Ser and *estar*: The Role of Adjective-Types

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1. Introduction

Children seem to attain their target grammars and ultimately become proficient users of their native languages with great ease. However, we still have very little understanding of how children learn the meaning and the properties of particular lexical items. This is especially true in cases where lexical items are so semantically impoverished that their distribution and interpretation seem to depend mainly on pragmatics, which in turn depends on selecting a point of view and a context situation.

Copula verbs are clear examples of semantically impoverished elements. In English it is easy to assume that the copula has no semantic content. Being semantically transparent (semantically empty) with no ability to assign thematic roles, the acquisition task may be treated as a purely morpho-syntactic one with all the work being carried out by other elements in the clause. Although they don't assign theta-roles, the copulas *ser* and *estar* in Spanish and Portuguese cannot both be treated as meaningless. Minimally they must differ from each other pragmatically. Even assuming that one is semantically empty, the transparent copula will have to contrast pragmatically with the other one in some way. Consequently, one of them will have some extra feature. How do we learn the pragmatic import of a semantically empty element? How do children extract from the input the information that is necessary (or not) to construct a semantic representation for these items, whose distribution depends so heavily on the pragmatics of the situation?

Spontaneous speech production studies have found that children seem to master the distribution of the copulas *ser* and *estar* quite early (Holtheuer, 2009; Sera, 1992). Although there are cases in which all that is needed to make the right choice between the two copulas is a purely linguistic, distributional analysis (for example, noun phrases and *that*-clauses appear mainly with *ser,* and some adjectives appear only with one of the copulas and not the other), there are many other cases in which copula choice is the result of an interaction of semantic and pragmatic factors. In these cases, spontaneous speech data does not always allow us to determine the speaker's intentions. Since the choice of the copula depends largely on point of view and a particular discourse situation, it is easy for an adult to accommodate a particular realization of the copula to a situation, independent of the situation that the child actually had in mind. Consequently it is in most cases very difficult to tell whether the child said what she intended.

In this paper, using two elicited production tasks, we continue to explore children's production and comprehension of the copulas *ser* and *estar* in Chilean Spanish. The present study has special focus on gradable adjectives (*tall* and *big*), and color adjectives, which are not conventionally gradable (Kennedy & McNally, 2010). We ask whether children's ability to produce the copulas is affected by different adjective-types and whether they are equally competent to use the copula with both types of adjectives in controlled production situations.

2. Linguistic background and linguistic hypotheses

Any attempt to answer the question of how the learner acquires the knowledge of particular linguistic items requires determining (i) the relevant linguistic properties of the items; and (ii) their distribution in the input. Only then can we formulate hypotheses and test children's knowledge across development. In this section we describe some of the basic properties of *ser* and *estar* in order to determine what is to be learned. Section 3 provides an overview of research on the acquisition of the copulas, including some information about the input children receive. We use this background information to form our hypotheses about the acquisition of *ser* and *estar*.

2.1. Semantics of ser and estar

As evidenced by the extensive literature on the topic (Arche, 2006; Bello, 1951; Camacho & Sanchez, 1992; Clements, 1988; Diesing, 1990, 1992; Fernandez-Leborans, 1995; Gili Gaya, 1955; Kratzer, 1995; Luján, 1981; Maienborn, 2000, 2005a, 2005b; Marin Galvez, 2001, 2004; Porroche, 1988; Roby, 2009; Schmitt, 1992, 1996, 2005; Schmitt & Miller, 2007; Vañó-Cerdá, 1982), the two copulas have quite complicated semantic and pragmatic properties and there is no consensus on what the proper analysis should be.

The common-sense understanding of the two copulas is that they are in complementary distribution. *Ser* + adjective is used to signify inherent or permanent attributes, while *estar* + adjective serves to indicate non-permanent, transitory attributes. And in fact this generalization works in a variety of cases, as illustrated in (1). We use *ser* to describe the permanent color of Manolo's eyes, and *estar* to describe the transitory properties of his eyes caused by (perhaps) crying too much. In other words, in these contexts the copulas indeed seem to be in complementary distribution.

(1) a. Los ojos de Manolo son azules.   *ser* + PRED = permanent properties
       Manolo's eyes SER blue.
    b. Los ojos de Manolo están rojos.   *estar* + PRED = temporary properties
       Manolo's eyes ESTAR red.

The examples above also illustrate an important point that we need to keep in mind in the design of experiments: in order to use the copulas correctly in (1), the speaker needs some knowledge about possible human eye color and must also understand that permanent and temporary properties tend to be associated to *ser* and *estar,* respectively.

Do the copulas carry a semantic feature akin to the permanent/temporary distinction or are these simply pragmatic inferences? If they are inferences, it must be possible to cancel them. Much of the work cited above aims at showing that there is no feature [temporary] or [permanent] inherently encoded in the meaning of any of the copulas. In this paper we also assume that the copulas do not carry a feature such as permanent/temporary. Rather permanence and temporariness are pragmatic inferences that can be cancelled depending on the discourse situation and point of view.

