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**The Primary and Non-primary Acquisition of the Mass-Count Distinction in
English and Spanish**

Diana M. Carter

Thesis submitted to the
Faculty of Graduate and Postdoctoral Studies
In partial fulfillment of the requirements
For the PhD degree Spanish

Department of Modern Languages and Literatures
Faculty of Arts
University of Ottawa

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ABSTRACT

This dissertation takes as its central focus the primary acquisition of the mass-count distinction in English and Spanish and the non-primary acquisition of the mass-count distinction in Spanish by English speakers. We compare the distinction in both languages and examine the problems that may arise from the acquisition of the distinction in a first and second language.

Current research examining the acquisition of the mass-count distinction has been primarily concerned with early language acquisition. In particular, first language research has looked at the use of language constraints and biases that may facilitate early language acquisition in general, and specifically of mass and count nouns. It has been hypothesized that children are born with constraints and biases that facilitate the acquisition process. One question that arises is whether or not these biases are universal or dependent on the specific language. Our first study aimed to answer this question by comparing the use of substance (*water/agua*) and object (*meat/carne*) mass nouns by Spanish and English children. The findings from the English and Spanish data led us to hypothesize that the biases may be affected by language specifics.

Our second study is concerned with the role of the first language in the non-primary acquisition of the mass-count distinction in Spanish. We proposed that the participants would produce fewer target responses in their experimental tasks for nouns that are more 'flexible' in Spanish than in English. This prediction was based on the hypothesis that for the nouns that have a similar status in both languages there would be a positive influence from the first language, whereas for non-equivalents there would be an opposite effect. Our results support these hypotheses.

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INTRODUCTION

Fundamental to the study of language acquisition, both primary and non-primary acquisition, is the study of the lexicon. The lexicon can be defined as the mental representation of the vocabulary of a language, which consists of words and expressions, or more formally, *lexemes*. By studying the lexicon, we can learn how the lexemes are structured, how they are used and stored, how they are learned, and how words are related to one another. To date, the study of the lexicon has been more a focus of first language (L1) acquisition researchers, as well as psycholinguists who are concerned with the structure of the bilingual mental lexicon. In second language acquisition (SLA) research, however, the lexicon has received far less attention, even though it is a fundamental component for L2 learners (Gass and Selinker, 2008; Meara, 1984). The lexicon in SLA should be given more attention, considering that lexical errors can outnumber grammatical errors by three to one, and that these lexical errors are found by native speakers to be more disruptive to communication than grammatical errors (Meara, 1984).

The lexicon is of great importance to both L1 and L2 acquisition. Levelt (1989:181) considers the lexicon to be the driving force in sentence production: 'grammatical and phonological encodings are mediated by lexical entries. The preverbal message triggers lexical items into activity. The syntactic, morphological, and phonological properties of an activated lexical item trigger, in turn, the grammatical, morphological and phonological encoding procedures underlying the generation of an utterance.' The lexicon is also vital to sentence comprehension. If the lexical information in a sentence cannot be interpreted, then sentence comprehension will be impeded (Gass *et al.*, 2008).

Despite the importance of the lexicon, it is not sufficient to know only the meanings of individual words. For sentence production and comprehension to take place, the speaker – hearer also needs to have a knowledge of the phrasal syntax. Examples (1) and (2) illustrate this point:

(1) Paul bought a chicken.

(2) Paul bought chicken.

If the language learner did not know how to interpret the indefinite determiner *a*, then the learner would not comprehend the difference in meaning between the two sentences. In (1), Paul bought a whole animal, which may have been alive or not at the time. In (2), Paul bought some chicken, which can be interpreted as a type of food. These two examples show that phrasal syntax plays a crucial role in the interpretation of word meanings. Similarly, the meanings of words also help determine syntactic relationships. The bi-directional relationship between semantics and syntax on the status of the lexicon, and how it facilitates both primary and non-primary language acquisition, is one of the main focuses of this dissertation.

In fact, one area of particular interest in the field of language acquisition is the study of the relationship between meaning and syntax for the mass-count distinction. In general, count nouns but not mass nouns can be quantified by cardinal numbers, they can take plural morphology, and they can be preceded by an indefinite determiner. Both mass and count nouns may be various types of common nouns, such as concrete (*dog-perro*), abstract (*beauty – belleza*), or collections (*army-ejercito*). There are also nouns that may type-shift between mass and count depending on the phrasal syntax and the referent, as illustrated above in examples (1) and (2). In example (1) *chicken* is used as a count noun preceded by an indefinite determiner, whereas in (2) it is given as a mass noun in a bare noun phrase. The difference in phrasal syntax between the two examples causes a change in the semantic interpretation of the sentences. The count

interpretation of a sentence tends to denote a countable, distinct individual (*a chicken*). The mass noun, however, tends to refer to an uncountable, indistinct non-individual (*chicken*).

