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Knowledge of Adjective Reference by Monolingual Spanish- and English-Speaking Children

Martha Elizabeth Rayas Tanaka

The University of Texas at El Paso, merayas@miners.utep.edu

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Abstract/Resumen

Previous studies (Waxman, Senghas and Benveniste, 1997 and Waxman and Guasti 2009) have concluded that there are crosslinguistic differences in the interpretation of adjectives by English, French, Spanish and Italian- monolingual speaking children. Their results show that only Spanish and Italian-speaking children categorized a novel adjective as an object responding in the same way for the categorization of a noun. According to the authors this is due to the Determiner-Adjective syntactic constructions in these languages that refer to the named objects or entities and to other members of that object category (e.g. *los pobres*). The present study looks more precisely at the interpretation of adjectives by presenting a task in which children had to recognize adjectives as properties of objects and it explores the role of syntax and morphology as informative linguistic sources for their acquisition by using four different linguistic contexts. The results show that English- and Spanish- monolingual speaking children do understand that adjectives refer to properties and not to objects responding in a different way for a categorization of an adjective.

Estudios anteriores (Waxman, Senghas and Benveniste, 1997 and Waxman and Guasti 2009) han concluido que existen diferencias croslingüísticas en la interpretación de los adjetivos por parte de los niños monolingües que hablan inglés, francés, español e italiano. Sus resultados muestran que solamente los niños que hablan español e italiano categorizan un adjetivo nuevo como un objeto respondiendo igual que a la categorización de un sustantivo. Los autores explican que esto se debe a las construcciones sintácticas de Artículo-Adjetivo en las lenguas mencionadas que se refieren a los objetos o entidades nombrados y a otros miembros de la categoría del objeto, por ejemplo: *los pobres*. El presente estudio analiza más precisamente la interpretación de los adjetivos presentando una tarea en el que el niño tiene que reconocer a los adjetivos como propiedades de objetos y explora el papel de la sintaxis y la morfología como recursos informativos lingüísticos para la adquisición de los adjetivos utilizando cuatro diferentes contextos lingüísticos. Los resultados muestran que los niños hablantes monolingües de inglés y español entienden que los adjetivos se refieren a las propiedades y no a los objetos respondiendo en forma diferente sobre la categorización de un adjetivo.

Keywords/Palabras clave

language acquisition, adjectives, linguistic cues, crosslinguistic differences. adquisición del lenguaje, adjetivos, señales lingüísticas, diferencias croslingüísticas.

Introduction

This study focuses on the development of conceptual and grammatical relations of the lexicon in English and Spanish-speaking monolingual children, more specifically, on the acquisition of the reference of adjectives. Quine's "Gavagai Problem" explains that there is a problem of reference when learning the meaning of a word because a word may refer to a number of referents such as parts or features that are part of the context of the visual space when hearing a new word. Consider the famous example to explain this problem: A native speaker of a different language exclaims "Gavagai" when looking at a rabbit hopping around in the green grass. How do you know what "Gavagai" refers to? According to the context it can refer to 'the rabbit', 'the rabbit tail', or 'furry'.

However, we know children are able to learn words easily and quickly, a phenomenon known as "fast mapping". According to Bloom (2000) "fast mapping" is the act of grasping the aspects of the meaning of a new word after incidental exposures. Therefore, researchers have proposed a series of constraints that could limit the number of hypotheses the child considers when he/she learns a new word to explain their fast learning. One of these is the noun category bias which is explained by Waxman, Senghas and Benveniste (1997) as the expectation that novel count nouns refer to categories of objects at the basic and superordinate levels. According to Waxman and Kosowski (1990) "this bias appears to guide the word learning process by placing limits on the number of possible meanings children will entertain for a new noun" (p. 1462); that is, if children are exposed to a novel noun that refers to a novel object they will be biased to interpret that novel noun as referring to another entity of the same kind. They will be looking for a taxonomically related object, rather than to a thematically related object.

