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Adjective Learning by Spanish-Speakers Children and Adults. The Impact of Morphology and Semantic Information

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ABSTRACT

The purpose of this research was to explore the kind of information Spanish-speaking 3-year-old children and adults use when learning adjectives in a joint picturebook reading situation. The impact of two linguistic clues was studied; a morphological clue (adjective suffix) and a semantic clue (descriptive information concerning the property). Results show that for children the description was decisive to map the new adjective with the property; for adults, instead, the presence of the suffix was crucial. These results illustrate a developmental shift in the sort of clues that shapes adjective learning.

Humans around the world learn different kinds of words naturally and easily. Also, in many cultures joint picturebook reading functions as a format or routine in which children learn words as well (Bruner, 1983).

In the present research we explored adjective learning by Spanish speakers in a context of a joint picturebook reading situation. We investigated the impact of linguistic clues in the mapping of a novel visual adjective with an object property. Specifically, we focused in two clues; adjective morphology (a suffix) and/or semantic information (descriptive information about the property). We focused on learners with different levels of proficiency, those who are in the process of acquiring their first language (young children) and those who are experienced native speakers (adults).

Learning words implies a construction of complex meanings which requires a detection of the central features of a concept (e.g., Waxman & Goswami, 2012; Waxman & Lidz, 2006). When children learn words, they are guided by a combination of expectations and a variety of linguistic and social cues that work simultaneously to map words with referents.

Expectations allow exclude potential referents and allow children learn words guided by a set of biases; like the shape, whole-object, taxonomical, and mutual-exclusively biases. The shape-bias is the propensity to generalize a word by salient perceptual information (e.g., Gasser & Smith, 1998; Jones & Smith, 1993; Smith, 2000; Yee, Jones, & Smith, 2012). The whole-object bias is the tendency to assume that a new word refers to a complete object, interpreting the word as a noun (e.g., Hall & Lavin, 2004; Markman, 1990, 1992; Markman & Jaswal, 2004).The taxonomical bias helps to extend a new word into the same object category (e.g., Markman, 1990, 1992; Waxman, 1991; Waxman & Gelman, 1986; Waxman & Kosowski, 1990). The mutual exclusively bias implies the trend to apply only one name to a category object, enabling to acquire terms other

than object labels (Markman, 1990, 1992). All together, these biases somehow induce children to treat novel terms as labels for whole objects and category exemplars.

Linguistic cues have been shown to be crucial in early word learning. For example, studies on children learning English showed that marking nouns with articles "He wants the/a X" or "This is a __", provides a syntactic structure that indicates that the word is a noun (Gleitman, 1990; Weisleder & Waxman, 2010). Smith and colleagues (e.g., Smith, Jones, & Landau, 1992; Yoshiba & Smith, 2005) proposed that syntax could boost the links between perceptual cues and category structure.

As far as early word learning, research has revealed that children learn nouns more easily than other more relational terms, such as adjectives (e.g., Booth & Waxman, 2009; Gasser & Smith, 1998; Waxman & Booth, 2001, 2003). When learning an adjective one has to detect its central feature; the central feature/s of an adjective is a property. The possibility to apply the same adjective to completely different kind of referents with the same property makes adjective learning difficult for young children (Hall & Lavin, 2004; Klibanoff & Waxman, 2000; Markman & Jaswal, 2004), and even for adults (Allopenna, Magnuson, & Tenenhaus, 1998; Half, Ortony, & Anderson, 1976; Medin & Shoben, 1988; Pechmann & Deutsch, 1982). Cross-linguistic evidence confirms this claim showing that while the acquisition of nouns seems to be similar across languages (e.g., Gentner, 1982; Gleitman, 1990; Grimshaw, 1994), the mapping between adjectives and properties vary across languages (e.g., Gentner, 1982; Imai & Gentner, 1997; Talmy, 1985; Waxman, Senghas, & Benveniste, 1997; Yoshiba & Smith, 2005).