According to Maienborn (2005a) *ser* and *estar* are semantically identical to *be* in English. The only difference between the two copulas is that *estar* presupposes a contextually relevant discourse situation. In other words, there is only a pragmatic distinction between *ser* and *esta*r. Choosing *ser* implies lack of a contextually relevant situation, and therefore it is linked to an atemporal and generic interpretation. In this paper we concur with Maienborn that there is a pragmatic distinction between the two copulas but we do not believe that *ser* and *estar* are semantically identical. Rather, we believe that there are both semantic and pragmatic differences between them. We follow Schmitt (2005), who hypothesizes that *ser* is a transparent copula, namely a copula with no aspectual properties.

Following Pustejovsky (1995) eventuality descriptions can be composed of one or more subevent types (STATE, TRANSITION or PROCESS) which carry basic aspectual information. Having no subevent of any kind means not being inherently a STATE, a TRANSITION or a PROCESS. The aspectual interpretation of *ser* predications is a result of the interaction between the argument structure and temporal properties of the predicate, tense, aspect and adverbial information. By default, *ser*

predications are interpreted as stative, as in the case of (2a). However, other interpretations are possible depending on grammatical aspect and predicate type. The example in (2b), for example, has an activity interpretation due to the use of the progressive and the agentive adjective *cruel*. A present tense *ser* predication with spatio-temporal anchoring (for example, an adverb such as *acá* 'here') will allow an interpretation that just expresses that the state of being 'cruel/skinny' holds during the time that the situation 'here' holds, as exemplified in (2c). 'Here' could refer to a picture or a place. Importantly, it is not necessary that the adverb be overtly realized; it may be just part of the context. An adverb such as 'now', on the other hand, can coerce an inchoative reading and give rise to an interpretation of 'from now on' María holds the property of being cruel or skinny.

(2) a. María es cruel/flaca.
María SER-PRES cruel/skinny
'María is cruel/skinny.'
b. María está siendo cruel.
María AUX SER-GER cruel.
'María is being cruel.'
c. Acá/ahora María es cruel/flaca.
Here/now María is cruel/skinny.

The generic stative interpretation associated to *ser* predications in the present tense (2a) is available in the absence of temporal anchoring and in most cases such an interpretation is equivalent to an individual-level interpretation (Carlson, 1977).

In contrast, *estar* differs from *ser* in not being transparent. *Estar* predicates always describe a stative situation. *Estar* is a copula with the subevent type STATE. This explains why *estar* is not as flexible as *ser* with respect to interpretations. As a consequence, it is impossible to force an activity reading on *estar*.

Summarizing, in this paper we assume that *ser* is transparent and its aspectual interpretation depends on other elements in the clause. *Estar,* on the other hand, is not transparent but rather has the subevent type STATE. Furthermore, we adopt Maienborn's intuition and assume that *estar* is a STATE that carries a presupposition that there exists a situation at a specific time *t* at which the state holds. Much like the definite determiner, which contrasts with an indefinite determiner by having an existence presupposition, we would like to suggest that *estar* contrasts with *ser* by also carrying a presupposition.

If *ser* is unmarked, it should be possible in all contexts in which *estar* is possible. However, this is not the naïve intuition of speakers. To explain these intuitions, we suggest that the choice between the two copulas is subject to the principle of *Maximize Presupposition.* Maximize Presupposition (Heim, 1991) is a principle of language use which forces speakers to choose sentence ψ rather than a competing sentence ϕ, if ψ has stronger presuppositions than ϕ. Given that, *estar* is to be chosen any time its presupposition is satisfied. If we use *ser*, on the other hand, it must be the case that the presupposition does not hold (and a stative generic interpretation becomes the default in the present tense) or the situation is not best described as stative. The temporariness implication arises from the choice of a copula with the presupposition that there is a specific situation in which the property holds.

It is important to note that the two copulas are not in a semantic subset relation. *Estar* does not entail *ser* or vice versa. In other words, pragmatically, it is not the case that every time some *estar* predication holds of a subject, it will also be the case that the *ser* predication holds. In the same sense, it is also not the case that if the *estar* predication holds, the *ser* predication does not hold. (3a) expresses that María is a pretty person but there is a situation in time (*hoy* 'today') in which 'ugly' holds of her. There is no contradiction. Alternatively, if María *estar* pretty, as in (3b), it could be because in general she is a pretty person, but this is not necessary. The use of *estar* is also compatible with a situation where María is an ugly person. Based on this proposal, all we are asserting for *estar* is that it denotes a state, which is linked to a specific time in the discourse. In other words, it is not the case that when *estar* holds, it is because the *ser* predication does not hold. Note that (3c), much like in English, is an infelicitous sentence, no matter the order in which the two copulas occur, because there is no contrast that warrants the use of *pero* 'but'.

(3) a. María es bonita pero está fea hoy.
        María is pretty but she is ugly today.
   b. María está bonita y es bonita/ pero es fea.
        María is pretty (at time t) and she is pretty/but she is ugly.
   c. #María es bonita pero está bonita.
        María is pretty but (she) is pretty.

In sum, we propose that the choice of *ser* and *estar* depends on whether the speaker intends to anchor the property in a situation that holds at a particular time or not. Depending on the adjective used, the procedure to evaluate *ser* + adjective and *estar* + adjective predicative clauses may be different because what counts as the evaluation set may change.