The Acquisition of Adjectives

Adjectives have a problematic status for acquisition because there are some languages that have no adjectives at all, or that have only a very restricted number. Examples of these languages are: Igbo, Hausa and all Bantu languages. Dixon (1982) classified the most common adjectives in 19 languages with a small number of adjectives in different semantic types such as age (e.g. young), dimension (e.g. big), value (e.g. good) and color (e.g. red). Other adjectives classified as physical property (e.g. smooth), human propensity (e.g. happy) and speed (e.g. fast) for example, are expressed with nouns and verbs in other languages and therefore their mapping from conceptual to lexical structure is

different. According to Mintz and Gleitman (2002), it is very likely that the acquisition of adjectives is difficult because what the adjective encodes (semantic types) is expressed in an arbitrary way by different lexical categories in different languages.

Crosslinguistic Studies

Previous studies¹ investigated if children expect nouns, but not adjectives, to refer to objects in English, French, Spanish and Italian. The researchers of the base studies did a five-item match-to-sample task, in which pre-school aged children that speak English, French, Spanish and Italian were presented with a model object of a category, (e.g., a cow) and four possible choices. Two belonged to the same superordinate category of the model object (e.g., a fox and a zebra) and the other two options were thematically related to the model object (e.g., milk and a barn). They were arranged in a book with five pictures in each page. The center picture on each page was the model object. Children were asked to select two items for each model object by going through the picture book twice. Children were randomly assigned to the No Word condition, the Novel Noun condition and the Novel Adjective condition. In the three experimental conditions the experimenter used a puppet, and explained to the child that the puppet could not speak the language the experiment was conducted on and that the puppet “had his own special names for things”.

I will use English and Spanish to exemplify their test stimuli; similar prompts were used in French and Italian. In the No Word condition the experimenter pointed to the model object and said: *Mirá esta cosa. ¿Me mostrás otra?* (‘Look at this thing. (Can you) show me another (one)?’). Children had to point with their finger to the item from the 4 they had to select. After completing the first trials the experimenter went through the book a second time to elicit second responses: *¿Te acordás cuando te mostré esta cosa y vos me dijiste que ésta era otra? ¿Me mostrás otra más?* (‘Remember when I showed you this thing, (model object) and you told me that this (child’s choice) was another one? Can you show me yet another?’). In the Novel Noun condition the experimenter said: *Mirá un/a fopine. ¿Me mostrás otro/a fopine?* (‘Look, a fopine. Can you show me another fopine?’). Children had to select from the four items pointing to one item. After completing the trials, the experimenter went through the book a second time to elicit second responses: *¿Te acordás cuando te mostré esta/e fopine y vos me*

¹ Waxman & Kosowski 1990, Waxman, Senghas & Benveniste, 1997 and Waxman & Guasti 2009. They are the base studies of the present study.

dijiste que éste/a era otro/a? ¿Me mostrás otro/a fopine más? ('Remember when I showed you this fopine (model object) and you told me that this (child's choice) was another? Can you show me yet another fopine?'). In the Novel Adjective condition the novel adjectives were presented in an adjectival context: *Mirá una cosa foposa. ¿Me mostrás otra que sea foposa?* (Look, a foposa thing. Can you show me another (one) that is foposa?'). The same protocol of the No Word and Novel Noun conditions were followed. To elicit the second choices the experimenter said: *¿Te acordás cuando te mostré esta cosa foposa y vos me dijiste que ésta era otra? ¿Me mostrás otra que sea foposa más?*² ('Remember when I showed you this foposa thing (model object) and you told me that this (child's choice) was another? Can you show me yet another (one) that is foposa?').

Their results show that like their English- and French-speaking counterparts, Spanish- and Italian-speaking children exhibited a strong preference to select those items that are taxonomically related to the model object in the Novel Noun condition more frequently than did children in either the Novel Adjective or the No Word condition. The difference with children speaking English or French was that when the Spanish-speaking children and Italian-speaking children were presented with the Novel Adjective condition they also selected both items taxonomically related to the model object against the expected chance level of responding on both first and second choices consistently (zebra (taxonomic) and fox (taxonomic)) and on first choice alone (zebra (taxonomic)).