In this sense, and quite relevant to the present research, a pioneer cross-linguistic study (Waxman et al., 1997) showed that while English-French- and Spanish speaking young children mapped nouns to object-categories, only the Spanish-speaking children treated adjectives as nouns also. The results were interpreted in the frame of the shaping role of the properties of the particular language under acquisition. The structure of the syntax is a language property that helps children to map adjectives to meanings (Smith et al., 1992). The common English structure "This is a__one" denotes that the word is an adjective (see, Mintz & Gleitman, 2002). This kind of structure is less common in Spanish, a language in which adjectives and nouns can share similar syntactic structures. For example, det-A constructions (e.g., *una roja, un azul* [a red one, a blue one]) permit adjectives to have syntactic structures similar to nouns. These ambiguous structures may explain why in some cases it is difficult for Spanish speaking children distinguish adjectives from nouns (Waxman et al., 1997).

Another linguistic clue that helps to differentiate an adjective from a noun is morphology. In this regard, the presence of a suffix has been recognized as an important source of information in learning adjectives in English (e.g., Hall, Waxman, & Hurwitz, 1993; Waxman & Kosowski, 1990). In Spanish, there are lots of suffixes for constructing adjectives, like oso/a, ado/a, ante, able. Faitelson-Weiser (1993) analyzed 16 Spanish dictionaries and other written productions to detect different Spanish adjective suffixes and how they are used. She found 125 kind of suffix used, being AD- (*ado, ada*) one of the most frequent. Also, as in other languages, in Spanish there are many adjectives without a suffix like *rojo, fino, frío, amargo* (red, thin, could, bitter). To the best of our knowledge, the impact of the presence of a suffix when learning adjectives in Spanish has not been yet systematically studied.

Semantic information also constitutes a clue that supports word learning. For example, Arunachalam and Waxman (2011) explored the impact on toddlers' verb learning of the semantic richness provided in an interaction. They found that a rich semantic information helped toddlers to "zoom in" on the important aspect of the scene that they had to link with the new verb.

Rich semantic information may also highlight the property of an adjective. The impact of semantic clues on adjective learning has been addressed (e.g., Hall, 1994; Hall et al., 1993). However, little attention has been paid specifically to how the semantic information provided in an interaction can help adjective learning (Graham, Welder, & McCrimmon, 2003).

In sum, in order to learn the meaning of an adjective a learner may rely on a variety of linguistic information. In this work, we focus on two linguistic clues: morphology and semantic information. The morphology involved the presence or absence of a suffix. The semantic information consisted in a description of the central features of a visual property. Our question was if Spanish-speaking 3-year-old children and adults use these clues when learning a new adjective in the frame of a picturebook reading situation.

The present work In this research we studied adjective learning by children (Study 1) as well as by adults (Study 2). Studying children and adults may shed light into the clues that might support adjective learning at different points in development.

We chose the word *pompe* from the Test de Lectura y Escritura en Español LEE [Spanish Reading and Writing Test] (Defior Citoler et al., 2006) in order to use it as an adjective. *Pompe* is a nonexistent word, that is, it is not in the dictionary of *La Real Academia Española* [Spanish Royal Academy] (2012). However, its phonological structure is similar to Spanish words. We constructed another adjective, *pompeado*, using the word *pompe* and adding the suffix *ado*. The suffix *ado* denotes that the word is an adjective; this suffix is one of the most common in Spanish (Faitelson-Weiser, 1993). The new adjectives were introduced within Spanish grammatical structures.

We adapted the task used by Ganea to teach nouns in a picturebook reading situation (Ganea, Bloom Pickard, & DeLoache, 2008; Ganea, Allen, Butler, Carey, & DeLoache, 2009). In this task a new noun is linked with a new object depicted in the book. In our research we taught adjectives applied to a salient visual property, a pattern. We also examined the extension of the new adjectives learned via pictures to new exemplars and to three-dimensional objects. We presented the new adjectives in a typical Spanish det-A syntactic construction.

We tested two variables: 1) the morphology of the adjective (suffix/no-suffix); 2) the semantic information provided concerning the central features of the visual property (description/no-description). In consequence, we taught the new adjectives in three conditions: 1- *Description with a suffix*, 2- *No description with a suffix* and 3- *Description without a suffix.*

We hypothesized that in order to learn an adjective and apply it to other objects bearing the same property: 1- Children need both, the description of the property and the presence of the suffix; 2- Adults learn the adjective in the three conditions.

Study 1: children

Methodo

Participants

Fifty-one children were randomly assigned to one of three conditions: *No description with a suffix* (17 children, 8 girls, 9 boys, age range 35 to 37 months, $M = 35.82$); *Description with a suffix* (17 children, 8 girls, 9 boys, age range 35 to 37 months, $M = 36.35$) and *Description without a suffix* (17 children, 9 girls, 8 boys, range 35 to 37 months, $M = 36.06$). Children were recruited from different preschools from a large city in Argentina. All participants came from middle-class Spanish-speaking families.