2.2. Semantics of adjectives

A typical classification of adjectives is that of relative vs. absolute. Relative or subsective adjectives relate to a standard or norm. When we say that a giraffe is tall, we are saying that it is tall with respect to other animals but not with respect to a 5-story building. Absolute adjectives, on the other hand, denote properties that intersect with intrinsic properties of entities they refer to. For example, a plastic table is both plastic and a table. Rips and Turnbull (1980) include in this class those adjectives that denote qualitative properties such as color, shape, physical composition, nationality, etc. However, Kennedy (1999) has noted that some adjectives that have been treated as absolute can appear felicitously in comparative constructions and can appear with adverbial degree modifiers. Further classification of adjectives as gradable or not gradable becomes necessary.

A classification that captures differences in scalar structure divides adjectives according to whether they refer to properties that vary in degree. That is, there are adjectives that vary height or size, (e.g., *tall* and *big),* and there are adjectives that do not vary according to any scale (e.g., *pregnant* and *carnivorous).* The former are gradable adjectives and the latter are non-gradable adjectives. According to Kennedy and McNally (2005), gradable adjectives must be further classified as to whether they refer to an open or closed scale. Gradable open scale adjectives are adjectives that refer to a scale that lacks minimal or maximal values (e.g., *big*, *little*) while gradable closed scale adjectives are those that refer to a scale that has minimal or maximal values (e.g., *empty*, *full*, *striped*).

The interpretation of gradable adjectives such as *tall* or *big* varies with context. In other words, we cannot determine that a cat is fat without, in some way, evaluating what counts as fat for a cat of that size. In order to evaluate the truth of a predicative clause with an open-scale adjective, we need to determine whether the individual holds that property to a degree such that it counts as having that property. In other words, we have to consider a standard of comparison against which we can evaluate whether that degree has been reached or not by an individual. The standard of comparison is determined relative to a comparison set of objects that are similar to what is being discussed. In contrast, non-gradable adjectives do not require a context-dependent standard of comparison (Kennedy & McNally, 2010). We can determine that a cat is black (and not white or blue) without the need to compare it with other cats.

Interestingly, the choice of *ser* and *estar* affects what can or cannot become part of the evaluation set from which the standard degree is determined. When we say that a cat *ser* fat (with a generic interpretation), the comparison set involves other cats or other fat creatures in the context, but crucially not stages of the same cat. If we use *estar,* we presuppose the existence of a time in which the stative predication holds. This allows (but does not require) the set from which the standard degree is determined to include other temporal slices (stages) of the same individual. In other words, when we say that a cat is fat using *estar*, it is not necessary to inspect any other individuals, but only stages of the same individual. This is not possible for *ser* predications without spatio-temporal anchoring (adverbs such as *here* or *now*). Thus, copula choice affects what counts as the evaluation set especially for relative adjectives and one could argue that in the case of *estar* predicates the potential comparison set is by definition bigger and involves a temporal dimension. For *ser* predications to involve a

comparison set specifying stages of an individual, there has to be some temporal dimension included in the context either by an explicit or implicit adverbial.

Although many details have been left out, this is enough to allow us to formulate two basic hypotheses about the use of copulas in Spanish by both children and adults assuming children behave as adults. Any differences should be related to the inability to calculate the inferences as adults do.

Hypothesis 1: Non-complementarity
Ser and *estar* will not always be in complementary distribution and are not in a subset relation. The use of one copula over the other will depend on the context and the speaker's point of view. In other words, the same situation may be described with both copulas.

Hypothesis 2: Overuse of Ser
Ser is the transparent copula. As such, it may be overused in production with both colors and open-scale adjectives. This follows from Maximize Presupposition, which dictates that the member of the competitors set with the strongest presupposition compatible with the common ground should be chosen. In the case of *ser* and *estar,* it also predicts overuse of *ser.* After all, *estar* carries a presupposition that there is a specific temporal slice in which the predication holds and its use, when the presupposition does not hold, amounts to presupposition failure. The use of *ser*, on the other hand, is much less constrained by the discourse. Its use only indicates that the presupposition does not hold. If nothing prevents it (such as an adverbial), the pragmatic inference of permanence arises.

3. Acquisition background

The experiments in this study examine children's abilities to use *ser* and *estar* with gradable and non-gradable adjectives. We know that children represent adjectives as a separate class from other parts of speech quite early, (Hall, 1994; Hall & Graham, 1999; Hall & Moore, 1997; Hall, Quantz, & Persoage, 2000; Hall, Waxman, & Hurwitz, 1993; Waxman & Booth, 2001; Waxman & Markow, 1995, 1998). We also know some of the factors that aid in the learning of novel adjectives (Mintz & Gleitman, 2002). With respect to children's ability to calculate contextual standard degrees, Barner and Snedeker (2008) in a beautiful set of experiments, have shown that children are able to set and reset the standard of comparison, as the experimental display that provides the comparison set is changed in various ways (Syrett, 2007; Syrett, Lidz, & Kennedy, 2009). These studies indicate that children can calculate contextually-dependent standards of comparison quite early. However, we don't know whether children know that for *estar* + open-scale adjectives the comparison set may require comparing stages of the same individual and not different individuals.

With respect to the acquisition of *ser* and *estar*, there are very few studies dealing with how children acquire these verbs. We assume that the acquisition of *ser* and *estar* involves three logical steps. As a first step, children do a simple distributional analysis of the two copulas in order to determine the kinds of phrasal complements that can appear with each copula. A second step is to identify the rough interpretation of *ser* and *estar* and the third step is to become proficient in the evaluation of the pragmatic conditions under which each of them can be used.