How do they explain the different results for English and French on the one hand and Spanish and Italian on the other hand? The researches state that experience with the Spanish and Italian languages that frequently present a Determiner-Adjective construction, "lead children to expect that adjectives may be linked to either property-based or category-based commonalities" (p. 61). In this determiner-adjective construction that the authors explain the noun is elided and the adjective occurs in the same surface position of the noun, for example: *La azul* 'the blue (one)'. In English, the equivalent phrase is a DP in which the adjective is followed by the pronoun *one*: "the blue one", clearly marking that blue is an adjective, not a noun.

English as well as French, Spanish and Italian does allow these Determiner-Adjective constructions such as *the blind*, *the young*, and *the accused*. In these cases, the adjective refers to a group of people who share the same social or physical condition. Like Spanish and Italian, in French the determiners and the

² It is important to note, though, that this question, as presented in Waxman, Senghas & Benveniste (1997), is ungrammatical in Spanish. The correct word order should be: *¿me mostrás otra más que sea foposa?* with *más* 'more' after *otra* 'other.'

adjectives are also marked for grammatical number and gender, and French also allows the noun to be elided. According to the authors of the base studies, French exhibits a broader range of contexts than English in which the Determiner-Adjective construction appears: With definite or indefinite articles and with singular and plural morphology, and this type of construction is more frequent in Spanish and Italian than in French or English. (Waxman, Senghas, & Benveniste, 1997). More specifically, in their adjective corpora analysis it is shown that in the utterances in which the adjective modifies a lexically specific head noun or a generic thing (e.g., the red horse or the red thing), 98% of the utterances were adjectives modifying a lexically specific head noun in Italian (Waxman & Guasti, 2009). The comparable figure in English was 84%; this includes the generic terms *thing* (e.g., the red thing) and *one* (e.g., the red one). The authors also focused on the constructions that had an omitted noun in both languages. They found 27% of the utterances with omitted noun in Italian whereas in English they only found 1%. The researchers conclude that “[Italian] children have access to the kind of input that could lead them to expect that category based extensions are within the realm of adjective use; English children do not” (Waxman & Guasti, 2009).

According to the authors their studies reveal that there is a distinct inclination to “extend” a novel adjective that is applied to an individual object, to other members of the same superordinate level category in the Spanish and Italian due to the Determiner-Adjective construction that occurs in Spanish and Italian in which the noun is omitted and that these Determiner-Adjective constructions “[...] appear to adopt a semantic function that is customarily associated with count nouns: they typically refer to the named objects and to other members of that object category” (p.191) and that there is a preponderance of the syntactic information over the semantic information in the input that affects the acquisition of adjectives, due to the frequency of these Determiner-Adjective construction in Romance languages in the input. They also state that the developmental course of the acquisition of adjectives in Spanish is different than in English, permitting Spanish-speaking children to build an expectation that adjectives may be “linked to either property-based or category-based commonalities” (Waxman & Guasti, 2009 p. 61).

Critique and Rationale

The authors disregard the difference between reference and predication. In English and Spanish adjectives never refer directly to objects. They refer to properties which are predicated of objects. Therefore the adjective in the Determiner-Adjective constructions in Spanish also refer to a property of an object. Selecting a taxonomically related object when one hears an adjective as

the Spanish-speaking children did, does not show that children think that the adjective refers to an object, just that the adjective could be predicated of that object. English and French-speaking children did not show any preference for the taxonomic or thematic related object in the Novel Adjective condition during the five-item match-to-sample task. (Waxman, Senghas, & Benveniste, 1997 and Waxman & Guasti, 2009) The results from the English- and French-speaking-children demand further investigation because their results are counterintuitive.