Materials

Book

We constructed a heavy cardboard book with seven pages presenting 14 photographs (11 x 11 cm), two per page. We used six photographs of objects with conventional properties (a yellow duck, a furry bear, a colorful rainbow, a crumpled paper, a round ball, and a cloudy sky) and eight photographs of objects bearing non- conventional properties; dotted and striped (four of a
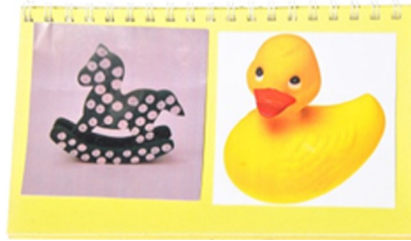
Figure 1. Examples of a book page showing a picture of an object with non-conventional property and an object with a conventional property.

dotted horse and four of a striped train). For one group of children dotted (applied on the horse) was the target property and striped (applied on the train) functioned as a distractor property. In the other group striped was the target property and dotted was the distractor one (Figure 1).

The first six pages of the book showed one photograph of an object with a conventional property and one of an object with a non-conventional property. The last page showed two pictures of objects with the non-conventional properties. The objects with non-conventional properties appeared equally often on the left or right side of the book. The book had the format of an album, so pictures could be removed and placed in different folders so as to counterbalance the presentation of the stimuli.

Objects

We used the two real objects with non-conventional properties that appeared in the book (dotted horse and a striped train) and two additional objects bearing the same properties (a dotted flower and a striped dress) (Figure 2).

Procedure

We tested the participants individually. The sessions took place in a quiet room of the preschools the children attended; the sessions lasted approximately 15 minutes. We used a puppet in order to make the interaction more attractive for the children. First, the experimenter showed the puppet saying: *Este es Jack, le gusta tomar fotografías de todos sus juguetes; hizo un libro lleno de fotos, ¿lo vemos?* [This is Jack, he loves taking photographs of all his toys. He made a book full of pictures, shall we see it?]

The entire procedure for the three conditions consisted of three phases; book reading, training, and test.

Book reading

The new adjective was taught in a picturebook reading interaction. Below we describe the procedures by condition.

- *No description with a suffix*: The experimenter pointed to and named the target property in each appearance three times without giving information about the property (e.g., *Este caballo/tren es pompeado; mira, Jack dice que este es pompeado; ¿ves este caballo pompeado*? [This horse/train is pompeado; look, Jack says that it is pompeado; can you see this pompeado horse?]). All the conventional properties applied to the different objects appeared only one time each and were named once (e.g., *Mira, este arcoíris es colorido* [See, this is a colorful rainbow]). The experimenter referred to the objects with the distractor property but without labeling it (e.g.,: *Mira esto; esto es de Jack también; ¿ves esto?* [Look at this; this is Jack's too; can you see it?]).

- *Description with a suffix*: The experimenter pointed to the pictures naming them and describing the target properties (e.g., *Este caballo/tren es pompeado, es pompeado porque tiene todos estos*

Figure 2. Objects used in the test phase.

dibujos. ¿Lo ves? Jack dice que este caballo/tren es pompeado [This horse/train is pompeado, it is pompeado because it has all these little drawings. Can you see it? Jack says that this horse/train is pompeado]). The experimenter repeated this procedure with the objects with conventional properties (e.g., *Mira, este es un arcoíris colorido; es colorido porque tiene muchos colores* [Look, this is a colorful rainbow; it is colorful because it is full of colors]). She also described the non-target property but without labeling it (e.g., *Mira esto! este tiene todos estos dibujos, ¿lo ves?* [Look at this! it has all this little drawing; can you see it?]).

   - *Description without a suffix*: The experimenter showed the book and described the properties that appeared but using the word *pompe* instead of *pompeado* (e.g., *Este caballo/tren es pompe, es pompe porque tiene todos estos dibujitos. ¿Lo ves? Jack dice que este caballo/tren es pompe* [This horse/train is pompe, it is pompe because it has all these little drawings. Can you see it? Jack said that this horse/train is pompe]).