With regard to the step 1 (distributional analysis), studies of spontaneous speech production (Sera, 1992, and Holtheuer, 2009), show that knowledge of the syntactic distribution of the two copulas is acquired by children quite early. This is not surprising since the copulas are quite frequent in the input. Sera (1992) observes that Spanish-speaking children use *ser* and *estar* in an adult-like fashion before age 4; except in locative constructions with event subjects (i.e., 'the party', 'the meeting') which obligatorily require *ser*. Similarly, Holtheuer (2009) in an analysis of 22 hours of eleven caretaker-child interactions ranging from 1;10 to 3;7 found that adults never use *estar* with NPs and CPs and neither do children. PPs and AdjPs appear with both copulas in the speech of both children and adults; there are just a few cases of overuse of *ser* as an auxiliary of the progressive by children.

The second step in the acquisition of the copulas is to determine a rough interpretation for them. It may be, as suggested by Sera (1992), that children bootstrap the semantics of the copulas by learning something from the types of predicates that they appear with in the input. Noun phrases are event-less and atemporal and appear mostly with *ser*. With respect to adjectives, some adjectives that are derived

from verbs tend to appear with *estar*. This may allow children to establish correlations between temporal properties and *estar*. Another possibility for bootstrapping an interpretation of the copulas is through children's abilities to correlate certain uses of the copula to certain knowledge they may have. Knowledge of typical properties of objects or natural kinds may help to establish that there is a rough connection between temporally unbounded properties and *ser* and temporally bounded properties and *estar*. If this is the case, we might find that children are more likely to treat the copulas differently and perhaps even in complementary distribution when the contrast is between typical and atypical properties. In fact, Holtheuer (2003) showed that children, unlike adults, matched permanent attributes to *ser* significantly more often than they matched temporary attributes to *estar*, although they allowed *estar* to describe inherent and transitory properties (Schmitt, Holtheuer, & Miller, 2004). These studies, using different types of adjectives found that children are more likely to use *ser* with a typical permanent property than with an atypical permanent property (giraffes are tall but not short). In our experiments below, we only use characteristics that are not typical of the species (e.g., fat/thin cats), in order to control for any bias due to world knowledge.

Finally, a third step in the acquisition of *ser* and *estar* is to become proficient in the evaluation of the pragmatic conditions under which each of them can be used. This involves, at least, understanding that the inference of a temporary state can be canceled. As we have seen, the combination of *ser* or *estar* plus open-scale adjectives has an impact on what counts as the set from which the standard degree is determined. The evaluation of *estar* + open-class adjectives may involve the inclusion of previous and future stages of the individual that behaves as the subject of a predication, as the use of *estar* is temporally bound.

Table 1
Distribution of SER and ESTAR tokens in spontaneous speech (Holtheuer, 2009)

		NP	CP	PP	AdjP	Other	Aux	Total
Adults	ser	571	39	146	302	53	0	1111
	estar	0	0	71	283	469	379	1200
Children	ser	160	14	23	85	19	4	305
	estar	0	0	17	54	164	84	299

Schmitt and Miller (2007) examined children's abilities to use context to make decisions between *ser* and *estar* in both an elicitation task using color adjectives and a picture-matching task, using gradable adjectives. They argue that children performed better in the elicitation task because in this task children had to contrast typical inherent colors with atypical inherent properties (a red tongue vs. a green tongue and blue eyes vs. red eyes in a boy, for example). In this task children produced the expected copula more than 80% of the time: *ser* with inherent properties and *estar* with temporary properties. In their picture-matching task, however, the properties in the experimental task were not typical of the species (e.g., fat cats). The task involved a story in which two cats, with a particular set of properties, ate magic beans that caused them to change to the opposite property for a short period of time. The experimental prompt asked which of the two cats was (with *ser* or *estar*) fat, the one that originally was born fat or the one that was born skinny and became fat upon eating the magic beans. In this task the results were much more mixed. Adults selected the subject with the permanent property when they heard a question with *ser*, but children did so only 42% of the time. When the question had *estar*, on the other hand, adults chose the cat with the permanent property only 50% of the time while children chose it 77% of the time. Schmitt and Miller argue that this PMT (as opposed to the elicitation task with typical and atypical colors) was much harder because (i) children could not rely on world knowledge and (ii) children had to determine the exact temporal slice that was relevant to answer the question. There is, however, an alternative explanation for the results, namely that there is a difference between color adjectives and gradable adjectives. However, in Schmitt and Miller, the methodology of the color adjectives experiment (elicitation) and the open-scale adjectives (comprehension) was so different that it is very hard to conclude whether adjective type could be the explanation for the

differences: not only were the adjectives different but the tasks and experimental situations were also different.

In this paper our goal is to determine whether the differences found between the color adjective experiment and the open-scale adjectives experiment in our previous work is due to the adjective-type or to the methodological differences between the experiments. In the general discussion session we will come back to Schmitt and Miller's results.