Why would English- and French-speaking children not use the adjectives to refer to the property of other objects of the same superordinate category? We need to look more closely at the experimental design and the materials of these studies. Unfortunately Waxman and colleagues do not provide enough information about the characteristics of the drawings they used. When using an adjective, we expect the objects to which the adjective applies to have some common properties. We do not know if the objects depicted in the model and test items shared any properties. The only property that the objects shared is that two of them were animals just as the model object. Waxman and colleagues do not mention any other properties. If the drawings had some other similar properties, the logical answer would be to select the taxonomically related items as the Spanish-speaking children did. If someone tells you a new adjective, say foppish and, presumably, the object it refers to (e.g., a cow with black spots) shares some characteristic with both an object taxonomically related to it (e.g., a dog with black spots) and an object thematically related to it (e.g., a barn with black spots), you could in principle select either of the two items. However, since the model object was an animal, you would be more likely to select the other animal since there are similar adjectives that apply to animals but not objects, or to humans but not animals, (e.g., handsome applies to humans, but not to animals or beautiful objects). Now, if you are told a new adjective applied to a cow and you are presented with the options of a barn and a zebra, and the objects do not share any characteristics; how are you supposed to interpret this new adjective? Even assuming that you noticed that the word has an adjectival morpheme, if there is no salient characteristic it could refer to (other than sharing the property of being animals as in the base studies), your best bet would be to apply it to the closest object you could find to the model object. The study of the understanding of adjectives must be addressed in a more proper way, by using a design that directly targets how English-and Spanish children interpret adjectives.

The present study uses and modifies the methodology used in Hiramatsu, Rulf, & Epstein (2010) who also criticized another study by Klibanoff & Waxman (1999). In this study children were presented with a within-category condition that showed a toy horse as the model object and two toy horses (a property-match

horse and a property-contrast horse) as choices for the child to select. In the across-category condition they showed a toy rhinoceros as the model object and two toy horses (a property-match and a property-contrast one) as choices for the child to select. In the Novel Adjective condition children heard: *Let's look at this one! Gogi says this is a very blickish one. Can you give Gogi another one that's blickish?* In the Adjective condition 4-year-olds made more property choices than 3-year-olds suggesting again that for 3-year-olds it is difficult to map a novel adjective across categories. Hiramatsu et al (2010) critique the prompts used in this procedure. They say that the use of *one* is pragmatically odd because the most common interpretation is that *one* refers to the specific type of animal (be it a horse or a rhinoceros); even though *one* can also be interpreted as a “thing”. In the within-category condition, the authors explain that there is an appropriate choice to select from whether you interpret *one* as the “animal” or “thing”, you have two toy horses to select, being these of the same category as the model object (a horse) whereas in the across category condition, you only have two animals to select from (two horses) that are different from the model object which is a rhinoceros. Therefore, if you interpret *one* as ‘rhinoceros’, you do not have appropriate options to select from. The authors say that “the only way to successfully extend a novel adjective in the across-category condition is by interpreting *one* more generally, such as the use of “thing” (p. 1211). This hypothesis was confirmed in their study with adults.

The main purpose of the present study is to investigate how the experience with two different languages such as English and Spanish steers the acquisition process of adjectives. The conclusion reached by the base studies (Waxman, Senghas & Benveniste, 1997; Waxman & Guasti, 2009) could have important implications for the field of language acquisition. It proposes that there is a difference in the acquisition of adjectives in English and Spanish based on the syntactic structures in which the adjectives appear in these languages. Another part of the research question is how children use linguistic cues –such as adjectival morphemes and syntactic context to figure out that a word is an adjective.

The hypothesis to be evaluated is that English and Spanish-speaking children do understand that adjectives refer to properties and not to objects, and therefore, they will use adjectives to refer to properties of an object of a different superordinate category from that of the model object regardless of the language. If the hypothesis is confirmed, this will show that

- (i) the results of the base studies were due to methodological problems.
- (ii) from age 3;0 on, children conceptualize adjectives as properties and not as objects, regardless of the language they used.