Training

The purpose of this phase was to familiarize participants with the kind of questions that were going to be asked in the test. The experimenter showed the participants two pictures of objects with conventional properties and asked participants to indicate the one with the conventional property. For example, while showing a page with a yellow duck and a furry bear, the experimenter asked: *¿Cuál es amarillo?* [Which is the yellow one?]. Children had to choose between the two pictures.

Test

The experimenter introduced the test to the child saying: *Jack quiere mostrarte otras cosas* [Jack wants to show you more things]. Then, the participant performed two successive trials (see Figure 3). In each trial the experimenter always asked the same question while showing two items and asking the participant to indicate one:

   - *Description with suffix and No-description with suffix conditions.¿Cuál es pompeado?* [Which is the *pompeado* one?].
   - *Description without suffix condition. Cuál es pompe?* [Which is the *pompe* one?].

   Notice that the structure of the last question is more ambiguous in Spanish than in English. In Spanish, it is very frequent to introduce an adjective without a pronoun.

   The two successive trials were (see Figure 3):

a. *Symbolic comprehension.* Object with the target property versus object with a distractor property, the objects were identical to the ones that appeared depicted in the book. This trial assessed if participants applied the new adjective to the target property.
b. *Extension.* Object with the target property versus object with a distractor property. This trial evaluated the extension of the adjective to a new exemplar with the target property.

	Target property dotted	Target property striped
Symbolic comprehension		
Extension		

Figure 3. Examples of the items used in each one of the tests by experimental order.

Participants' responses were recorded manually by the experimenter. To record the data we followed the criteria for intentional responses used by Ganea et al. (2009) considering only pointing to or grabbing the chosen object.

Data analysis

We analyzed participants' responses in two steps. First, we contrasted the responses against chance in each condition (*Chi Square*). Then, we compared the performance by condition using *Fisher's exact test*, contrasting two groups at a time.

Results and discussion

Symbolic comprehension

We analyzed children's responses against chance in each condition. No description with suffix ($X^2(1, N = 17) = 13.23, p < .01$); Description with suffix ($X^2(1, N = 17) = 9.94, p < .01$); Description without suffix ($X^2(1, N = 17) = 9.94, p < .01$).

Most children chose the object with the target property in all conditions (Table 1). These results show that children learned the new word and connected it to the real object with the property. The data indicate that children understood pictures in a referential way.

However, it is possible to argue that children may have connected the word with the whole object (horse or train) and not with the property (stripes or dots). Therefore, we considered that the link between the word *pompeado/pompe* and the real object in this test did not necessarily mean that children have actually detected the specific referent: the property. In order to make sure that children mapped the adjective with the object property, we asked children to extend the word to another *pompeado/pompe* object.

Extension

First, we analyzed children's performances in the three conditions. Then, we compared choices by condition, two conditions at a time.

In the *No description with suffix* condition only 3 children selected the new object with the target property, while most chose the object with the distractor property, choice that was above chance level ($X^2(1, N = 17) = 7.11, p < .01$) (Table 2). This result shows an association of the word with an object that appeared in the book, but not with the property.

That is, participants did not extend the adjective, *pompeado*, to a new exemplar. Remember that in this condition, the experimenter while reading the picturebook said: *Este caballo es pompeado* [*This hourse is pompeado*] and then, in the test, asked: ¿Cuál es *pompeado*? [*Which is the*

Table 1. Percentage of children's choices on the symbolic comprehension test by condition.

	Target property	Distractor property
No-descriptive information with a suffix	84%*	16%
Descriptive information with a suffix	88%*	12%
Descriptive information without a suffix	88%*	12%

*Choice above chance (p > .01).

Table 2. Percentage of children's choices on extension test by condition.

	Target property	Distractor property
Non-descriptive information with a suffix	18%	82%*
Descriptive information with a suffix	88%*	12%
Descriptive information without a suffix	76%**	24%

*Above chance (p > .01).
**Above chance (p > .05).

pompeado one?]. Learning the adjective in these circumstances was rather difficult. The syntactic structure of Spanish phrases did not help when participants had to extend the adjective to different object categories (clothing, animals, vehicles, and plants). The structure of the question did not help either.