4. Experiment 1: Open-scale Adjectives Elicitation Task

The goal of Experiment 1 was to examine children's production of *ser* and *estar* with open-scale adjectives in contexts that portray temporary and permanent characteristics of individuals. Importantly, all properties described are not characterizing properties of a species and therefore only contextual information is relevant for the proper copula choice. Our goal was to test whether children treat the copulas as in complementary distribution (H1) or whether children overuse *ser* in production (H2).

4.1. Participants

Twenty-six Chilean Spanish-speaking children (3;10 -7;4, mean age 5;7) and twenty-five Chilean Spanish-speaking adults participated in Experiment 1. This was a between-subjects design. Thirteen children (3;10 - 7;0, mean age 5;6) and eleven adults were tested on the Different Character (DC) Condition and thirteen children (3;10 -7;4, mean age 5;9) and fourteen adults on the Same Character (SC) Condition.

4.2. Methods

An elicited production task was used. Children were presented with a short story about a character or a set of characters (cats, for example) that had specific properties related to size (e.g., they were born fat, or they were born short). Children were asked to describe the original property of the character(s) and also any new properties that they acquired. We examined how often children and adults used either *ser* or *estar* in their description. There were two conditions, the Different Character Condition (DC) and the Same Character Condition (SC). The DC Condition involved describing the properties of two different characters, which should bias speakers toward a *ser* response. The SC Condition involved a story where an individual character swallowed some magic beans and for a short period of time acquired a different size (i.e., he became thin if he was fat before, or short if he was tall before, and vice-versa). This condition should bias speakers toward an *estar* response.

Each condition had 4 trials for the four open-scale adjectives tested (i.e., *gordo* 'fat', *flaco* 'thin', *alto* 'tall', *bajo* 'short). Each trial allowed two opportunities to complete the sentence. Therefore, children had a total of 8 opportunities to produce one of the two copulas. There were also 4 practice trials at the beginning of the experiment that each elicited a copula two times. In the practice trials children described the location of a ball, which should trigger *estar* or they described the color of a house, which should have triggered *ser*. Figure 1 provides one sample trial for the SC Condition and Figure 2 provides one sample trial for the DC Condition. All experimental materials are shown in Appendices A and B.

It should be noted that in the SC Condition, the original property of the cat was made visible by showing not only a change in the character's size, but also a change in the character's clothing (e.g., the character's clothing was torn because he had grown bigger). This decision was made to ensure that upon hearing the experimental prompt, participants were paying attention to the character's change in size and, hence, were more likely to describe stages of the character. Moreover, the experimental prompt in the SC Condition: *Aquí el gato* _____ ('Here, the cat _____.') was used so that there would be as little as possible temporal information in the prompt that might coerce a *ser* response. In other words, a prompt like 'Before/After eating the beans _____' with a temporal adverb is much more consistent with a *ser* response. Nevertheless, even though we have made every effort in our attempt to strongly bias the stories in each condition toward a *ser* or an *estar* response, if the two copulas are not

treated by speakers as if in complementary distribution, then creating a context that only elicits one or the other copula + an adjective would be impossible.
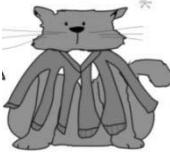

Figure 1. Same Character Condition sample trial: > Biased toward ESTAR responses.

Figure 2. Different Character Condition sample trial: > Biased toward SER responses.

The SC Condition involves different stages of the same cat's life; therefore, we predicted that it would be biased toward eliciting more *estar* responses; however, it is not incompatible with a *ser* response, as the adverb 'here' may allow for coercion (see (2c) above). On the other hand, the DC Condition involves two different cats, so the default should be to use *ser*.

4.3. Results

Due to the nature of the elicitation task, several different types of responses were possible. Each trial allows two opportunities to complete the sentence, which means that children had a total of 8 opportunities to produce one of the two copulas. The first and perhaps most important finding is that in the SC Condition children and adults used both copulas while in the DC Condition only *ser*, and never *estar*, was used.

In the DC Condition there were four response types that we classify as (i) SER+SER (i.e., *ser* was used twice, both in the first and second elicitation in the trial); (ii) SER+Ø (i.e., *ser* was used in the first elicitation and just the adjective (e.g., *gordo* 'fat') was used in the second elicitation of the trial); (iii) Ø+Ø (i.e., only the adjectives with no verb were produced); and (iv) OTHER (i.e., participants produced other constructions without copulas like *salió alto* 'he turned out tall').

In the SC Condition, the same response types were found, but in addition, participants produced (v) ESTAR+ESTAR (i.e., *estar* was used twice, both in the first and second elicitation in the trial); and (vi) ESTAR+0.

Children produced adjectives without any copula or verb (Ø+Ø) 25% of the time in the DC Condition and 17% of the time in the SC Condition, much more often than adults (DC 0%, SC 1%). A few more responses could be classified as 'OTHER' (Children DC 12% and SC 25%, Adults DC 5% and SC 7%). We removed these response types (Ø+Ø and OTHER) from the data so that only the trials where participants produced a copula at least once during the trial were included in the analysis. This decision was made so that we could examine what copula children produced when they decided to use one. In other words, using a copula was not required to complete the task; however, if one was used, we wanted to see which was preferred given the experimental context.

