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

Martha Elizabeth Rayas Tanaka
University of Texas at El Paso, merayas@miners.utep.edu

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ENGLISH-SPEAKING CHILDREN.

MARTHA E. RAYAS TANAKA

Department of Languages and Linguistics

APPROVED:

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María Blume, Ph.D., Chair

_____

Ellen H. Courtney, Ph.D.

_____

Ana Schwartz, Ph.D.

_____
Benjamin Flores, Ph.D.
Interim Dean of the Graduate School

KNOWLEDGE OF ADJECTIVE REFERENCE BY MONOLINGUAL SPANISH- AND

ENGLISH-SPEAKING CHILDREN.

By

MARTHA E. RAYAS TANAKA, B.A.

THESIS

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ABSTRACT

Previous studies (Waxman and Kosowski 1990, Waxman, Senghas and Benveniste, 1997 and Waxman and Guasti, 2009) have concluded that there is a distinct inclination for Spanish-speaking monolingual children but not for English-speaking children (3 and 4 years of age) to "extend" a novel adjective that is applied to an individual object, to other members of the same superordinate level category due to the Determiner-Adjective construction in Spanish, in which a postnominal adjective occurs in the same surface position as a noun such as in: *La azul* 'the blue (one)'. In an Across-Category condition, children were presented with a model object and two test items as alternatives to choose from. 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 the task, children had to recognize that the novel adjective refers to a property of the object (its pattern) and no to the object itself and find the test item that has the same pattern. This design gives the opportunity to investigate how children interpret what an adjective refers to: a property or an object. The present study additionally explores the role of syntax and morphology as informative linguistic sources for the child to acquire the grammatical category of the adjective by using four different linguistic contexts: 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. According to the authors of the previous studies the adjective in the Determiner-Adjective construction adopts a semantic function that is customarily associated with count nouns leading Spanish-speaking children to assume that adjectives refer to objects and therefore the conceptual representation of adjectives by monolingual Spanish-speaking children is different from their representation by monolingual English-speaking. The results of the present study show that English- and Spanish- speaking children do understand that adjectives refer to properties and not to objects by recognizing that the novel adjective refers to a property of the object (its pattern) and no to the object itself. Some caveats are presented and further methodological implications are discussed in order to further explore the conceptual representation of adjectives in English and Spanish-speaking monolingual children.

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CHAPTER 1

INTRODUCTION

1.1 Purpose of this Study.

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. My question in broad terms is: how do 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?

In this thesis I will review and criticize previous studies by Waxman and Kosowski (1990), Waxman, Senghas and Benveniste (1996), and Waxman and Guasti (2009)—henceforth referred to as the "base studies"— that deal with how monolingual children who speak English and Spanish apply linguistic knowledge to understand what adjectives refer to when they are presented with objects that belong to the same superordinate level category of a model object or which are related thematically to the model object. In the previously mentioned studies, the authors concluded that the conceptual representation of adjectives by monolingual Spanish-speaking children is different from their representation by monolingual English-speaking children due to the Determiner-Adjective construction in Spanish, in which a postnominal adjective occurs in the same surface position as a noun such as in: *La azul* 'the blue (one)'. More specifically, the authors claimed that Spanish-speaking children use adjectives to refer to nouns and this constitutes a difference in the acquisition of adjectives in Spanish and English, in which Spanish-speaking children go through stages in order to understand what an adjective refers to. The stages that English-speaking children go through in order to understand what an adjective

refers to are going to be reviewed in the related studies of the base studies in Chapter 2. Since the base studies were interested in the taxonomic assumption bias, they did not test for the acquisition of adjectives directly. The base studies do not reveal in a precise way the interpretation of adjectives in monolingual children, because children were not exposed to stimuli that allow us to discover how the child interprets the meaning of adjectives. Therefore, it cannot be stated that children acquiring languages that present the Determiner-Adjective construction will show a different understanding of novel adjectives. A clearer experiment in which we present different objects, belonging to different superordinate categories, and which share a common property can lead us to better understand the acquisition of reference of adjectives. The different results obtained by the English- and Spanish-speaking children deserve further investigation with a method that focuses on adjectives.

In the next chapter we will review what we know about the acquisition of adjectives, but before doing that we need to look at the main grammatical differences between the two languages we will study, English and Spanish.

1.2. Overview of the Grammar of Spanish and English.

Word order in Spanish is variable. SVO is the main word order, but VSO, and VOS (although rarer than VSO) are also possible. Spanish is a *pro*-drop language with rich inflectional morphology. It is a head-first language in which complements appear to the right of the head. Spanish has both prenominal and postnominal adjectives, although postnominal adjectives are most common. Adjectives agree in number with the head noun and, in most cases, in gender also. Noun phrases in Spanish containing adjectives may show noun ellipsis as in *la azul* 'the blue

(one)', a fact that will be important for the interpretation of the base studies I review in the next chapter.

Word order in English is more restrictive. SVO is the main word order. English is a non-*pro*-drop language with little inflectional morphology. Like Spanish, it is a head-first language in which complements appear to the right of the head. However, adjectives in English are prenominal, [1]and although a construction similar to *la azul* is possible, a crucial difference is that in the English version the noun is not elided completely but replaced by the pronoun *one*, (e.g., *the blue one*).

1.2.1. Adjective Word Order.

There are two theories that explain the structural position of postnominal adjectives in Spanish. According to Bosque and Picallo (1996) postnominal adjectives in Spanish are mapped onto the specifier positions in the DP, as are English adjectives. What explains the surface word order in Spanish is the overt raising of the noun for overt Case checking since Spanish has strong Case features; while in English, which has weak Case features, no raising is necessary. Contrary to Bosque and Picallo, Ticio (2003) explains that prenominal and postnominal adjectives in Spanish are in different positions in the structure. Postnominal adjectives are adjuncts to NP and prenominal adjectives are specifiers of NP[2]

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[1] Postnominal adjectives also occur in English as in *A father proud of his sons,* in which the PP is the complement of the AjP.
[2] Interestingly Ticio's proposal that there are two different positions is based on her explanation of the elision of the noun in a DP structure such as La azul 'the blue (one)'; but that is outside the scope of this thesis.

1.2.1.2. Postnominal Adjectives in Spanish.

It is beyond the scope of this thesis to provide an evaluation of these contradictory proposals about postnominal adjectives in Spanish. For our purposes, it is only important to note that they show up in postnominal position in the surface and that the DPs they appear on can be subject to NP-ellipsis. The importance of NP-ellipsis constructions will be explained in the next chapter when I review the base studies' analysis of adjective acquisition in Spanish.

1.3. Summary.

In this chapter I have introduced the main rationale for this study and I have presented a short overview of the grammar of Spanish and English and reviewed some theories proposed for the structural position of adjectives in Spanish. Chapter 2 presents a review of lexical acquisition in English and Spanish as well as the critique of the base studies of this thesis and related studies that look at how children apply their conceptual and linguistic abilities to know what an adjective refers to. Chapter 3 presents the design of the present study that seeks to research the conceptual and linguistic relations of adjectives in English- and Spanish-monolingual children by modifying the studies criticized in Chapter 2. Chapter 4 provides the results and the conclusions of the present study.