In the *Description with a suffix* condition, most children chose the object with the target property; that choice was above chance ($X^2(1, N = 17) = 9.94, p < .01$) (see Table 2). As far as the *Description without suffix* condition, children extended the new adjective *pompe* to another object with the same property, the performance was also above chance level ($X^2 (1, N = 17) = .50, p < .05$). The absence of the suffix had no effect in children´s performance and they linked the adjective with the property, as long as they had the description of the property. These results show that descriptive information seems to be crucial for children.

Comparing children´s performance between conditions, we found significant differences between the *No-description with a suffix* and *Description with suffix* conditions (*Fisher's exact test*, $p < .01$); the *phi coefficient* revealed a strong and negative association (-765, $p < .01$). No significant differences were found between *Description with a suffix* and *Description without a suffix* conditions (*Fisher's exact test*, $p > .05$). These results once again clearly show that as long as the child received the descriptive information, the morphology of the word did not have an impact on adjective learning.

The semantic information appeared to be decisive for children to map a word presented as an adjective with an object property. The description of the property helped children identify the regularities between two very different entities when the only thing in common was the pattern. Notice that participants even extended this adjective across superordinate levels (clothing, animals, vehicles, and plants). The extension of an adjective beyond a basic category level has been described as a real challenge for young children (Hall & Lavin, 2004; Klibanoff & Waxman, 2000; Markman & Jaswal, 2004).

In sum, Study 1 showed that children did not extend the adjective *pompeado* to another object when they lacked the description of the property. In fact, they linked the word *pompeado* to an object category instead to an object property probably assuming that the word referred to the whole object and, thus, to a object category. Some anecdotal data may support this interpretation. For example, when extending the word *pompeado* to a dotted flower, one participant exclaimed: ¡*Esto no es un pompeado*! ¡*Es una flor*! [¡This is not a *pompeado*! ¡It's a flower!]. Notice that in the child's sentence, the word *pompeado* is in a noun position. According to mutual exclusivity bias, an object category can only have one name, so if it is a *flor* it cannot be a *pompeado* at the same time. It also shows that it was the word *flor*, but not *pompeado*, what activated the mutual exclusivity bias. These results are in line with research that showed that little children first assume that a new word is a noun instead of another kind of word, like an adjective or a verb (e.g., Hall

& Lavin, 2004; Markman, 1990; Markman & Hutchinson, 1984; Waxman, 1990, 1991; Waxman & Gelman, 1986; Waxman & Kosowski, 1990).

Study 2: adults

As adults are proficient speakers of their first language and they are used to learn words in different contexts, our hypothesis was that adults learn the adjective in the three conditions: *No description with a suffix, Description with a suffix* and *Description without a suffix.*

Method

Participants

Fifty-one middle-SES Spanish-speaking adults participated. All participants had university education, either complete or in progress. They were randomly assigned to one of three conditions: a) *No description with a suffix* (17 adults, 9 female, 8 male, age range 20 to 44-year-olds, $M = 25.35$), b) *Description with a suffix* (17 adults, 8 female, 9 male, age range 20 to 37 year-olds, $M = 26$), and c) *Description without suffix* (17 adults, 8 female, 9 male, range 20 to 42 year-olds, $M = 36.06$).

Materials

We employed the same materials as in Study 1.

Procedures

We replicated the procedure of Study 1 with some modifications that are described below.

Book reading. We did not use a puppet in the interaction but we highlighted the experimenter´s intention saying: *Voy a mostrarte un libro de imágenes que contiene fotos que tomé especialmente para este estudio* [I will show you a picture book which contains some photos that I took especially for this study].

Training. The training was similar as the one of Study 1, except that we started saying: *Voy a mostrarte algunos objetos y algunas imágenes y voy a hacerte algunas preguntas* [I'm going to show you some objects and pictures and I'm going to ask you some questions].

Test. The procedure was identical as the one of Study 1, but the experimenter said: *Voy a mostrarte otras cosas* [I'm going to show you more things].

Data analysis

We analyzed the data in the same way as in Study 1.

Results and discussion

Symbolic comprehension

All adults in all conditions chose the target over the distractor property: *No description information with a suffix, Description with a suffix* and *Description without suffix*. These findings show that participants learned the new word in all conditions. However, as in the previous study, the

Table 3. Percentage of adults' choice on the extension test by condition.

	Target property	No choice
Non-descriptive information with a suffix	94%*	6%
Descriptive information with a suffix	100%	0%
Descriptive information without a suffix	65%	35%

*Above chance (p > .01).

results may reflect a link between the word and the object category instead of the word and the property.