Of primary interest to the current dissertation is the difference between the mass-count distinction in English and Spanish. In particular, we examine the problems that the distinction presents for the acquisition of English as a first language, and of Spanish as both a first and second language. The study entails a comparative description of the distinction in English and Spanish, based on an analysis of new data as well as the relevant previous research that has been conducted to date.

Chapter one presents a comparison of the distinction that focuses on the similarities and differences of the mass-count morpho-syntax in both languages. The first chapter is also concerned with the theories regarding the root of the mass-count distinction. It is argued that there is a semantic relationship between the distinction and reference to individuals. More specifically, the semantic view posits that count nouns refer to entities that are perceived as distinct individuals, whereas mass nouns are nonindividuated entities.

Chapter two begins with a discussion of the word learning problem in L1 acquisition. Specifically, how do children acquire a language when there are so many possible interpretations of the available input? Some of the possible strategies children may use to facilitate the acquisition process are word learning constraints and mapping procedures. For instance, children may extend novel labels on the basis of shape or material. The learner may classify object nouns as count nouns because they are born with an innate mechanism that constrains object nouns on the basis of their shape. A child may also classify a noun as mass if the referent is a non-solid substance.

This theory of word learning is explored further in chapter three through the study of spontaneous speech data from monolingual English, monolingual Spanish, and bilingual English-Spanish children. The study is a quantitative analysis of the production errors from seventeen early language learners. Part one of the study examines two categories of mass nouns, substance mass nouns and discrete object mass nouns, in order to test the following questions: will children overextend the shape bias or whole-object bias and miscategorized object mass nouns as count nouns? Moreover, if these learning biases are universal, will Spanish and English children produce the same types of overextensions and miscategorizations? The second part of the study analyzes the transcript data according to a further categorization of the object mass nouns, in order to take into consideration further conceptual differences.

In chapters four and five the focus of this dissertation shifts from the primary acquisition of the mass-count distinction to the non-primary acquisition, and the role of the L1 in the L2 acquisition process. In the fourth chapter, we discuss the similarities and differences between L1 and L2 acquisition, as well as key issues in SLA such as the nature of non-native grammars with specific reference to the lexicon, and the effects of positive and negative language transfer. Chapter five presents an empirical study of the acquisition of the mass-count distinction in Spanish by native English speakers. The participants, fifty-five undergraduate students from three different proficiency levels, were invited to complete two tasks: a translation task and a multiple choice task. The results from the two tasks were analyzed according to four main conditions: bare mass noun phrases, nouns preceded by an indefinite quantifier, flexible (type-shifting) nouns preceded by an indefinite determiner, and nouns used with a classifier. The experiment tested two hypotheses: 1) the number of target responses would increase with an increase in proficiency level; and 2) the participants would produce the highest percentage of

non-target responses with nouns that are flexible in Spanish. The aim was to determine whether or not flexible nouns in Spanish that are not considered flexible in English have the lowest percentage of target responses.

The main contributions of this dissertation may be considered as the following: First, the dissertation offers a comparative description of how the mass-count distinction is instantiated in English and Spanish. Second, it contributes new data on the L1 and L2 acquisition of the mass-count distinction in Spanish. Third, there are very few L1 studies concerning the mass-count distinction that include Spanish data. To date, only research from Gathercole (1997), Gathercole and Min (1997), and Gathercole, Thomas and Evans (2000) has been noted. By considering both English and Spanish data, it is the goal of this author to contribute to the study of the universality of constraints in L1 acquisition. Fourth, to the knowledge of this author, there are no studies investigating the topic of the mass-count distinction in Spanish L2 research. The experiment in chapter five is intended as a starting point for further research in this area. Finally, even if it is not a main objective of this dissertation, it is expected that the data will be of pedagogical use since it will provide teachers and textbook authors with information about the problems encountered by language learners as well as the usage preferences depicted by the native speakers who comprise the control group.