Table 2

Experiment 1: Percentage of SER and ESTAR in DC and SC conditions

	Different Character (DC) Condition				Same Character (SC) Condition			
	Adults		Children		Adults		Children	
	%	N	%	N	%	N	%	N
SER+SER	54	(23/43)	33	(11/33)	57	(29/51)	20	(6/30)
SER+Ø	42	(18/43)	67	(22/33)	18	(9/51)	10	(3/30)
TOTAL SER	**96**	**(41/43)**	**100**	**(33/33)**	**75**	**(38/51)**	**30**	**(9/30)**
ESTAR+ESTAR	2	(1/43)	0	(0/30)	22	(11/51)	37	(11/30)
ESTAR+Ø	0	(0/43)	0	(0/30)	4	(2/51)	13	(5/30)
OTHER+ESTAR	0	(0/43)	0	(0/30)	0	(0/51)	17	(5/30)
Total ESTAR	**2**	**(1/43)**	**0**	**(0/30)**	**24**	**(13/51)**	**70**	**(21/30)**

The most important result is that *estar* was never used in the DC Condition but *ser* was used in both conditions[*]. The proportions of target-like copula responses (*ser* in the DC Condition and *estar* in the SC Condition) were entered into Independent t-tests. The proportions were obtained by taking the number of times participants produced *ser* or *estar* and dividing them by the number of all copula responses produced. In other words, we did not include in the statistic production of other verbs or only adjectives with no copula. The results showed that children behaved significantly differently from adults in their copula choice in the SC Condition ($t(23)=2.943$, $p<.01$) but not in the DC Condition ($t(21)=.372$, $p=.737$).

The results indicate that children are adult-like in the DC Condition, which was biased for *ser,* as both children and adults produced *ser* close to 100% of the time. In SC Condition, which was biased for *estar*, children and adults did not behave the same. Adults were much more willing than children to use *ser* in both contexts (i.e., to describe inherent and transitory properties). In other words, the SC condition did not strongly bias adults for *estar*. However, this was not true for children. Instead, while children produced both *ser* and *estar* in the SC Condition, they showed a strong preference for *estar*. In other words, the SC Condition strongly biased children toward *estar*.

4.4. Discussion

First of all, it is very clear that both children and adults differentiate the SC and the DC conditions. Independent of the choice of copula (clearly different in the two conditions) there are two facts that point to this conclusion. First, there are more OTHER responses in the SC Condition than in the DC conditions. This is expected since, in the situation in which the same cat changes its property, it is possible to describe the change rather than the result state. Second, there is a difference in the numbers associated to SER+Ø in the SC Condition and the DC Condition for both children and adults. This is expected if we consider many of these responses to be cases of gapping. As is well-known,

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[*] An anonymous reviewer points out that the use of *ser*, but not *estar*, in the experimental story may have primed children to produce *ser* more often than *estar*. Given this possibility of priming, our finding that children prefer *estar*, and not *ser*, in the SC condition strongly suggests that children prefer to use *estar* in a context that describes temporal slices of an individual.

gapping is impossible when the subject of the two clauses is the same, as exemplified in (4). In copular constructions the facts are identical as illustrated in (5):

(4) a. John ate an ice-cream and Mary Ø a gelato.
   b. *John$_i$ ate an ice-cream and in addition, he$_i$ Ø a gelato.

(5) a. [This cat]$_i$ is fat and [this cat]$_j$ Ø skinny.
   b. *[Here the cat]$_i$ is fat and here [this cat]$_i$ Ø skinny.

If children and adults treat the contexts differently they should have less gapping in the SC Condition. Independent t-tests show that children (t(24)=2.079, p<.05), but not adults (t(23)=1.563, p=.132), allow gapping in the DC Condition significantly more often than in the SC Condition. While there appears to be a trend for adults to omit the copula more in the DC Condition, the difference is not significant due to the fact that adults omitted the copula overall much less often than children in both conditions. We would like to suggest that the residue of 10% and 18% of SER+Ø for children and adults, respectively, in the SC condition may reflect an experimental artifact. It is not always the case that children and adults treated the second clause as a conjoined clause related to the first. Sometimes a long pause between the two clauses (*here the cat is… and here the cat is…)* allowed the second clause to be treated as an independent statement.

Focusing on the copula choice, both children and adults showed different usage across the two conditions. Neither adults nor children used *estar* in the DC conditions. However, both used *ser* in both the DC and SC conditions. This fact supports Hypotheses 1 and 2: that there is not a perfect complementarity between the two copulas (one copula in one condition and the other copula in the other condition, at least for *ser*, used in both conditions) and that *ser* but not *estar* is 'overused'. This is very clear for adults. Being the transparent copula, it can be used in a context of change with an inchoative reading, induced partially by the presence of the adverb (i.e., *aquí* 'here'), explicit in the experimental prompt. The lack of *estar* in the DC condition suggests, at least for adults, that the context did not satisfy the presupposition that there was not a relevant particular time situation involving the characters that forced the stronger item (*estar*) to be chosen. Children, on the other hand, use *estar* 70% of the time in the SC condition but never in the DC condition. There is therefore a certain complementarity between the two copulas. It is possible that this shows that children prefer the strongest copula rather than other verbs or the transparent copula with an inchoative reading.

5. Experiment 2: Absolute Adjectives Elicitation Task
5.1. Participants

Twenty-seven Chilean Spanish-speaking children (4;5–7;4, mean age 5;6) and thirty-four Chilean Spanish-speaking adults participated in Experiment 2. We used a between-subjects design. Fifteen children (4;8–7;4, mean age 5;5) and thirteen adults were tested on the DC Condition and twelve children (4;5–7;0, mean age 5;8) and fifteen adults on the SC Condition.