Extension

In the *No descriptive information with a suffix* condition, most adults selected the *pompeado* object; the performance was above chance level ($X^2(1, N = 17) = 13.23, p < .01$). Adults extended the new word with the suffix and no description (Table 3).

As far as the *Description with a suffix* condition; when the experimenter gave semantic and morphological information all adults chose the *pompeado* object.

In the *Description without a suffix* condition, some adults did not extend the word *pompe* to another object bearing the same property, probably due to the lack of the suffix and the ambiguity of the syntax of the Spanish sentence: *Este caballo es pompe* [This horse is *pompe*]. The performance was under chance level ($X^2 (2, N = 17) = 3.64, p > .05$). In the syntactic construction of the phrase used, the word *pompe* may refer to an object property or to a category, even to a proper name. The results found may reflect that adults have fixed expectations about word morphology. In fact, the adults that did not choose the object with the distractor property, did not choose at all. When the experimenter asked adults to select a *pompe* object they said: *Ninguno, el caballo es pompe* [None, the horse is *pompe*].

Observing participants' choices, we noticed that the participants that did not extend the adjective to the new exemplar with the property, they did not do so when *pompe* was related to the horse. We did not test this observation systematically but some anecdotal data made us conjecture that the adults apparently interpreted the word *pompe* as the proper name of the horse, not as an object or property. For example, one adult said: *Pompe es un caballo, un caballo en particular, como Ico* [*Pompe* is the horse, a particular horse, like Ico] (Ico is a character of a famous Argentinian animated movie). In contrast, all participants who learned the adjective *pompe* applied to the train extended the adjective to a new object bearing the same property. May be adults use their previous knowledge about the world to support adjective learning. While it is probable that horses have proper names, it is not so common that trains have.

As far as differences between conditions, we found significant differences in adult's performance between the *Description with a suffix* and the *Description without suffix* conditions (*Fisher's exact test*, $p < .05$), the *phi coefficient* revealed a strong and negative association (-.765, $p < .01$). In contrast, we did not find significant differences between *Description with a suffix* and *No description with a suffix* conditions, showing once again that as long as they have the morphological information adults interpreted the new word as an adjective.

The results of this study reveal that adults strongly relied on morphology when learning an adjective. If the syntax is ambiguous and morphology gives no information, learning the new adjective becomes complicated for adults.

General discussion

The goal of this work was to explore the impact of morphology and semantic information when young children and adults learn an adjective in a picturebook situation. We reached three main conclusions: 1) To learn an adjective children used the semantic information provided, that is, a

description of the features that are central to define the property underlying the novel adjective; 2) As long as they have the description of the property, children were not affected by the morphology (presence or absence of the suffix) as adults were; 3) In contrast, the morphology, but not the semantic information, was decisive for adults.

Our results show that children needed a rich semantic framework consisting in the description of the central property (the pattern) to make the adjective-property connection (Study 1). These findings are in line with studies on verb learning that showed the importance of the semantic framework (e.g., Arunachalam & Waxman, 2011). The semantic clue was so powerful that children also learned the adjective without the suffix. These results did not support our hypothesis that predicted that children need both, semantic and morphology, to learn an adjective . That is, children needed only the description in order to learn the new adjective, but not a combination of the description and the suffix.

The description allowed children to connect the visual property with the adjective and extend the adjective to other exemplars, not only of the same category but of different categories as well. Children extended the word *pompeado* from a horse: animal, to a flower: plant; and from a train: means of transportation, to a dress: clothing. It is well known that it is hard for young children; and in some cases, for adults as well, to extend an adjective beyond basic level categories (e.g.,; Allopenna et al., 1998; Half et al., 1976; Hall & Lavin, 2004; Klibanoff & Waxman, 2000; Markman & Jaswal, 2004).

In this sense, extensions worked probably due to efficient connections between categories and words (e.g., Waxman & Gelman, 2009; Waxman & Lidz, 2006). It seems that the semantic information provided helped children not only to block the whole object bias but also to overcome the taxonomic assumption. As it has been proposed, linguistic expectations are effective cognitive mechanisms in early word learning (e.g., Markman, 1990; Waxman & Klibanoff, 2000), but they are not fixed, they are regulated by the information given in social context (e.g., Bloom, 2000; Nelson, 1996; Waxman, 1991).