CHAPTER 2

BACKGROUND REVIEW

This chapter begins with the description the lexical constraints proposed to explain the fast learning of vocabulary by the child and the description of *Theory of Mind* as part of the social-pragmatic theory of word learning (Tomasello 1994, 2000 and 2003 and Bloom 2000). The chapter continues with a description of the adjectival acquisition in English- and Spanish-speaking children and the critique of some studies selected as the base studies for this thesis. I will criticize the authors' analysis of the relationship between adjectives and their semantic functions in the Spanish Determiner-Adjective construction such as *"la azul"* and the design they used to explain how children apply their linguistic knowledge to show what an adjective refers to. Next, this chapter presents a review of related studies that are part of my critique and have been conducted to analyze the acquisition of the reference of adjectives by looking at how syntax, semantics and pragmatics affect the learning of adjectives. Finally, the present chapter presents the rationale for this thesis.

2.1. Lexical Constraints.

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', 'furry'

'green grass' or to a 'hopping activity'. Learning a word should be almost impossible since learners would have to consider a large number of possible referents for each lexical item.

However, we know children are able to learn words easily and fast, 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 and which could explain their fast learning.

One such constraint is the *whole object bias*, (Markman and Hutchinson, 1984). This constraint proposes that children believe by default that new words refer to whole objects and not to a part or a property of the object. The *mutual exclusivity constraint* [3] states that children expect an object to have only one category label and that each label refers to only one category of objects, in other words, an object can have only one name.

According to Markman and Hutchinson (1984), children make inductive generalizations to objects of the same kind. For example, "after having learned that a poodle has incisors, a child should be more likely to conclude that a collie has incisors than that a bone does, even though dog and bone are strongly associated" (p.99). This constrain is called the *taxonomic assumption bias* and it explains that children "expect that a novel count noun will refer to an object and to other members of the same or superordinate level category of objects" (Waxman, Senghas and Benveniste, 1997 p. 184). According to Waxman and Kosowski, "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

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[3] Other authors have proposed similar principles such as Slobin's (1973) "Principle of one-to-one mapping", Pinker's (1984) "Uniqueness principle", and Clark 's (1983, 1987) "contrastive principle."

a novel object they will be biased to interpret that novel noun as referring to another entity of the same kind thus looking for a taxonomically related object, rather than to a thematically related object.

The social-pragmatic theory of word learning proposed by Tomasello (1994, 2000, 2003) and Bloom (2000) suggest a different alternative to lexical constraints by explaining that children learn words by understanding the intentionality of others. The following section provides an explanation of *Intention Reading* (Tomasello 1994, 2000, 2003) —later called *Theory of Mind* by Bloom (2000)— which is a socio-cognitive and pragmatic ability proposed to guide the child in the process of lexical acquisition.

2.2. Theory of Mind.

According to the social-pragmatic approach, the foundational skill of word learning is *Intention Reading* which is defined as the children's attempt to understand the communicative intention of the utterance expressed by the adult. A word is learned through a joint intentional frame which is a social situation that the adult and the child share.

Bloom (2000) proposes a similar account based on *Theory of Mind*. According to Premack and Woodruff, 1978 *Theory of Mind* is a cognitive process about the awareness we have about other people's knowledge. Field (2004) defines it as "the ability to recognize that another human being has their own ideas and intentions, which may be distinct from one's own; the ability to conceptualize those ideas and intentions" (p. 32).

Children are very sensitive to the situation in which words are presented, because children are very active observers of their surrounding and they follow socio-pragmatic cues. If children hear a word that they have never heard before, they pay attention to what adults look or

point at when they are using a new label (Baldwin, 1991, 1993 b). Therefore, as it has been stated before *Theory of Mind* is a constraint that is not specifically linguistic.

Bloom gives the following example taken from Markman and Wachtel (1988) in which children were shown a banana and a whisk and asked to: '*Show me the fendle*''. According to Bloom, (2000: p 68.) in this situation children might reason about the thoughts of others in the following way:

1. I know that a banana is called a banana.

2. If the speaker meant to refer to the banana, she would have asked me to show her the banana.

3. But she didn't; she used a strange word, *fendle*.

4. So she must intend to refer to something other than the banana.

5. A plausible candidate is the whisk.

6. *Fendle* must refer to the whisk.

Bloom proposed that the fact that children assume a new label refers to a new object and not to a known object can actually be explained by the child's reliance on *Theory of Mind*; that is, on their understanding of the referential intentions and thoughts of other people.

The following section presents a description of the adjectival acquisition in English- and Spanish-speaking children.

2.3. 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 of them. 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.

In Spanish, adjectives represent the third semantic category that children produce, just after nouns and verbs according to Serra-Solé (1995) based on their corpus of 10 Spanish- and Catalan-speaking children recorded monthly during the period of 12 to 23 months, 24 to 35 months and 36 to 47 months. Adjectives also represent the third semantic category in the order of acquisition of grammatical categories in English. Nelson (1973) reports in her longitudinal study of the acquisition of first words by 18 children between 1 and 2 years of age that adjectives in English constitute 6 to 10% of the children's first 50 to 100 words; while Serra-Sole (1995) report that in Spanish they constitute 8 to 9% of the children's first 100 words.

Children are very sensitive to the properties that adjectives encode, more specifically to the *color* and the *dimension* semantic categories which are time-stable semantic categories. These are the earlier semantic categories of adjectives produced by Spanish-speaking children

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and English-speaking children (Saylor 2000 and Blackwell 2005). The dimension adjectives that

Hernández Pina (1984) reports in the vocabulary of her son at the age of 18 to 24 months and

that Blackwell (2005) reports in the language samples of two English-speaking children from 2;3

to 5;0 years of age are *gordo* 'fat', *pequeño* 'small', and *grande* 'big'. In Spanish, adjectives that

represent values also appeared in the first 100 words according to the corpus Serra-Sole (1995).

These value adjectives are *bueno* 'good', *bonito* 'beautiful' and *tonto* 'foolish'.

The following section presents the studies I selected as the base studies for this thesis.

They look at how monolingual children who speak English and Spanish apply their linguistic

knowledge to understand what adjectives in predicative contexts refer to when they are presented

with some objects that belong to members of the same superordinate level categories and with

objects related thematically.

2.4. Base Studies.

The base studies of this thesis are Waxman and Kosowski (1990), Waxman, Senghas and

Benveniste (1997) and Waxman and Guasti (2009). They investigate if children expect nouns,

but not adjectives, to refer to objects in English, French, Spanish and Italian. The conclusion

reached by the authors to explain the difference in the reference of adjectives depending on the

language the child speaks as well as the design used in these studies is explained next in detail

since such level of detail is necessary to understand my critiques to these studies. They

concluded that infants link adjectives to either category- or property-based commonalities and

that this expectation is shaped by the language under acquisition. Specifically, they say that

English- and French-speaking children expect that "category-based commonalities are within the

realm of noun (but not adjective) use. For children acquiring Italian and Spanish, experience

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steers the acquisition process along a slightly different developmental course, permitting them to build an expectation that category-based commonalities are within the realm of both noun and adjective use" (p. 65). In other words, children acquiring English or French expect that nouns but not adjectives refer to objects and children acquiring Italian and Spanish expect that nouns and adjectives refer to objects.

