appropriate picture.

For experiment 1 the child heard (6a) followed by (7a) or (7b). For experiment 2 the child heard (6b) followed by (7a) or (7b):

(6) a. Mira las jirafas. ¿Me puedes describir una jirafa? Altas las jirafas ¿no? Pero aquí hay una más alta que la otra. La jirafa chiquita se encuentra encima de una mesa y la alta en el suelo.'
‘Look at the giraffes. Can you describe a giraffe? Pretty tall giraffes, eh? But here we have one taller than the other. The small giraffe is on a table and the tall one is on the floor’.

b. Mira las jirafas. ¿Me puedes describir una jirafa? Altas las jirafas ¿no? Pero aquí hay una más alta que la otra. Esta solucionó su problema subiéndose a esta mesa.
‘Look at the giraffes. Can you describe a giraffe? Pretty tall giraffes, eh? But here we have one taller than the other. This one solved her problem by climbing on top of this table’.

(7) a. ¿Cuál jirafa es alta?
‘Which giraffe is SER tall?

b. Cuál jirafa está alta?
Which giraffe is ESTAR tall?

### 4.1 Materials and Participants

The materials consisted of 6 experimental sentences (3 with SER and 3 with ESTAR) plus 7 fillers.

The adjectives used were: *grande* 'big'; *alto* 'tall', *bajo* 'short', *moteado* 'spotted', *orejón* 'big eared', *rayado* 'striped'.

Thirty-six Spanish-speaking children from daycares and kindergartens in Chile participated in this study. There were twenty children (Mean age 4;6) in experiment 1 and sixteen children (mean age 4;4) in experiment 2. As a control group, seven Chilean Spanish-speaking adults participated in experiment 2.

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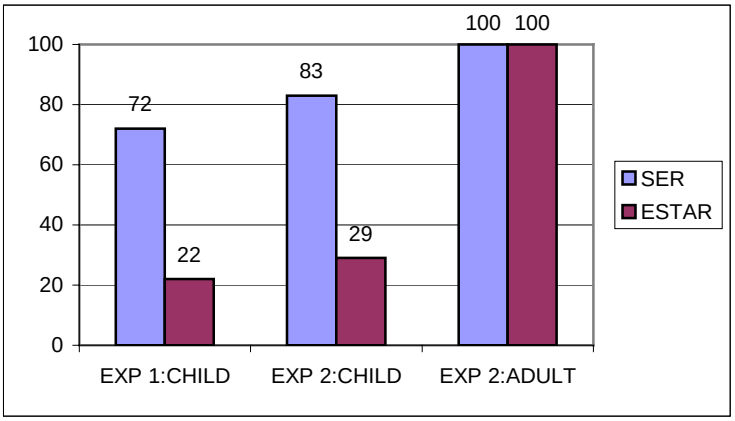
information, we will assume it as being the narrower in most contexts. The fact that we can go either way illustrates the complexity of the problem.

**4.2 Results of the PMT**

In experiment 1 children chose the picture illustrating permanent properties in the SER condition 72% (43/60) of the time and the picture illustrating temporary properties in the ESTAR Condition 22% (13/60) of the time. On the assumption that chance performance in these experiments corresponds to a 50% acceptance rate (there are two pictures for each target sentence), child performance in the SER condition was significantly different from chance ($t(19) = 4.333$, $p < .05$) and child performance in the ESTAR condition was also significantly different from chance but in the opposite direction ($t(19) = -5.667$, $p < .05$). In other words, in the SER condition children performed significantly much BETTER than chance and in the ESTAR condition children performed significantly much WORSE than chance.

Experiment 2 tested adults in addition to children. Adults chose the picture illustrating permanent properties in the SER condition and the picture illustrating temporary properties in the ESTAR condition 100% (7/7) of the time. Children chose the picture illustrating permanent properties in the SER condition 83% (40/48) of the time but they only chose the picture illustrating temporary properties in the ESTAR Condition 29% (14/48) of the time. The proportion of correct responses (based on what has been reported in the literature about the adult grammar) for each subject was entered into a mixed design Analysis of Variance (ANOVA) with 2 factors (Verb: SER, ESTAR) X 2 (Age: ADULT, CHILD) with Verb as a within subjects variable and Age as a between subjects variable. The analysis revealed a main effect for Verb ($F(1, 21) = 22.981$, $p < .05$) and a main effect for Age ($F(1,21) = 44.739$, $p < .05$). There was also a significant interaction for Verb by Age ($F(1,21) = 22.981$, $p < .05$). Although children did not reach adult levels in both the SER and ESTAR conditions, children performed more closely to adults in the SER condition than they did in the ESTAR condition. Like for experiment 1, child performance in the SER condition was significantly BETTER than chance ($t(15) = 6.325$, $p < .05$) and child performance in the ESTAR condition was significantly WORSE than chance ($t(15) = -3.478$, $p < .05$). The results from both experiments 1 and 2 are shown in Table 1.