If the hypothesis is not confirmed, it will suggest that there is indeed a difference in adjective conceptualization according to language.

Method

Participants. The participants were 29- English-monolingual speaking children and 25-monolingual Spanish-speaking children³, whose ages were 3 and 4 years living in El Paso, Texas and San Elizario, Texas.

Stimuli. In an Across-Category condition, children were presented with a model object with a salient pattern and two test items as alternatives to choose from with salient patterns. One test item was the same object as the model object, but had a different salient pattern (non-target object). The other test item (target object) belonged to a different superordinate level category to that of the model object and had the same salient pattern of the model object.

In order to look at how children rely on morphological and syntactic cues to interpret the adjectives, the linguistic context was varied in terms of the presence or absence of morphological or syntactic information, resulting in four different linguistic contexts. Only one example of each linguistic context is presented below.⁴ These were:

1. Adjective without morpheme or syntactic context: Tep / Tepo
2. Adjective without morpheme but with syntactic context: It's all prall / Está todo pralo
3. Adjective with morpheme but without syntactic context: Mipy / Miposo
4. Adjective with morpheme and syntactic context: It's all garpy / Está todo garposo

There were 4 stimuli in each of the four linguistic contexts⁵. The total number of stimuli was 16.

Procedure. Children were introduced to Peter or Pepe, the puppet that was used to play the game, they were told that the puppet spoke differently and they were

³ One English-speaking child and 4 Spanish-speaking children were excluded from the statistical analyses due to their misunderstanding of the task.

⁴ Refer to the appendix in order to see all the linguistic contexts used.

⁵ The adjectives in the syntactic contexts were kept as equal as possible for number of morphemes and syllables within the 2 languages. The number of words in the contexts was very similar in both languages too. The number of morphemes and syllables varied from 1 to 3 in both languages in the four contexts. Spanish always presented an additional morpheme for gender.

asked to help the researcher understand what the puppet said. The child was shown the pictures and heard:

Peter says (referring to the model object): “*Tep*”. *Is there something else here that is tep? Can you point to it?* /Pepe dice (referring to model object): “*Tepo*” *¿Hay algo más aquí que está tepo? ¿Me lo puedes señalar con tu dedo?*

Scoring criteria. The children’s responses were coded in terms of whether they selected the target object (adjective/ pattern matching) or the non-target object (noun/object matching). Target object selection was coded as 1 which was the codification of a response that shows that children understand adjectives as referring to the pattern of the object and non-target object selection was coded as 0 which was the codification of a response that shows that children understand adjectives as referring to the object itself.

Specific hypothesis of the design

Based on this design it was hypothesized that children were going to be more successful when the context provides more information, that is, when they have both a morpheme and a syntactic context such as in it’s all *freppy / está todo freposo*. It was also hypothesized that children were going to be less successful when they were presented with the context of Adjective without morpheme or syntactic context such as in *tep / tepo*.

Results

The analysis of the picture selection test results was designed to test for the effect of three independent variables: the linguistic context (adjective without morpheme or syntactic context, adjective without morpheme but with syntactic context, adjective with morpheme but without syntactic context and adjective with morpheme and syntactic context), the language of the child and the age of the child. The linguistic context was treated in this analysis as the within-subjects variable and age and language were treated as between-subjects variables. The dependent variable was the type of response that the children gave: target object selection (property matching) or non-target object selection (object matching). The linguistic context of adjective without morpheme or syntactic context was considered as the baseline performance covariate and the other independent variables were tested for variance using an ANOVA. In a different analysis, a new ANOVA was used to test for differences in scores in one of the four different linguistic contexts based on language and age.