Waxman and Kosowski state that English-speaking children focus on category relations when they interpret the meaning of a novel noun and that children do not "overextend" adjectives to refer to object categories. How did they come to these conclusions?

The researchers did a five-item match-to-sample task, in which children 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. Children were asked to select two items for each model by going through the picture book twice. The investigators asked the children to do this twice because they thought that if children selected pictures of the same taxonomic category (in this case, the fox and the zebra) both times, they should have already established some criteria for selecting between the taxonomic relations of the model object (e.g., a fox and a zebra) and the thematic categorical relations (e.g., milk and a barn) and they should apply them consistently.

Children were randomly assigned to the No Word condition and the Novel Noun condition. In both 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 to exemplify the test stimuli; similar prompts were used in the other languages under study. In the No Word condition, the experimenter pointed to the model item and said: *See this one? Can you find another one?* In the Novel Noun condition the experimenter labeled the model object with a nonsense word, using a different word for each trial. The experimenter said*: See this? This is a cham.* (pointing to the model object*) Can you find another cham?* After they had seen all the stimuli in the book, the experimenter went through the book a second time and said for the No Word condition:

Remember when I showed you this one and you told me that this (child's selection) *is another one? Can you tell me why?* And for the Novel Noun condition: *Remember when I showed you this cham and you told me that this* (pointing to the child's selection) *is a cham too? Can you tell me why?* Each child received two scores, one for the selection of the items and the other one for the justification. Justifications were coded as taxonomic, thematic or other/ irrelevant. [4]

In the first study Waxman and Kosowski (1990) tested four groups of English-speaking children: 2-year-olds, 3-year-olds, 4-year-olds, and 5-year-olds. In Experiment 1 they tested the 3-4 year-old group (mean age 3;5 ranging from 3;1 to 4;1). Their results showed that English-speaking children interpret Novel Nouns taxonomically even in the presence of thematic alternatives. In Experiment 2, they added the Novel Adjective condition and extended the age of the subjects to 5 year of age (mean age 3;9 ranging from 3;1 to 5;0). In the Novel Adjective condition the novel labels were presented in an adjectival context: *See this? This is a foppish thing. Can you say that? Can you find another one that is foppish?*

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[4] The investigators coded as an irrelevant justification responses such as "I don't know" or "Because that's a bunny and that's a carrot." Waxman and Kosowski (1990) do not report how many "I don't know's" were used as a response on the Novel Adjective condition. It may be that the English-speaking children got that unusual pattern of responses (selecting the thematically related items in the adjective condition) because in such a confusing experiment they were just answering a lot of "I don't knows" and those answers were not counted.

Results showed that only nouns and not adjectives highlight category relations at the superordinate level. When children heard nouns to refer to the model object they selected the taxonomic option in the task, in the example provided before, children selected the fox and zebra in the Noun category condition when the model object was a cow. The investigators concluded that novel nouns, but not novel adjectives serve to focus the attention of the children on superordinate-level category relations. The authors conclude that English-speaking children "expect novel nouns to refer to categories of objects and expect words from other syntactic classes to have different referring functions" (1990: 1471).

In a subsequent study, Waxman, Senghas and Benveniste (1997) extended the study of the *Taxonomic-Assumption bias* to monolingual children that speak Spanish and French. They focused specifically on the linkage between count nouns and superordinate level object categories and used the same three experimental conditions that Waxman and Kosowski (1990) used: Novel Noun condition, No Word condition and Novel Adjective condition. Since in this thesis I will focus on Spanish and English only, I will refer to the French data only briefly. They tested French-speaking children ranging from the ages of 2 to 4 years. In French, subjects behaved similarly to the English-speaking children. Children in the Novel Noun condition selected both category members more often than did their same-aged counterparts in either the Novel Adjective or the No Word conditions.

The Spanish-speaking children ranged in age from 3;1 to 4;9 (mean age 4;1). 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)?') 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 all novel nouns had gender neutral endings. The gender of the article agreed with the gender associated with the familiar basic level Spanish label for the model object depicted in the picture or drawing: *Mirá un/a fopine. ¿Me mostrás otro/a fopine? (*'Look, a fopine. Can you show me another fopine?*'*) 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 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?') 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?* [5]('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-speaking children exhibited a strong preference to select those items that are taxonomically related to the model object in the Novel Noun condition (M = .70) more frequently than did children in either the Novel Adjective (M = .37) or the No Words condition (M = .20). The difference with children speaking English or French was that when the Spanish-speaking

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[5] It is important to note, though, that this question, as presented in Waxman, Senghas and Benveniste (1996), is ungrammatical in Spanish. The correct word order should be: *¿me mostrás otra más que sea foposa?* with *más* 'more' after *otra* 'other'

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)). The authors conducted a different independent experiment in which they introduced the novel adjectives with the suffixes –*ado* and –*ante*. They found that children in these conditions also chose both taxonomic alternatives in the Novel Adjective condition.

 In a subsequent study they tested 6-and 7-year-old English- and Spanish-speaking children. They found no decrease in the tendency to extend novel adjectives to other members of the same superordinate level category by the Spanish-speaking children. On the other hand, the data from the English-speaking children are comparable to that of the pre-school English-speaking children.

These results, according to the authors, reveal:

(i)   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 language and

 (ii)   that this difference "becomes more entrained with age" (1997: 208).

The authors propose that "the linkage between nouns and object categories, which emerges early in English-speaking children may be a universal phenomena (Dixon, 1982, Genter 1982, Gleitman 1990, Maratsos 1991, Pinker 1994, Waxman 1994, Waxman and Markow 1995) and that the meanings related to adjectives may be more language specific" (pp. 211-212).

Waxman and Guasti (2009) conducted a similar study with Italian-speaking children. They tested 3-year-olds (mean age 3;5, from 3;1 to 4;0) and 5-year-olds (mean age 4, from 4;1 to 5;0). They found that the Italian-speaking children, like the Spanish-speaking children, chose both taxonomic categories when they were presented with Novel Nouns and Novel Adjective conditions.

How do they explain the different results for English and French on the one hand and Spanish and Italian on the other hand? The investigators state that experience with the Spanish and Italian languages that present the Determiner-Adjective construction frequently, "lead children to expect that adjectives may be linked to either property-based or category-based commonalities" (p. 61). Remember that in this construction the noun is elided. For example: *La azul* 'the blue (one)'. According to the authors, for children acquiring Spanish and Italian, this specific construction could make it difficult to comprehend the meaning of an adjective and a noun during the first years of life because the surface position of the adjective in the Determiner-Adjective construction is the same as the surface position of the noun in Determiner phrases such as *la casa* `the home`. 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 the 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 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

constructions appear: with definite or indefinite articles and with singular and plural morphology and this type of constructions is more frequent in Spanish and Italian than in French or English.