Table 1. Experiments 1 & 2: Percentage of Correct Responses.




Note: The correct response in the SER condition corresponds to the picture illustrating permanent qualities and for the ESTAR condition the picture illustrating temporary qualities.

**4.3 Discussion**

The first important finding of the PMT is that adults and children do not behave alike. Adults treat the copulas as in complementary distribution, although both pictures are compatible with *estar* (see our botanist) and both pictures may be marginally compatible with *ser* if an adverbial such as *from now on* or *in this picture* is added covertly. The children in our study do not treat the copulas as in complementary distribution. Children overuse *estar* for the picture with the canonical property (as our botanist would) (they choose the canonical picture in the ESTAR condition 78%) and seem to reject a statement with both *ser/estar* for the temporary property altogether (the temporary picture was chosen below 30% of the time). This suggests that children are not making use of the pragmatic principles to rule out *estar* in the context involving canonical properties.

We must be cautious in our interpretation of the results with respect to *ser*. The use of *ser* with the non-canonical property is unclear. It could be that children are coercing *ser* + adjective (tall) with an adverbial such as 'in

this drawing'. What seems to be the case, however, is that again children are ignoring the implicature associated with the copula choice.

Our results are compatible with the idea that children aged 4;5 have not yet mastered the implicatures associated with the copula choice.

## 5. Study 2: Acceptability Judgement Task

Generally context influences adult choice of the copula when it occurs with an adjective. There are two cases in which the choice of the copula is associated with lexical and syntactic properties:

a) Some homonymous adjectives may allow only one meaning with each copula.
b) Adjectives with complements can only occur with *estar*.

Study 2 is an attempt at verifying whether children can use the three types of information (syntactic, semantic and pragmatic) when deciding between *ser* and *estar* in a felicity judgment task.

This study is divided into three experiments that all used an Acceptability Judgment Task to test whether children were sensitive to the lexical, syntactic and context-dependent properties of SER and ESTAR.

**Experiment 1** **Lexical homonimy + context (8 experimental sentences)** **estar listo vs. ser listo** **be ready vs. be intelligent**

| **Context favouring ESTAR** | **Context favouring SER** |
|---|---|
| *Pedro tocó al gato pero el gato no se movió. Pedro pensó que el gato se había muerto y lo tocó de nuevo. Esta vez el gato se estiró y bostezó. Pedro respiró aliviado cuando vió al gato vivo.*<br><br>Pedro thought the cat was dead but then he realized that the cat was alive. | *Pablo tiene un gato muy inteligente. Cuando destroza las flores del jardín le echa la culpa a otros gatos, cuando pelea dice que el no empezó la pelea. Siempre queda como el que no hizo nada malo. ¡Qué gato tan vivo!*<br>The cat is very intelligent and never takes the blame for anything. |
| **Experimental sentences**<br>*A ver Pepe, descríbeme al gato de Pedro.*<br><br>A. *El gato está vivo.* 'The cat is alive.'<br>B. *El gato es vivo.* 'The cat is smart.' | **Experimental sentences**<br>*A ver Pepe, descríbeme al gato de Pablo.*<br><br>A. *El gato está vivo.* 'The cat is alive'<br>B. *El gato es vivo.* 'The cat is intelligent' |

**Experiment 2** **Syntactic restriction + context (4 experimental sentences)** ***SER vs. ESTAR malo de la guata** ***SER vs. ESTAR sick of the stomach**

*Pedro comió mucho en el cumpleaños de su hermana y la comida le hizo mal. Ahora no se siente muy bien y la guata le pesa como si tuviera piedras.¡Qué mal tener la guata mala!* Pedro ate too much on his sister's birthday and the food made him feel really sick. Now he doesn't feel very well. How awful to have a sick stomach!

**Experimental sentences:** *A ver pepe, descríbeme a Pedro:*

*A. Pedro está mal de la guata*
Pedro ESTAR sick to his stomach

*B. *Pedro es mal de la guata*
Pedro SER sick to his stomach

*Note that SER sentences are always unacceptable and the ESTAR sentences are always acceptable.