In the ANOVA with the context 1 (adjective without morpheme or syntactic context) as the baseline performance covariate the analysis revealed two main effects, one for age ($F(2,102) = 2.25, p < .05$) and one for linguistic context ($F(2,102) = 2.78, p < .05$). There was no main effect for language, as the base studies (Waxman, Senghas & Benveniste 1997; Waxman & Guasti, 2009) would have predicted. The main effect of age reflected that four year-olds performed better than three year-olds, specifically in the contexts of adjective with morpheme but without syntactic context and adjective without morpheme but with syntactic context. The main effect of context was qualified by an interaction with the type of linguistic context. As illustrated in Figure 1, three year-olds benefited from the full context (adjective with morpheme and syntactic context). Follow-up t-tests revealed significantly better performance for three year-olds in the full context condition: Adjective with morpheme and syntactic context relative to the context of adjective with morpheme but without syntactic context, ($t(19) = 2.449, p < .05$), and adjective without morpheme but with syntactic context ($t(19) = 2.333, p < .05$).

Figure1. Means of correct responses according to linguistic contexts by age.

Subsequent analysis for differences in scores in one of the four different linguistic contexts based on language and age with no baseline performance covariate in context 1 (adjective without morpheme or syntactic context) revealed no main effect for language again. Only age was a statistically significant predictor of differences in the adjective with morpheme but without syntactic context being the four-year olds the children with higher means selecting the target object selection (property matching) ($F(1,55) = 4.17, p < .05$). This result shows that in the adjective with morpheme but without syntactic context, four year olds had more correct answers than three-year olds. Figure 2 shows the descriptive total means of the target object selection (property matching) that children in both ages had for the linguistic context of adjective with morpheme but without syntactic context. Table 1 shows the descriptive total means that children had in both ages for the linguistic context of Adjective with morpheme but without syntactic context in English and Spanish.

Figure 2. Descriptive total means by age for the linguistic context of adjective with morpheme but without syntactic context.

Table 1. Descriptive means by age and language for the linguistic context of adjective with morpheme but without syntactic context.

Age	Language	Mean	Standard Deviation	N
3 Year Old	Spanish	1.6667	1.65831	9
	English	1.5714	1.60357	14
	Total	1.6087	1.58800	23
4 Year Old	Spanish	2.0000	1.81659	21
	English	3.0667	1.38701	15
	Total	2.4444	1.71455	36
Total	Spanish	1.9000	1.74889	30
	English	2.3448	1.65348	29
	Total	2.1186	1.70278	59

Discussion.

Previous studies have demonstrated how children apply their conceptual and linguistic abilities to show understanding of adjectives. The linguistic input in which the adjective is presented has been one of the most important aspects that these studies have investigated. These studies have shown that the extension of novel adjectives to objects within and across the same basic level category is affected by the syntax, semantics and pragmatics of the input that children are exposed to and that the ability to map an adjective to a member of a different category emerges with the support of a familiar basic level category. (Gelman & Markman, 1985; Taylor & Gelman, 1988; Waxman & Markow, 1998; Waxman & Klibanoff, 1998; 2000; Waxman, 2000; Klibanoff & Waxman, 1999; 2000, Sandhofer & Smith, 2007; Hiramatsu, Rulf, & Epstein, 2010). The linguistic input that children were exposed to in this study presented morphology and syntax as cues to interpret the novel adjectives as well as objects of different superordinate categories that shared the property that the adjective referred to.

The results of the present study show that children are very sensitive to the linguistic input they are exposed to, as the authors of the base studies (Waxman, Senghas & Benveniste, 1997; and Waxman & Guasti, 2009) would predict. Nevertheless this study does not assert in the difference of language that the authors explain in their proposal that Spanish-speaking children have an expectation that adjectives refer to object categories due to the presence of the Determiner-Adjective construction in which the noun is elided and the adjective appears in the same surface position of that of the noun (e.g. *la azul*).