To further explore whether or not the frequency of this construction in the two groups of languages was different, they examined the input that Italian and English children receive pertaining to adjective use. They selected eight corpora from the CHILDES database (MacWhinney, 2000) in which Italian-speaking caregivers interacted with children ranging in age from 16 to 40 months and three corpora for the CHILDES database in which English-speaking caregivers interacted with children in the same age range. They found that only 68% of the Italian parental uses were unambiguously adjectival, that is, parents uttered an adjective in a position where only an adjective could be placed. In contrast, in English, 94% of parental uses were unambiguously adjectival. They also considered the subset of unambiguous utterances in which the adjective was used attributively to modify an overt noun (e.g., *the pretty thing* or *a yellow cup*). In the Italian corpora, in 98% of these uses, the adjective modified a lexically specific head noun (e.g., *the red horse*) rather than a generic term (*e.g., the red thing).* The comparable figure in English is 84%; this includes the generic terms thing (e.g., *the red thing*) and one (e.g., *the red one).* These data are important because they show how parents use adjectives to refer to a characteristic of an object which is expressed in the form of a basic level category such as *cup,* as an unspecified object as a *thing* or with the pronoun *one.* Some studies that have looked at how children apply their conceptual and linguistic abilities to show understanding of adjectives when they are presented with these syntactic structures are explained below as part of my critique to these studies.

Finally the authors focused on Determiner-Adjective constructions in Italian and Determiner-Adjective-Noun constructions in English. They found 27% of the utterances being

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Determiner-Adjective constructions in Italian whereas in English they only found 1% of the Determiner-Adjective-Noun construction (e,g., *the blue one*). The investigators 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" (p. 57).

To summarize, according to the authors these studies reveal:

(iii)   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 languages, but not in English or French.

The conclusion reached by these base studies, if true, 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. According to these researchers 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 the Determiner-Adjective construction in Romance languages in the input.

2.4.1. Critique.

The base studies conclude that English- and French-speaking children do not "overextend" adjectives to refer to object categories while Spanish- and Italian-speaking children do "overextend" adjectives to refer to object categories. According to the authors this is due to the Determiner-Adjective construction that occurs in Spanish and Italian in which the noun is elided and therefore, this construction leads children to think that adjectives refer to objects.

In this section, I will criticize the previous studies on two grounds:

(i)   Their analysis of the relationship between adjectives and their semantic functions.

(ii)   The design of the studies.

The analysis presented in the base studies about the relationships of adjectives and their semantic functions to explain the difference in the performance by English and Spanish-speaking children is not correct.

According to Waxman, Senghas and Benveniste (1997) the 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).

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 the 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. The results from the English- and French-speaking-children demand further investigation because their results are counterintuitive. Why wouldn't English- and French-speaking children 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 materials of these studies. Unfortunately Waxman and colleagues do not provide enough information about the characteristics of the

drawings they used. When using and 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 2 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[6]; 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-speaking children and Spanish-speaking children interpret adjectives. The different results obtained by the English- and Spanish-speaking children

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[6] I do not know if this was true of the items in Waxman et al.'s (1997) study; but we are led to assume this is true since, as I said above, they do not mention any characteristic shared by the stimuli.

deserve further investigation with a design that focuses on adjectives, that is, where a common characteristic is salient.

The following section presents other studies that also look at the interpretation of adjectives in predicative contexts and other syntactic structures as well as at the role of the basic level category in the acquisition of reference of adjectives.

2.4.1.2. Related Studies.

Adjectives in predicative contexts appear after a verb as in *she is lucky*. The onset of the process of word learning was scrutinized to see how perceptual and conceptual factors affect the acquisition of predicative adjectives in children at 2 years of age in Waxman (2002). In this study, the author presented the children with a set of ambiguous stimuli (drawings) that could be interpreted as either objects (pictures of things) or non-objects (portions of substance). The drawings were undefined shapes. The within-basic condition contained the same target and test items. In the within-basic condition the target item and the test items were all perceptually similar. The property-match item shared the color or texture with the target item. The property-contrast item displayed a different property than the target item. In this case a different color or a different texture. An example of a target item in the within-basic condition is a yellow drawing. The test items in this condition are two identical drawings to that of the target item: one that is yellow and other that is green. The across-basic category condition contained two identical drawings as test items and a different drawing as a target item. In the across-basic condition the target item was different from the one in the within-basic condition (a different undefined shape) and the test items (two identical undefined shapes) were a property-match item (color or texture)

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and a property-contrast item. An example of a target item in the across-basic condition is a shiny drawing. The test items in this condition are two identical drawings that contrast with the target item because they are different to it. One test item shared the same property of being shiny to the target item. The other displayed a different texture. In Experiment 1 the stimuli were described as objects (pictures of things) whereas in Experiment 2, they were described as non-objects (blobs of stuff). In the Novel Adjective condition children heard: *Look, this book has lots of different things* (description of objects) */ blobs of stuff* (description of non-objects)*. This is a blickish one (*target item*). Can you find another one that is blickish?* When children were presented with the stimuli as pictures of things or description of objects (Experiment 1) they succeeded in mapping the novel adjective to the matching test object in the within-basic condition but not in the across-basic condition. In Experiment 2, when the conceptual status of the objects was changed (from objects to non-objects) children succeeded in mapping adjectives on both within- and across-category conditions suggesting that the mapping of novel adjectives is dependent upon the conceptual status of the entities being described and not only by perception. When children were exposed to the description of objects they applied the novel adjective only to other members of the same basic level category (within-basic condition) and when the stimuli was construed as a non-object children applied the adjective to objects from different basic level kinds.

Taylor and Gelman (1988) investigated how two-year old children interpret novel words presented in either a syntactic context that would lead them to interpret the new word as a count noun (*This is a zav*) or in a context that would lead them to interpret it as an adjective (*This is a zav one*). The authors found that children rely in the syntactic context to distinguish between the count noun and the adjective, since they tended to interpret the *zav* in the expected ways

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according to the context. The syntactic context in which a novel word appears is very important for the interpretation of that word. Children rely on syntactic inputs that help them to know what an adjective refers to. According to Sandhofer and Smith (2007), the ambiguous linguistic frames provided by parents when they utter an adjective alone such as *red!*, in a noun construction such as *this is a red* [7] and in an ambiguous non-modifying context such as in *this is red* make the acquisition of adjectives more difficult. In their first experiment they asked children (18.4 to 34.5 months) to match three test objects (a red, green and a yellow dinosaur) to three objects from the same basic level category differing in color (a red cup, a green cup and a yellow cup). Children heard: *This is red, find a red one*. According to the authors this syntactic frame is ambiguous with regards to the adjectival status of the word because it does not provide an explicit noun that is modified by the adjective and younger children performed better than older children in matching the model object with the object of the same color. The authors explain that older children tried to find a noun-like meaning for the terms. What the authors do not comment on is the fact that *red one* disambiguates the status of the word *red* as an adjective because it is accompanied by the pronoun *one*. What the results suggest is that older children know that the speaker has a category in mind (*dinosaur*) and since the objects to select from were not *dinosaurs*, older children did not choose the red cup. (See a similar critique by Hiramatsu Rulf, and Epstein (2010) to Waxman and Klibannof's (1999) study below).