**Experiment 3 Context only** **los ojos SER vs. ESTAR rojos**
**the eyes SER vs. ESTAR red**

| ESTAR favouring context | SER favouring context |
|---|---|
| *Pedro se encontró a Juan en la escuela esta mañana y apenas lo saludó, se dio cuenta de que Juan había estado llorando. Se dio cuenta porque Juan tenía los ojos rojos de tanto llorar*<br>Juan has red eyes because he has been crying. | *Este conejo se llama Pirolo y tiene unos ojos rojos muy bonitos. Pirolo sacó el color de ojos a su mamá y papá que también tienen unos ojos rojos muy lindos.*<br><br>Pirolo has red eyes because rabbits have red eyes. |
| *A ver Pepe, descríbeme a Juan:*<br><br>A. *Los ojos de Juan están rojos.*<br>The eyes of Juan ESTAR.3sg red.<br>B. *Los ojos de Juan son rojos.*<br>The eyes of Juan SER.3sg red. | *A ver Pepe, descríbeme a Juan:*<br><br>A. *Los ojos de Pirolo están rojos.*<br>The eyes of Pirolo ESTAR.3sg red.<br>B. *Los ojos de Juan son rojos.*<br>The eyes of Juan SER.3sg red. |

### 5.1 Materials and Participants

The materials consisted of 20 experimental sentences plus 16 fillers.

Fourteen Spanish-speaking children (mean age 5;0) from daycares and kindergartens in Chile participated in this study. In addition, twenty Spanish-speaking adults were given a paper and pencil test.

### 5.2 Results of the Acceptability Task

**Experiment 1 (Lexical)**

Given the fact that there was a strong yes-bias in Experiment 1, we decided to look at the number of times children rejected and accepted target sentences for each adjective, which is shown in Table 2. Our interpretation of the results relies heavily on these data, specifically on the number of times children rejected target sentences. Notice that when we consider only the No answers (rejection of target sentence), we do not see a difference between the *ser* and the *estar* conditions. Adult subjects did well on this experiment, providing the correct answer 89.4% of the time.

Table 2. Experiment 1: Percentage of Child Acceptance and Rejection for Each Target Sentence.

| Adjective | YES to Acceptable SER + predicate | YES to Acceptable ESTAR + predicate | NO to unacceptable SER + predicate | NO to unacceptable ESTAR + predicate |
|---|---|---|---|---|
| Buena | 100 | 100 | 57.1 | 28.57 |
| Listo | 100 | 100 | 28.57 | 57.1 |
| Vivo | 57.1 | 1000 | 14.2 | 14.2 |
| Malo | 100 | 71.4 | 57.1 | 57.1 |
| percentage | 89.27% | 92.85% | **39.24%** | **39.24%** |

**Experiment 2 (Syntactic)**

Experiment 2 tested whether children recognize that only *estar* is grammatical in certain syntactic constructions of the form *Jorge ESTAR/*SER mal de la guata* (as noted above) while SER is not. The proportion of correct responses for each participant was entered into a mixed design Analysis of Variance (ANOVA) with 2 factors (Verb: SER, ESTAR) X 2 (Age: ADULT, CHILD) with Verb as a within subjects variable and Age as a between subjects variable. There was a main effect for Verb ($F(1,32) = 21.299$, $p < .05$) and a main effect for Age ($F(1,32) =$

23.655, p < .05). There was also a significant interaction for Verb by Age (F(1,32) = 4.938, p < .05). Although children did not reach adult levels in both the SER and ESTAR conditions, children performed more closely to adults in the ESTAR condition than they did in the SER condition. Child responses were correct 32% (9/28) of the time in the SER Condition and 82% (23/28) of the time in the ESTAR Condition. On the assumption that chance performance in this task corresponds to 50% acceptance rate (an answer of either "yes" or "no"), child performance in the SER condition was not significantly different from chance ($t(13) = -1.794$, $p = .096$) but child performance in the ESTAR condition was significantly higher than chance ($t(13) = 3.798$, $p < .05$).

Because the correct response (adult response) was to reject all the experimental sentences with *ser* and to accept all the experimental sentences with *estar*, we have to be very cautious when interpreting the results. Table 3 presents the percentage that children accepted (Yes) or rejected (No) target sentences for each adjective. As in experiment 1, adults did not show a yes-bias and were correct 88.75% of the time. Notice that children rejected target sentences in *ser* condition more often than in the *estar* condition. However, this difference is not significant (p=.39).

Table 3. Experiment 2: Percentage of Child Acceptance and Rejection for Each Target Sentence.

| Adjective | Yes to bad Ser | Yes to good Estar | No to Bad Ser | No to good Estar |
|---|---|---|---|---|
| Mal de | 42.9 | 85.7 | 57.1 | 14.3 |
| Aburrido de | 57.2 | 85.7 | 42.8 | 14.3 |
| Orgullosa de | 85.8 | 85.7 | 14.2 | 14.3 |
| Muerto de | 85.8 | 71.4 | 14.2 | 28.6 |
| Percentage correct | 67.92 | 82.125 | **32.07** | **17.87** |