5.2. Methods

An elicitation task almost identical to Experiment 1 was used. Because children in Experiment 1 often produced only the adjective (i.e., *gordo* 'fat'), with no verb or copula in many of the trials, we changed the procedures a bit in an attempt to elicit more copulas. At the beginning of Experiment 2 children were introduced to a puppet and were told to speak very clearly to the puppet so that he could learn how to talk better. In this way, we hoped to elicit from children complete sentences that included a verb or copula. As in Experiment 1, there were also 4 practice trials at the beginning of the experiment that were designed to elicit both copulas (e.g., children described the location of a ball with *estar* or they described the size of an animal with *ser*). A sample trial for the SC Condition and the DC Condition is shown in Figure 3 and 4, respectively. In the SC Condition, the temporariness of the change was highlighted by making the original color (e.g., blue) still visible under the new color (e.g., red). In other words, the picture showed a blue ogre with red smudges on him.

¡Mira! Este es el mismo ogro. El ogro tenía el cuerpo azul pero comió unos porotos mágicos y se puso rojo. Descríbeme el ogro. *Look! This is the same ogre. The ogre had a blue body but he ate some magic beans and turned red. Describe the ogre.*		Aquí, el ogro _____. *Here, the ogre _____.* Y aquí, el ogro _____. *And here, the ogre_____.*

Figure 3. Same Character Condition sample trial: > Biased toward ESTAR responses.

¡Mira! Son dos ogros distintos. Este ogro nació azul y este ogro nació rojo. Descríbeme los dos ogros. *Look! These are two different ogres. This ogre was born blue and this ogre was born red. Describe the two ogres.*		Este ogro _____. *This ogre _____.* Y este ogro _____. *And this ogre _____.*

Figure 4. Different Character Condition sample trial: > Biased toward SER responses.

5.3. Results

We wanted participants to talk about colors and not other features (horns, belly, etc.), so we explicitly mentioned the color adjectives in this experiment. Instead of saying *look what happened* (general and vague), we said look *it had a blue body but he ate some magic beans and turned red).*

First of all, the results indicate that the change in procedures for eliciting verbs (speaking clearly for the puppet) was successful, as fewer children produced adjectives alone. In the DC Condition no children produced Ø+Ø responses and there were only 15% (9/60) responses in the category OTHER. In the SC Condition, only 6% (3/48) produced Ø+Ø responses and there were 8% (4/48) responses of the category OTHER. For adults the results showed that in the DC Condition 0% were Ø+Ø responses and 18% (9/52) were responses of the category OTHER. In the SC Condition 13% (8/60) were Ø+Ø and 22% (13/60) were responses of the category OTHER. The data was coded the same way as in Experiment 1. The results are shown in Table 3.

Table 3
Experiment 2: Percentage of SER and ESTAR in DC and SC conditions

| | Different Character (DC) Condition | | | | Same Character (SC) Condition | | | |
| | Adults | | Children | | Adults | | Children | |
	%	N	%	N	%	N	%	N
SER+SER	99	(42/43)	86	(43/50)	54	(21/39)	22	(9/41)
SER+ Ø	1	(1/43)	14	(7/50)	0	(0/39)	5	(2/41)
TOTAL SER	**100**	**(43/43)**	**100**	**(50/50)**	**54**	**(21/39)**	**27**	**(11/41)**
ESTAR+ESTAR	0	(0/43)	0	(0/50)	26	(10/39)	66	(27/41)
ESTAR + Ø	0	(0/43)	0	(0/50)	3	(1/39)	7	(3/41)
Total ESTAR	**0**	**(0/43)**	**0**	**(0/50)**	**28**	**(11/39)**	**73**	**(30/41)**
MIXED COPULAS	0	--	0	--	18	(7/39)	--	--

The most important finding of Experiment 2 is that the results are similar to those of Experiment 1. While adults and children produced *ser* in both the SC and DC Conditions, neither group produced *estar* in the DC Condition. We believe that there were fewer instances of gapping in Experiment 2 because of the change in methodology that asked participants to speak with complete sentences. In any case, the trend continues in the same direction. Only the DC Conditions allow gapping, since, as we discussed before, gapping requires different subjects.

The results of both experiments are also similar in that children are less likely than adults to use *ser* in the SC Condition. The proportion of times that *ser* or *estar* were produced (out of all the copulas produced) was entered into an Independent t-test. The results showed that children behaved significantly differently from adults in their use of *estar* in the SC Condition ($t(23)=2.173$, $p<.05$) but not in the DC Condition ($t(26)= -.334$, $p=.741$).

5.4. Discussion

The results of Experiment 2 support Hypothesis 1 and Hypothesis 2. In the DC condition, children were no different from adults, using mainly *ser*. Moreover, we see only a partial complementarity in the usage of the copulas. In both cases it is *ser* that is used in both conditions, not *estar*. The main difference between children and adults was found in the SC Condition, where in both experiments children produced *estar* significantly more often than adults. Why do we get this difference? And why don't adults always choose *estar*?