In their second experiment they provided the children (18.6 to 32.9 months) a syntactic frame that more clearly indicated an adjectival status. Children heard: "*This dinosaur is very red. Find a red cup*". Before children were queried to find the red cup, in this experiment children were provided with two examples of each object from different basic level categories: a red

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[7] Ungrammatical sentence that according to the studies parents utter to their children.

blanket was placed next to a red dinosaur and children were told: "This is the red dinosaur and this is the red blanket" (p.256), After this, children were asked to match the three test objects (a red, green and a yellow dinosaur) to three objects from the same basic level category differing in color (a red cup, a green cup and a yellow cup). In this experiment, older children performed better than the younger children. According to the authors, the multiple comparisons provided in the second experiment "may have overwhelmed the younger children and distracted their attention away from the adjectives" (p.258). What it is important for the present thesis is that in these experiments the objects presented to the children were objects that belong to different superordinate categories a fact about the conceptual organization in the hierarchical systems of adjectives that is going to be explained in the rationale of this thesis. The authors stress the fact that in the first experiment children were not provided with an explicit noun whereas in the second experiment children were provided with explicit nouns. I propose the use of a different linguistic input that is going to be presented and explained in the next chapter to investigate how children rely on the input to understand what an adjective refers to in the present thesis.

Gelman and Markman (1985) investigated if young children (2 to 4 years of age) are sensitive to the contrast that adjectives mark between two different members of a single category. In the adjective condition children saw a set of three members of the same basic level category (three butterflies that were red, blue and yellow) and a member of a different category (a red chair). Children heard real adjectives. In this case children heard *red*. Each adjective item was worded as: "*Show me the X one*" where X was a real adjective. In the noun condition children saw three different objects (e.g. ball, kite, top) sharing color or size and a singleton, being this one of the three same objects but with a different characteristic to the one of the group of the three objects (e.g. blue ball). Each noun item was worded as: *"Show me the Y"* where *Y*

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was a real noun. Their results show that children tended to focus on a contrast between members of the same object category when asked to interpret adjectives and that they chose the singleton when they heard the noun. When hearing adjectives the older children inferred that each adjective named a contrast between members of the same object category.

In their Experiment 2 artificial objects were used instead of familiar ones, and novel nouns and adjectives were used instead of familiar ones. All pictures were drawn to represent imaginary objects and creatures including food, furniture, clothes, toys, vegetation, animals and miscellaneous artifacts. For any given array, three set of pictures formed a set: they had several features in common including size, color, shape and apparent function. One member of the set differed from the other two along a single dimension (either color, size or state). This was the contrastive category member. The fourth picture, the singleton, differed from the set members on every important dimension. In this task, children were more likely to select the lone exemplar or singleton when they heard a noun than when they heard an adjective and they were more likely to select the contrastive category member when they heard an adjective than when they heard a noun. Children selected the lone exemplar or singleton which was different in all the dimensions (size, color and shape) comparing it with the other three set of pictures when they heard the noun and they selected the contrastive set member which was a picture that differed from the set of members in one dimension such as the color, size or state. These results show that children know that adjectives imply a contrast between members of a single noun category.

The capacity to contrast two different properties of two objects that belong to the same basic level category (two cars) is the result of comparison. According to Waxman and Klibanoff (1998, 2000) and Klibannof and Waxman (1999, 2000) this is the foundation of success in mapping a novel adjective to an object property. Presenting two objects that belong to the same

basic level category but differ in a property (transparent plate and an opaque plate) makes it easier for the child to identify the property, and map that adjective to a property of objects from different basic level categories when the children hear a novel adjective in a modifier position such as "*a blickish snake*" as well as in the predicative position such as in "*a snake that is blickish*". In these set of experiments it was found that children at 3 years of age successfully interpret the adjective and apply it to another object of the same basic level category. Moreover they found that 4-year-olds are more likely to extend novel adjectives to objects from diverse basic level categories than 3-year-olds. (Klibannof and Waxman, 2000). These studies also show that when provided with "practice" in matching a test object from the same basic level category (a spotted fish) to the target object (another spotted fish), three-year-olds successfully mapped the novel adjective to a member of a different basic level category in the test trial. More specifically, these studies suggest that the ability to map an adjective to a member of a different category emerges with the support of a familiar basic level category, that is, children first learn to compare and contrast properties between two members of the same basic level category and from there they continue developing their ability to map adjectives across categories.

Waxman and Markow (1998) found the same result for children as young as 21 months of age. They also found a difference of interpretation of novel nouns and novel adjectives. When children heard a novel noun they did not demonstrate any preference for the matching property, supporting other studies that have found that for children novel nouns refer to object categories (Waxman and Kosowski 1990, Waxman, Senghas and Benveniste 1997, Waxman and Guasti 2009).

Hiramatsu, Rulf, and Epstein (2010) criticized the study by Klibanoff and Waxman (1999), in which 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. The across-category condition in Klibanoff and Waxman (1999) 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. 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, there is an appropriate choice to select because 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. So here, if you interpret *one* as 'rhinoceros', you do not have appropriate options to select. 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 «thing»" (p. 1211).

To support this affirmation, the authors tested the adult interpretation of the pronoun *one*. The conditions in this experiment were as follows: two test objects were of the same category as the model object and two test objects were of a different category. The conditions differed on which test object(s) matched the color of the model object. In the control case there was no object of the same color. In the within-category condition a test object of the same category had

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the same color as the model. In the across-category condition a test object of a different category had the same color as the model. In the within/ across-category condition, two test objects (one from the same category, one from a different category) had the same color as the model. The experimenters wanted to determine whether adults would allow a generic interpretation of *one* as 'thing' in the across category condition. After presenting each set of pictures, the experimenter pointed to the model picture and gave the following prompt: *This is a (n) red one. This one is red. Is there another red one?* Participants were asked to respond by pointing. The investigators calculated the proportion of color-matched test items that were selected by each subject for each condition. They found that: "subjects were more likely to choose the color-match item in the within-category condition than in the across-category condition. [...] subjects were more likely to choose the color-matched item from a different category in the across-category condition than in the within-across condition" (p. 1213). These results show that adults interpret *another yellow one* as "another yellow toothbrush" and not as "another yellow thing."

In Experiment 2 they tested whether 3- and 4-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, because one of the main purposes of this research was to see how syntax affects the acquisition of adjectives. More specifically, they were interested in the role of the phrase "*all over*" as a linguistic cue for adjective learning. They also tested adults as a control group. 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 has a contrastive pattern, therefore providing for 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 are 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 used novel adjectives such as *bisk, rup, drin, prall, stoof* and *zav*. 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 4-year-old chose a property-matched object on the majority of trials, while only half of the 3-year-olds did. This study, according to the authors, shows for the first time that 3-year-olds were able to refer across categories with just one example of the novel adjective.