**Experiment 3 (Context only)**

Experiment 3 tested whether children can use context to determine the use of SER and ESTAR. The proportion of correct responses for each participant was entered into a mixed design Analysis of Variance (ANOVA) with 2 factors (Verb: SER, ESTAR) X 2 (Age: ADULT, CHILD) with Verb as a within subjects variable and Age as a between subjects variable. There was a main effect for Verb (F(1,32) = 29.809, p < .05) and a main effect for Age (F(1,32) = 19.807, p < .05). There was also a significant interaction for Verb by Age (F(1,32) = 10.375, p < .05). Although children did not reach adult levels in both the SER and ESTAR conditions, children performed more closely to adults in the SER condition than they did in the ESTAR condition. Child responses were correct 79% (44/56) of the time in the SER Condition and 45% (25/56) of the time in the ESTAR Condition. On the assumption that chance performance in this task corresponds to 50% acceptance rate (an answer of either "yes" or "no"), child performance in the SER condition was significantly higher than chance ($t(13) = 4.947$, $p < .05$) but child performance in the ESTAR condition was not significantly different from chance ($t(13) = -1.883$, $p = .082$).

Again we have to be cautious when interpreting these results because there was a strong yes-bias in experiment 3 as well. Table 4 presents the number of times children accepted and rejected target sentences. There we no yes-bias for adults and they performed correctly 88.12% of the time.

Table 4. Experiment 3: Percentage of Child Acceptance and Rejection for Each Target Sentence.

| Adjective | Yes to Good Ser | Yes to Good Estar | No to Bad Ser | No to bad estar |
|---|---|---|---|---|
| Callada | 100 | 71.4 | 42.8 | 14.2 |
| Blanca | 100 | 85.7 | 57.1 | 0 |
| Colorada | 100 | 85.7 | 71.4 | 14.2 |
| Rojo | 100 | 85.7 | 57.1 | 0 |
| Percentage correct | 100 | 82.12 | **57.1** | **7.1** |

Notice that children reject the target sentences in the *ser* condition significantly more often than they reject target sentences in the *estar* condition (p=.00).

**5.3 Discussion**

In all three experiments children behave differently from adults. We will refer to each experiment separately.

Experiment 1 (Lexical). Children were above chance in both the *ser* and the *estar* conditions. This is to say that children did just as well in the *ser* favouring contexts as in the *estar* favouring contexts (66% correct responses for both) but that overall their performance was significantly lower than that of adults. As noted above none of the sentences were false or unacceptable unless the child had a strong sense of the story line. Because our data does not show a significant difference between child rejection of target sentences in the *ser* condition and child rejection in the *estar* condition and children performed significantly lower than adults on both verbs, it may be that this experiment was too difficult. We make no further comment about this experiment here in order to discuss experiments 2 and 3.

Experiment 2 (syntactic) showed that children performed more closely to adults on *estar (82% correct)* than on *ser (32% correct).* However it is easy to misinterpret the results. Notice that in this condition the *estar* sentences and the *ser* sentences do not have the same probability to be REJECTED. All the *ser* sentences are supposed to be BAD while all the *estar* sentences are supposed to be GOOD. Therefore, if there is a yes-bias the results that we are getting are easily explained: yes to Bad *ser* 68% while No to good *estar* only 17.87%. Still, it is interesting to note that children reject more *ser* Bad (32.07%) than *estar good* (17.87%) so perhaps they notice that something is marginally wrong with *ser* + 'de' complement while they will allow the *estar* + 'de" complement.

Experiment 3 (context only). The results of experiment 3 show that children performed more closely to adults on *ser* than on e*star*. In other words, children responded correctly on the *ser* target sentences (79% of the time) but they performed at chance on *estar* (45%). Because of the strong yes-bias in experiment 3, it is crucial that we consider only the NO responses. When we do that we find a significant difference ($p<.05$) between NO answers to SER sentences in ESTAR favouring contexts (57.1%) and NO answers to ESTAR in SER favouring contexts (7.1%). Therefore, children show that they are more likely to accept ESTAR sentences in SER favouring contexts than accept SER sentences in ESTAR favouring contexts. This last experiment is clearly showing that children overuse *estar*.

## 6. General Discussion

There is an overall over-acceptance of ESTAR in SER favouring contexts both in the PMT and in context condition of the AJT, when the results are compared with the adult's preferences. These results are compatible with the idea that children have not yet mastered the ability to deal with the implicatures brought about by the copula choice. Moreover, it appears that children are more likely to accept *estar* in a SER favouring context, than vice-versa, which is compatible with Crain and Thornton (1998) hypothesis. With respect to whether discourse is harder than syntactic information, it seems that our results are not as clear. There is however a stronger tendency to reject the ungrammatical sentences than the sentences that were grammatical but inappropriate for the context.

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