The present study does not support this last assertion since Spanish-speaking children pointed to an object that belonged to a different superordinate category but that shared the same property (a pattern) as the model object when they were asked to point to what the adjective referred to. The results show no main effect for language, as the base studies would have predicted. Hiramatsu, Rulf, and Epstein (2010) tested whether three and four year-olds (mean ages 3;7 and 4;6) were able to use novel adjectives to refer across categories excluding in their prompt the pronoun *one*, and using the phrase *all over* to force an adjectival interpretation of the novel word. The experimenter asked: *See what's in the picture? The dragon says it's zav all over. Look at these two pictures. Is there something here that's zav?* Each picture set consisted of three black and white drawings of common objects or animals. Of the two test items, one had the same pattern as the model object while the other had a contrastive pattern, providing in this way a referent for the novel adjective. There were two experimental conditions: within-category and across-category. An example of the within-category is where the model object is a picture of an elephant covered with black triangles and the test items are a picture of an elephant covered with black triangles and a picture of an elephant covered with squiggly lines. An example of the across-category condition is a drawing of an apple covered with black triangles as the model object and a drawing of an elephant covered with black triangles, and a drawing of an elephant covered with squiggly lines as the test items. They found that five out of eight children in both age groups selected at least four property-matched objects in the within-category condition. However on the across-category condition all but one four year-old chose a property-matched object on the majority of trials, while only half of the three year-olds did.

In contrast to the results reported on the Hiramatsu et al. (2010) study, the results of the present study show that even three year-olds were able to apply the novel adjective to an object that belonged to a different superordinate category. These findings further show that there is a development with age in children's reliance on the different types of contexts. While four-year-olds do not need to have both the syntactic and the morphological information to comprehend the adjective, three-year-olds in both languages need to rely on both types of linguistic information to do so, supporting the studies that have found that children know that adjectives imply a contrast between members of the same basic level category (Taylor & Gelman, 1988). The present study also shows that older children performed better than younger children in context 3: adjective with morpheme but without syntactic context. This finding shows that children understand the morpheme *-y* as a linguistic cue that signals an adjective in this study and it has very important repercussions in their understanding of adjectives since this linguistic context was the one with a statistically significant difference

in age, being the older children the ones that performed better than the younger children.

The results of this study also show that it was difficult for the children to apply the adjective to an object of a different superordinate category. There are several reasons why this task could be difficult for the children. First of all, children had to recognize the adjective in the input that was provided, after that, they had to look for the same pattern that the adjective referred to by looking at two different objects: one being the same object as the model object and the other being an object of a different superordinate level category. Finally, they had to discriminate the same object as the model object that had a different pattern to apply the adjective to a different object that had the same pattern as the model object.

Conclusion

The design presented in this study tested in a more precise way the interpretation of adjectives by children at the ages of 3 and 4 because it provided the children the possibility to choose the same object as the model object with a different pattern (non-target object) or to choose a different object of a different superordinate category with the same pattern (target object) as the model object which represented the novel adjective that children heard in this study. This study has found that children successfully refer the adjective to the pattern that it represents, showing their understanding of what an adjective refers to in Spanish and English relying on different linguistic contexts. Therefore it confirms the hypothesis established that the conclusion reached by the authors of the base studies about the difference of the conceptual and grammatical relations of adjectives in English and Spanish-speaking monolingual children is not correct.

In this study both groups of children were successful in selecting the property that the adjective referred to. Even from age 3;00 children conceptualize adjectives as properties and not as objects, regardless of the language they appear on. Nevertheless, as it has been stated before, applying an adjective to an object of a different superordinate category was a difficult task for the children. To further explore the development of conceptual and grammatical relations of adjectives in English and Spanish in the future, it is necessary to present the four different linguistic contexts to four different groups of children with a bigger number of participants in the two languages, including adults. This will allow me to detect more differences concerning the understanding of adjective reference in the four different linguistic contexts.

The present study has looked at the acquisition of the reference of adjectives criticizing the analysis by the base studies (Waxman, Senghas & Benveniste, 1997; Waxman & Guasti, 2009) about the relationship between adjectives and their semantic functions. The authors disregard the difference between reference and predication. In English and Spanish adjectives never refer directly to objects. Adjectives refer to properties which are predicated of objects. The main hypothesis to be evaluated was that English- and Spanish- speaking children do understand that adjectives refer to properties that are predicated of objects and not to objects, and therefore, they will use adjectives to refer to properties of a different superordinate category from that of the model object. This hypothesis is confirmed by the fact that children selected the target object (property-matching) and that there was no main effect for language.