The authors conclude that the differences between the two groups of ages which is that 4-year-olds are slightly better at choosing the property-matched object than the 3-year-olds, is because in the first part of the prompt, the object introduced is characterized as being "*stoof all over*", however the question of the prompt (*is there something here that's stoof?*) does not include the phrase *all over*. The missing phrase of *all over* could be a pragmatic interference in which the child looks for something that is "*stoof all over*" not something else that is "*merely stoof yet not stoof all over*" (p. 1217).

The studies reviewed above show that children successful match adjectives to objects that belong to different superordinate categories (Sandhofer and Smith 2007). They also show that children know that adjectives imply a contrast between members of a single noun category and that 3-year-olds successfully interpret a novel adjective and apply it to another object of a different basic level category when they are provided with "practice" to match a test object from the same basic level category (a spotted fish) to the target object (another spotted fish). This suggests that the ability to map an adjective to a member of a different category emerges with the support of a familiar basic level category and that syntax, semantics and pragmatics affect the extension of novel adjectives to objects within and across the same basic level category. The main focus of this thesis is to look at the acquisition of the reference of adjectives in English and Spanish. These studies show how children apply their linguistic knowledge to understand what adjectives refer to by presenting different alternatives of object categories. The following section presents the rationale for this thesis.

2.5. Rationale for this Thesis.

All the studies reviewed here lead us to further investigate the conceptual and linguistic development in children, more specifically, to research about the acquisition of the reference of adjectives in two different types of languages: Spanish a language with the Determiner-Adjective construction in which the noun is elided as in *la azul* 'the blue (one)', and English a language with the Determiner-Adjective construction in which the noun is replaced by the pronoun *one* as in (e.g., *the blue one*).

According to the base studies 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 et al 2009 p. 61). In other words, they explain that Spanish-speaking children interpret the meaning of an adjective as if it referred to an object or to a property.

I propose that Spanish –speaking children actually used the adjectives to refer to a property of another member of the same superordinate category demonstrating their knowledge of adjectives (in this case, the property of being an animal). Adjectives do not refer to objects, they refer to properties that are predicated about an object, so if an adjective can be predicated of an individual object (e,g,, *this is fast* used to refer to a bee), it should also be used to refer to properties that are predicated about other members of the same superordinate category ((e.g., *the fast fly*), as the Spanish –speaking children did, selecting the other animals in the five-match to sample task in the base studies. Adjectives should also be used to refer to a property of a member of a different superordinate level category that also shares such property (e.g. *the fast plane*). As it has been explained before, the authors disregard the difference between reference and predication.

The base studies do not study in a precise way the interpretation of adjectives in monolingual children, because they are not exposed to concrete stimuli that allow us to discover how the child interprets what an adjective refers to, since the objects presented to the children did not share —to the best of my knowledge— another salient property than that one of being taxonomically related objects of the model object. The authors of the base studies presented members of superordinate level categories and objects that were thematically related to the superordinate level category, because their main aim was to look at the *Taxonomic-Assumption bias*. Therefore it cannot be stated that children acquiring languages that present the Determiner-

Adjective construction in which the noun is elided will show a different understanding of novel adjectives.

The different results, which they did not expect, obtained by the English- and Spanish-speaking children deserve further investigation with an improved design that really focuses on adjectives. To overcome this limitation it is necessary to include alternatives that share a salient property (a pattern) with the model object but are drawn from a different superordinate level category than the model object. This design permits children to interpret the novel adjective as a property that can be applied to an object of a different superordinate category.

The present study additionally explores the role of syntax and morphology as informative linguistic sources for the child to acquire the grammatical category of the adjective and adapts the methodology used in Hiramatsu et. al (2010) to retest Spanish- and English-speaking children's understanding of adjectives.

Next chapter presents the methodology and design of the present study.

CHAPTER 3

DESIGN AND METHOD

3.1. Research Question.

The main purpose of this study is to investigate how the experience with two different

languages such as English and Spanish steers the acquisition process of adjectives. This study

adapts the method used in Hiramatsu et al. (2010). The research question of the present study is:

How do Spanish and English monolingual children conceptualize the meaning of adjectives?

Adjectives do not directly refer to objects, although they are predicated about them. Do children

understand that adjectives refer to a property of an object? Or do they think they refer to objects

themselves in the first years of life? Another part of the research question is how do children use

linguistic cues –such as adjectival morphemes and syntactic context–to figure out that a word is

an adjective? In this thesis I will use the morphemes *–y* in English and *–oso* in Spanish, as

adjectival morphemes. For syntactic context, adjectives will appear inside a verb phrase headed

by *is / está*.[8]Some adjectives will also appear with *all / todo* to provide extra syntactic cues e.g.,

it's all frepy / está todo freposo.

3.2. Main Hypothesis.

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

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[8] In Spanish, there are two copulas: *ser* and *estar*. Adjectives can co-occur with both copulas such as in
Juan es alto or *Juan está alto* 'Juan is tall' (Silvia-Corvalan, 1986). In the Standard Spanish *ser* is used
with permanent properties and *esta*r with temporal characteristics. In this study *estar* was decided to be
used because in the dialect of the participants *estar* is more common to be used with adjectives.

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;00 on, children conceptualize adjectives as properties and not as objects, regardless of the language they appear on.

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

3.3.   Design.

Hiramatsu et al. (2010) presented the same test objects with different characteristics as alternatives to choose from in the two conditions (Across-Category condition and Within-Category condition). In order to further investigate if Spanish-speaking children interpret the meaning of an adjective as if it referred to an object or to a property, I decided to modify the methodology used by Hiramatsu et al. (2010) by combining their Within-Category and Across-Category conditions therefore making the test more challenging for the subjects. That is, in an Across-Category condition, children were presented with a model object and two test items as alternatives to choose from. 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. Object patterns are physical properties that, as we saw in the previous chapter, are among the semantic categories expressed by the adjectives that English- and Spanish-speaking children first acquire.

The proposed modification gives us the opportunity to investigate how children interpret the meaning of an adjective: as a property or as an object, because we offer the child the possibility to choose the same object as the model object but with a different pattern (non-target object). If the children select this object it will show that children understand the adjective to refer to the object. We are also offering the child the possibility to choose a different object from a different superordinate category containing the same pattern as the model object (target object). If the child selects this object, then it will show that children understand the adjective to refer to the property. In the task, children have to recognize that the novel adjective refers to a property of the object (its pattern) and no to the object itself and find the test item that has the same pattern. This design allows us to see the child's interpretation of adjectives in a more precise way than the design of the base studies because it gives the child the possibility to choose between the property of the object (adjective) or the object (noun).

3.3.1. Factors in design.

There was one independent variable, linguistic context, presented as the within-groups factor. Two quasi-independent variables were presented as the between-subject factors: Age and Language.

3.3.1.1. Independent variable.

The linguistic context was varied on whether the adjective was presented in isolation, if it was presented only with an adjectival morpheme, with syntax only, or with both an adjectival morpheme and syntax.

3.3.1.2. Quasi-independent variables.

The quasi- independent variables were the subjects' age (3 and 4) and language (Spanish or English).

3.3.1.3. Dependent variable.

The dependent variable is the type of response from the child: target object selection (property matching) or non-target object selection (object matching).