The description of the property helped children construct a concept based on the perceptual features observed. In line with Arunachalam and Waxman (2011) interpretation concerning verbs, we think that the semantic information helped children to "zoom in" on the aspects of the object that they had to link with the new adjective.

In contrast, only with the suffix but with no description, children linked the word with the whole object that they have seen during the interaction. So, when this specific object did not appear in the extension test, as children saw a different *pompeado* object, they choose the distractor. They did not extend the adjective to a new exemplar bearing the property because they did not map the word to an object property but to an object category.

Thus, it seems that the suffix was not helpful for children, may be due to the ambiguity of the particular syntactic context in which it was presented, which probably hampered the link between the adjective and the property. We told the children: Esto es *pompeado* [This is *pompeado*] with no pronoun; in this syntactic context *pompeado* could either be an adjective or a noun.

On the other hand, the description of the property underlying the novel adjective was not necessary for adults. They learned the new adjective, *pompeado*, with or without this information as long as they had the morph-linguistic clue: the suffix *ado*. Also, as the syntax of the phrase was ambiguous, the morphology became crucial. It seems that Spanish-speaking adults supported their adjective interpretations more on linguistic expectations than on the semantic information given. As adjectives in Spanish are usually presented in ambiguous contexts, speakers may take advantage of clues like morphology in order to interpret a new word. This finding challenged our second hypothesis that predicted that adults learn the adjective with or without morphological or semantic information.

It is surprising that under some conditions adults were less efficient in adjective learning than children. Undoubtedly, more research is needed to build a stronger conclusion, probably making

a direct comparison and using tasks more natural for adults than a book reading interaction, a context more familiar for children.

It is possible that adults failed because they tried to integrate the linguistic information (adjective morphology and syntax) with their previous knowledge about the world (e.g., characteristics of animals and non-animate entities). In this sense the anecdotal observations concerning *pompe* as a property of the horse seemed to show that the adults neither connected the adjective with the property nor assumed that the word was a noun; instead, they interpreted *pompe* as the name of the horse. It seems that the lack of suffix did not activate the whole object or the taxonomic bias, as it was when children lacked semantic information.

Our findings show that, at least under some circumstances, proficiency is not an advantage in word learning. Adults focused on linguistic expectations, when these expectations were not enough or did not work, adjective learning became difficult. Children, on the other hand, not being proficient in their language probably had fewer linguistic expectations and used more efficiently the semantic information provided.

The question concerning when Spanish-speaking children start to have more rigid expectation and use clues like morphology can be addressed by developmental studies exploring adjective learning at different points in development. Also, since languages vary in the way words encode meanings; cross-linguistic studies involving languages with different levels of morphological complexity may contribute to explore whether and how children and adults use morphological information when they learn words. A recent naturalistic work suggests that the semantically richer the language, the faster the words are learnt (Xanthos et al., 2011).

In the present research we did not control if children knew the words typically applied to the properties studied. Perry and Saffran (2017) showed that children's vocabulary have an impact in learning adjectives denoting conventional and non-conventional properties. However, we can reasonably assume that adults knew the words that are applied to striped or dotted, and it did not seem to make any difference.

The results found open new questions for future research. The descriptive information could also help children learn other kind of adjectives, not only the ones that refer to a visual property; like adjectives referring to a texture, or denoting not observable attributes. Previous research showed that the adjective learning process is different when adjective referred to visual or not visual properties (Hall, Williams, & Bélanger, 2010). A naturalistic approach could also help reveal the strategies that parents, caregivers or teachers use when introducing new adjectives in interactions with children.

Finally, it is well known that additional information can help children determine that the word in question refers to a property of an object or to an object itself. For example, children may take advantage of available social and pragmatic support to map words with concepts (see, Clark & Wong, 2002), including speaker's eye-gaze (Baldwin, 1991; Booth, McGregor, & Rohlfing, 2008; Tomasello, 2001), emotional expression (Tomasello & Barton, 1994); object-directed (e.g., Booth et al., 2008); or pointing actions (e.g., Hall et al., 2010; O'Neill, Topolovec, & Stern-Cavalcante, 2002). Future studies could test how these kinds of variables interact with morphology and semantic information in children and adults adjective learning.

The present research illustrates that children, as well as adults, are active learners that use different clues to learn a new adjective showing that word learning is a dynamic, complex, and non-linear process.

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