This study has focused on the acquisition of the reference of adjectives. The principal question in broad terms was: How do English and Spanish monolingual children come to understand the possible referents of adjectives? How do they learn the concept of an adjective, that is, that adjectives refer to a characteristic or a property of an object, not to the object itself? The results of this study show that English and Spanish-speaking children at 3 and 4 years of age understand that referents of adjectives can be predicated of objects of different superordinate categories and that they rely on syntax and morphology to learn what an adjective refers to, being the morphemes the linguistic parts of the word that children at 4 years of age rely more and not supporting the explanation of language difference of adjective reference between English and Spanish that is explained by the authors of previous studies about the syntactic position of the adjective in the Determiner-Adjective construction *la azul* (the blue one). Further investigation is needed in French and Italian in order to assert the obtained results in the present study.

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APPENDIX

Table A1. Stimuli. Linguistic contexts and drawings in the task

	Linguistic Contexts	Linguistic stimuli	Drawing description	Position of target object
	Adjective without morpheme or syntactic context			
1		Fep Fepo	Model object: A circle with black triangles. Target object: a microwave with black triangles. Non-target object: A circle with vertical lines.	Right
2		Gop Gopo	Model object: A square with black hexagons. Target object: a train with black hexagons. Non-target object: A square with inclined lines.	Right
3		Meb Mebo	Model object: A plate with black crosses. Target object: A pig with black crosses. Non-target object: Plate with vertical lines.	Left
4		Tep Tepo	Model object: A glove with musical notes.	Left

			Target object: A pentagon with musical notes. Non-target object: A glove /with vertical lines.	
	Adjective without morpheme but with syntactic context			
1		It's all drin Está todo drino	Model object: A rectangle with black octagons. Target object: A bird with black octagons. Non-target object: A rectangle with spirals.	Right
2		It's all prall Está todo pralo	Model object: A shoe with black circles. Target object: A dog with black circles. Non-target object: Shoe with Z's.	Left
3		It's all besk Está todo besko	Model object: A hat with black asterisks. Target object: An egg with black asterisks. Non-target object: Hat with V's.	Right

4		It's all dap Está todo dapó	Model object: A dolphin with black rectangles. Target object: A car with black rectangles. Non-target object: Dolphin with Cs.	Left
	Adjective with morpheme but without syntactic context			
1		Daky Dacoso	Model object: A monkey with black cubes. Target object: A rhombus with black cubes. Non-target object: A monkey with arcs.	Right
2		Mipy Miposo	Model object: A penguin with black eights. Target object: A pencil with black eights. Non-target object: A penguin with opposite arcs.	Left
3		Piffy Pifoso	Model object: A cat with black spots. Target object: A balloon with black spots. Non-target object: A cat with zig zag lines.	Right
4		Romy	Model object:	Left

		Romoso	An isosceles triangle with black squares. Target object: A dress with black squares. Non-target object: An isosceles triangle with doodles.	
	Adjective with morpheme and syntactic context			
1		It's all palty Está todo paltoso	Model object: A tomato with little black dots. Target object: A bunny with little black dots. Non-target object: A tomato with inclined lines.	Right
2		It's all teffy Está todo tefoso	Model object: A teddy with black diamonds. Target object: A candy with black diamonds Non-target object: A teddy bear with horizontal lines.	Left
3		It's all garpy Está todo garposo	Model object: A book with squiggly lines. Target object: A duck with squiggly lines. Non-target object: A book with wavy lines.	Right
4		It's all frepy	Model object: An	Left

		Está todo freposo	elephant with black stars. Target object: A trapezoid with black stars. Non-target object: An elephant with semicircles.	
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