3.3.1.4. Number and identity of conditions.

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. 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

3.3.2. Number of stimuli per condition and total number of stimuli.

There were 4 stimuli in each of the four linguistic contexts. The total number of stimuli was 16. Table A.1 in the Appendix shows the complete set of stimuli and per condition.

To summarize, the present study was based on a 4 (context) X 2 (age) X 2 (language) mixed factorial design.

3.3.3. Controls.

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. Table A.2 in the Appendix shows the exact number of morphemes, syllables and words in the four different linguistic contexts in which the adjectives were presented.

In Spanish, the grammatical gender of the objects shown in each condition could be a confounding variable that made the child choose the object that had the same grammatical gender as the model object, therefore all the nouns referring to the objects depicted in the test were masculine.

The places in which the target object appeared were counterbalanced. Half of the target objects were placed to the right of the model object and the other half were to the left of the model object. Table A.1 in the Appendix contains a description of all the drawings used in the test as well as the places in which the target object appeared for each linguistic form.

3.4. Specific hypotheses of the design.

Based on this design we could hypothesize that children will 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* They should be less successful when they

have no context such as in *tep / tepo*. I make no prediction of which context will be easier for them between the morpheme context only or the syntactic context only.

3.5. Stimuli.

The stimuli were drawings that represent basic objects that children produce and recognize at the age of 3 and 4 years of age. They belong to different superordinate level categories such as animals, basic shapes, toys, clothing and food. The patterns that these objects portray as referents of the adjectives were basic patterns such as lines, dots, and spirals that were adapted from the study of Hiramatsu (2010). Some of the English novel adjective forms such as *mipy, freppy, prall, drin,* and *piffy* were taken from other studies that have looked at the acquisition of adjectives[9]. The others novel adjectival forms were invented based on the prior adjectival forms.
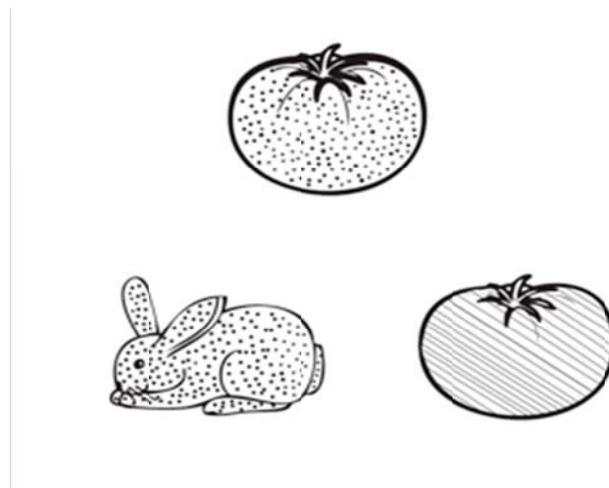

Figure 3-1: Sample drawing used in this experiment, showing the across-category condition

[9] Song L., Nazzi T., Moukawane S., Golinkoff R., Stahi A., Ma W., Hirch-Pasek K., Connel M, (2010) and Hiramatsu et al, (2010).

3.6. Procedure.

In the pretraining session, children were presented with a set of pictures that depicted three different objects: a model object and two different test items. Children heard real adjectives that represent physical properties such as dimension, color and nouns that referred to the model object (that were basic objects that children recognize at these ages) and they had to match the adjective or the noun to one of the two other items. Table A.3 in the Appendix shows a description of the specific pretraining pictures shown to the child and the specific lexical categories that children heard.

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

Pretraining question example:

Look at these pictures! Peter says (referring to the model object): "yellow". Is there something else here that is yellow? Can you point to it?

¡Mira estas fotografías! Pepe dice (referring to model object): "amarillo" ¿Hay algo más aquí que está amarillo? ¿Me lo puedes señalar con tu dedo?

After the pretraining, children were introduced to the task and after hearing the same instructions they were presented with the stimuli described above. Children in the task heard:

Task question example:

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?

The only difference between the pretraining and test stimuli was that in the pretraining stimuli children were presented with real adjectives and nouns. In the test stimuli children were presented with novel adjectives presented in 4 different linguistic contexts and the objects were drawings that belong to different superordinate categories from that of the model object.

3.6.1. Participants.

The participants were 30- English-monolingual speaking children and 30-monolingual Spanish-speaking children, whose ages ranged between 3 and 4 years of age. It is hard to find monolingual children in El Paso, Texas since the majority of the population is bilingual, and children grow up as simultaneous or successive bilinguals. The English-speaking children attended a day care center located at Fort Bliss, Texas which is a military zone in which American soldiers that are native speakers of English live and their children attend this day care center. The Spanish-speaking children were recent immigrants from Ciudad Juárez, México who live in San Elizario, Texas. Violence in Ciudad Juárez did not permit me to test the monolingual Spanish-speaking children there. Participants were recruited from San Elizario, Texas in which according to the U.S Census Bureu and USA.com the majority of the population is Mexican and Spanish is the language that is spoken at home.

The final statistical analysis included twenty-nine Spanish-speaking children and twenty-five English-speaking children. The next section explains the scoring criteria which were taken as a base to decide what children were excluded from the statistical analysis.

3.7. 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.

Four English-speaking children and one Spanish-speaking child were excluded due to their misunderstanding of the task. They obtained only 0's in the whole task. An English-speaking child was excluded from the statistical analysis because two of his/her responses were not captured by the camera.

The next chapter presents the results and the conclusions from this study.

CHAPTER 4

RESULTS AND CONCLUSION

4.1. Analysis.

The analysis of the picture selection test results was designed to test for the effect of three independent variables: the linguistic context (see Table 4-1), the language of the child and the age of the child.

Table 4- 1: Linguistic contexts in design.

Context 1	Context 2	Context 3	Context 4
Adjective without morpheme or syntactic context	Adjective without morpheme but with syntactic context	Adjective with morpheme but without syntactic context	Adjective with morpheme and syntactic context

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). I considered Context 1 (Adjective without morpheme or syntactic context) as the baseline performance covariate and I ran an ANOVA with the other three independent variables.