There are two possibilities. One possibility is that adults prefer to describe the change and use *ser* predications in an inchoative sense or use other verbs. The second possibility is that adults considered an induced change with a magic bean as creating a frame in which it is not necessary to presuppose a temporal interval in which the situation holds, but that children don't reason in the same way about the situation. Because children are less likely than adults to produce *ser* in the SC Condition it is possible that this finding can be linked to a stage in development where children have difficulty canceling the pragmatic inference of permanence that arises through the use of *ser* (Hypothesis 2). This is interesting in light of recent work by Schmitt and Miller (2007), which indicates that children are more restrictive in their interpretation of *estar* than adults. In a picture matching task, they showed that children, but not adults, associated *estar* more often to a changed attribute (i.e., the property that arose temporarily after eating a magic bean) than to the original property of the character, even though choosing both properties was appropriate and was what adults did (i.e., the original and the changed property both represent temporal slices of the same individual). This suggests that for children, only *ser*, but not *estar*, can be used to describe non-temporally anchored permanent properties (i.e., the original and final property of the character in the experiment). Again, caution must be taken as the methodology used in Schmitt and Miller (2007) was different from the one used in the present study.

When we compare both experiments we do not find any substantial differences between adjective types. As noted above, the choice between *ser* and *estar* affects what can or cannot become part of the evaluation set from which the standard degree is determined. When we say that a cat *ser* fat (with a

generic interpretation), the comparison set involves other cats or other fat creatures in the context. If we use *estar,* the set from which the standard degree is determined can (but does not need to) include temporal slices of the same individual; in other words, it is not necessary to inspect any other individuals, but only stages of the same individual. Previous work has shown that children are able to set and reset the standard of comparison when the experimental display changes in various ways (Barner & Snedeker, 2008). We asked whether children would also be able to generate a standard of comparison that involved temporal slices of the same individual. By comparing children's use of *ser* and *estar* with open-scale adjectives, we were able to determine that *estar + predication* was *not* more difficult for children. However, we must be cautious in our interpretation of this result because in both the SC and DC conditions our experimental displays provided the comparison set for children. Finally, the present studies suggest that the differences found for color v. open-scale adjectives in Schmitt and Miller's (2007) elicitation task was related to differences in methodology between the two experiments.

6. Conclusion

Our results showed that neither children nor adults treat *ser* and *estar* as in complementary distribution. In the SC Condition both *ser* and *estar* were used by children and adults; however, there is no evidence of participants using *estar* when it is not needed (i.e., in the DC condition), suggesting that children are aware that it has a stronger meaning. By five years of age, it appears that children have the pragmatic properties of the copulas, at least in the elicitation tasks we presented here. In any case, we believe that the experiments we presented here open several avenues for future investigation, particularly research related to how different adjectives in combination with *ser* and *estar* determine the comparison set from which the standard degree is obtained, which, we believe, will require more fine-grained online measurements.

Appendices
Appendix A. Experiment 1 Trials (Scalar Adjectives)

Different Character Condition (biased toward *ser*)

1. Este gato_____ y este gato_____(flaco, gordo)
   'This cat _____ and this cat _____' (skinny, fat)

2. Este hombre _____ y este hombre _____ (bajo, alto)
   'This man _____ and this man _____' (short, tall)

3. Esta mujer _____ y esta mujer _____ (baja, alta)
   'This woman _____ and this woman _____' (short, tall)

4. Este perro _____ y este perro _____ (flaco, gordo)
   'This dog _____ and this dog _____' (skinny, fat)

Same Character Condition (biased toward *estar*)

1. Aquí el gato_____ y aquí el gato_____(flaco, gordo)
   'Here the cat _____ and here the cat _____' (skinny, fat)

2. Aquí el hombre_____y aquí el hombre_____(bajo, alto)
   'Here the man _____ and here the man _____' (short, tall)

3. Aquí la mujer _____ y aquí la mujer _____ (baja, alta)
   'Here the woman _____ and here the woman _____' (short, tall)

4. Aquí el perro _____ y aquí el perro _____ (flaco, gordo)
   'Here the dog _____ and here the dog _____' (skinny, fat)

Appendix B. Experiment 2 Trials (Color Adjectives)

Different Character Condition (biased toward *ser*)

1. Este ogro _____ y este ogro_____ (rojo, azul)
   'This ogre _____ and this ogre _____' (red, blue)

2. Este gato_____y este gato_____(amarillo, verde)
   'This cat _____ and this cat _____' (yellow, green)

3. Este perro_____y este perro_____(blanco, negro)
   'This dog _____ and this dog _____' (white, black)

4. Esta oveja_____y esta oveja_____(rosada, café)
   'This sheep _____ and this sheep _____' (pink, brown)

Same Character Condition (biased toward *estar*)

1. Aquí el ogro_____ y aquí el ogro_____(rojo, azul)
   'Here the ogre _____ and here the ogre _____' (red, blue)

2. Aquí el gato_____y aquí el gato_____(amarillo, verde)
   'Here the cat _____ and here the cat _____' (yellow, green)

3. Aquí el perro_____y aquí el perro_____(blanco, negro)
   'Here the dog _____ and here the dog _____' (white, black)

4. Aquí la oveja_____y aquí la oveja _____(rosada, café)
   'Here the sheep _____ and here the sheep _____' (pink, brown)

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