4.2. Results.

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 would have predicted. The main effect of age reflected that 4 year-olds performed better than 3 year-olds. The main effect of context was qualified by an interaction with the type of linguistic context. As illustrated in Figure 1, 3 year-olds benefitted from the full context (Adjective with morpheme and syntactic context) while there seemed to be no effect on the type of linguistic context for the 4 year-olds. Follow-up t tests revealed significantly better performance for 3 year- olds in the full context condition 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. The same analyses performed on the accuracy data of the 4-year-olds revealed no significant differences in performance across the different linguistic contexts.
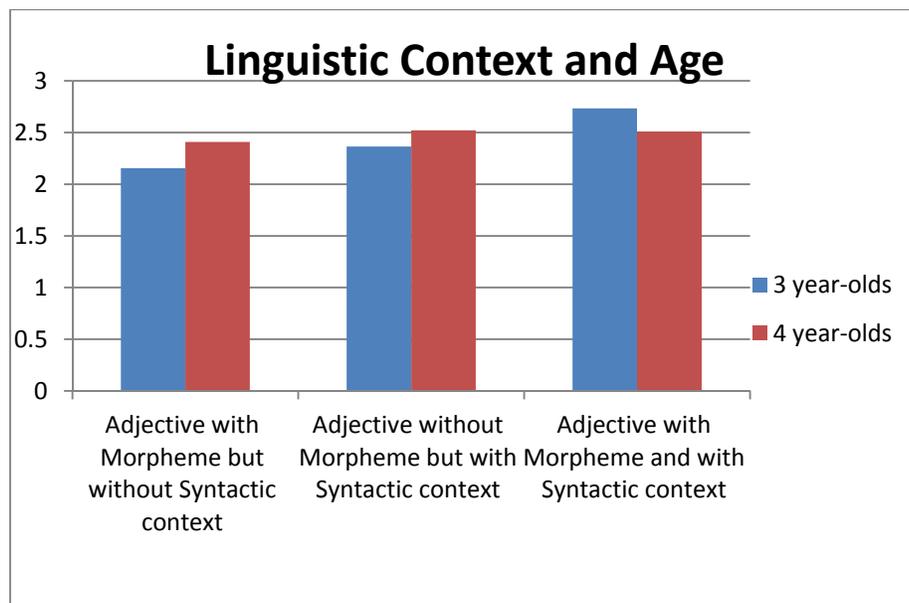

Figure 1: Means of correct responses according to Linguistic Contexts by Age

4.3. 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 and Markman 1985, Taylor and Gelman 1988, Waxman and Markow, 1998 Waxman and Klibanoff 1998, 2000, Waxman 2000, Klibannof and Waxman 1999, 2000, Sandhofer and Smith 2007. Hiramatsu, Rulf, and 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 would predict. They propose 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).* This study does not support this 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. In contrast to the results reported on the Hiramatsu et al.'s study, my results show that even 3 year-olds were able to apply the novel adjective to an object that belonged to a different superordinate category. However, the

low means presented in Figure 1 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.

My 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 and Gelman, 1988).

4.4. 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 years old because it provided to 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 in Spanish and English relying on different linguistic contexts; and therefore it confirms my hypothesis 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. For future work on this topic, I will include a second stage in the task. The first stage will be modified by presenting to the child the model object (e.g. an apple) and two test items. All of the objects are going to be members of the same basic level category (e.g. three apples). One test item will contain the same pattern of the model object and the other test item will contain a different pattern. This stage will provide support for the contrast between members of the same basic level category and children will apply the adjective within the same category. Children will hear: *Peter says: it's all garpy (target object) Is there something else here that is garpy?* In the second stage I will include two objects that will belong to a different superordinate category (e.g. two bunnies). Each item will portray a different pattern. One will be the same as the model object and the other will be a different pattern. This stage will allow us to see if children can interpret adjectives across different categories after they have been applied the adjective within categories. Children will hear: *Now there are two more. Which one of these is also all garpy?* Methodological issues will be

reassured in terms of the language proficiency of the participants, being these truly monolingual Spanish-speakers exposed to non-English at all and the number of participants will be increased.

The present study has looked at the acquisition of the reference of adjectives criticizing the analysis by the base studies 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 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. My 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? The results of this study show that children understand that referents of adjectives can be predicated of objects of different superordinate categories obeying the conceptual organization in the hierarchical systems of adjectives and that they rely on syntax and morphology to learn what an adjective refers to.

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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.	Left
3		Meb Mebo	**Model object:** A plate with black crosses. **Target object**: A pig with black crosses. **Non-target object:** Plate with vertical lines.	Right
4		Tep Tepo	**Model object:** A glove with musical notes. **Target object**: A pentagon with musical notes. **Non-target object:** A glove /with vertical lines.	Left
	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	Right

			rectangle with spirals.	
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 dapo	**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 marks. **Target object:** A balloon with black marks. **Non-target object:** A cat with zig zag lines.	Right

4		Romy Romoso	**Model object**: An isosceles triangle with black squares. **Target object**: A dress with black squares. **Non-target object:** An isosceles triangle with doodles.	Left
	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 Está todo freposo	**Model object:** An elephant with black stars. **Target object:** A trapezoid with black stars. **Non-target object:** An elephant with semicircles.	Left

Table A2. Number of morphemes, syllables and words in the linguistic contexts.

	Language	Number of morphemes	Number of syllables	Number of words in context
Adjective without morpheme or syntactic context	**English**	1 (root)	1	1
	Spanish	2 (root and gender)	2	1
Adjective without morpheme but with syntactic context	**English**	1 (root)	1	1
	Spanish	2 (root and gender)	2	1
Adjective with morpheme but without syntactic context.	**English**	2 (root and adjectival suffix)	2	4
	Spanish	3 (root, adjectival suffix and gender)	3	3
Adjective with morpheme and syntactic context.	**English**	2 (root and adjectival suffix)	2	4
	Spanish	3 (root, adjectival suffix and gender)	3	3

Table A3. Adjectives, nouns, and pictures in pretraining.

	Lexical Form	**Linguistic Stimuli**	**Picture**	**Position of Target Object**
1	Adjective	Yellow	**Model object**: A yellow bird. **Target object**: A yellow cheese. **Non-target object:** A blue ribbon.	Right
2	Adjective	Green	**Model object**: A green fish. **Target object**: A green tree. **Non-target object:** A white horse.	Left
3	Adjective	Big	**Model object**: A big panda. **Target object**: A big hippo. **Non-target object:** A small bug.	Right
4	Noun	Donkey	**Model object:** A gray donkey. **Target object:** A brown donkey. **Non-target object:** An orange comb.	Left
5	Adjective	Small	**Model object:** A small mouse. **Target object:** A small chicken. **Non-target object:** A big lion.	Right
6	Noun	Cake	**Model object:** A strawberry cake. **Target object:** A blue fork. **Non-target object:** A	Left

			chocolate cake.	
7	Noun	Airplane	**Model object:** An airplane. **Target object:** An airplane. **Non-target object:** A sun.	Right
8	Noun	Telephone	**Model object:** A gray telephone. **Target object:** A black telephone. **Non-target object:** An open notebook.	Left
9	Adjective	Round	**Model object:** The planet Earth. **Target object:** A round clock. **Non-target object:** A dinosaur.	Right
10	Adjective	Long	**Model object:** A long worm. **Target object:** A long cleat. **Non-target object:** A short worm.	Down in the page
11	Adjective	Short	**Model object:** A short way. **Target object:** A short pencil. **Non-target object:** A long way.	Up in the page
12	Adjective	Cold	**Model object:** An ice cube. **Target object:** An ice cream. **Non-target object:** A glass of hot chocolate.	Left

CURRICULUM VITA

Martha Elizabeth Rayas Tanaka studied her B.A and M.A in Linguistics at the University of Texas at El Paso. During this time Martha E. Rayas participated in the Virtual Center for the Study of Language Acquisition and the UTEP Language Acquisition and Linguistics Research Lab collaborating in the investigation of language acquisition in the area of El Paso Texas and Juárez, Chihuahua.