CHAPTER ONE

1.0 Introduction

One of the ongoing debates in language acquisition research is how semantics and syntax are related, and how knowledge in one area may facilitate acquisition in the other. One topic of debate in particular is the relationship between semantics and syntax in the acquisition of the mass-count distinction. On one side of the argument, researchers argue that syntax provides the foundations for conceptual knowledge. An alternative view suggests that there are semantic criteria that distinguish mass from count nouns. Both views are discussed in the current chapter. The syntactic view is presented in section 1.1 for the mass-count distinction in both English and Spanish. Section 1.2 follows with a review of the different theories of mass-count semantics. The chapter is concluded in section 1.3.

1.1 The Syntactic View

In English, common nouns are separated into mass and count nouns on the basis of distributional privileges (Gathercole, 1997; Gathercole *et al.*, 1997). There are distinct quantifiers for mass and count nouns, only count nouns can occur in the plural form as well as the singular form, and only count nouns can be preceded by an indefinite determiner. Gathercole (1997) argues that, unlike English, Spanish does not have a linguistic mass-count distinction that is based on distributional privileges for two main reasons: Spanish only has one pair of indefinite quantifiers that is used with both mass and count nouns. Additionally, Spanish nouns are not as restricted for number as they are in English, which means that there are many more nouns that can be used as count or mass depending on the denotation of the noun. Despite the differences in the nominal structures of these two languages, they share an important property: in both Spanish

and English, count noun phrases tend to denote countable, individual entities, whereas mass noun phrases refer to continuous entities that are not individuated. The following section discusses in detail the similarities and differences between English and Spanish mass and count syntax. At the end of the section we will return to Gathercole's claim that only English has a linguistic mass-count distinction.

According to Bosque (1999:7)¹, common nouns can be divided into four classifications: count and mass nouns, numerable and *pluralia tantum*, individual and collective nouns, and abstract and concrete nouns. The distinction between mass and count nouns establishes the notions of quantity and number within a language. Count nouns categorize an entity as discontinuous or discrete, whereas mass nouns tend to refer to the notion of substance or matter. Numerable nouns are those which can be quantified with a number (*un libro/a book*). In contrast, *pluralia tantum* only occur in the plural but cannot be counted or given a determined number. For example, *las relaciones públicas/public relations* cannot be used in the singular, nor can there be specify a quantity (**tres relaciones públicas/*three public relations*). The third classification of common nouns consists of individuals and collectives. Nouns of the individual type are perceived as simple entities (*soldado/soldier, árbol/tree*), whereas collectives are perceived as multiples (*ejército/army, arboleda/grove*). Abstract and concrete nouns fall into the fourth classification. Concrete nouns are those which denote material entities (*perro/dog*). Abstract nouns label complex notions that refer to nonmaterial entities (*belleza/beauty*). It should be noted that a noun does not have to be exclusive to only one classification. For example, a noun could be classified as count, individual and abstract (eg. *dia/day*). For the purpose of this

¹ The discussion by Bosque (1999) only addresses common nouns in Spanish. All the glosses and English translations are my own.

dissertation, I will discuss the aforementioned classifications of common nouns with respect to their status as mass or count.

Count nouns are given such a name because they tend to denote entities that can be quantified with a number and thus counted (*tres libros/three books*). These nouns can occur in the singular but can also be pluralized. The plural morphology forces a multiple count interpretation of the noun. In contrast, a mass noun refers to an entity that can be measured as a quantity but not as a specific number (**tres basuras/*three garbages*). A noun cannot be used with mass syntax and have plural morphology (**mucha arenas/*much sands*).

Mass and count noun phrases in both Spanish and English also differ with respect to the presence or absence of determiners. In English, mass nouns and plural count nouns can occur without a determiner, whereas singular count nouns require a determiner. For Spanish, this rule also applies in general²:

(1) Esto es {pan/*libro}.
this-M-SG is-3SG-PRES {bread-M-SG / book-M-SG}
'this is {bread/*book}'

(2) Quería {leche/*lámpara}
want-1SG-IMP {milk-F-SG / lamp-F-SG}
'I wanted {milk/*lamp}'

(3) Estos son libros.
these-M-PL are-3PL-PRES books-M-PL
'these are books'

Example (1) illustrates that the mass noun does not require an indefinite determiner, whereas the count noun does in both languages. The same rule is also shown in example (2). The third example shows that plural count nouns, like mass nouns, do not require an indefinite determiner. Examples (4) and (5) below contain several exceptions to this rule that exist only in Spanish (and not English) (O'Donnell and O'Donnell, 1988:19-23):

² The Spanish examples (1), (2) and (3) are from Bosque (1999:10).

(4) Mi padre es médico.
my-SG father-M-SG is-3SG-PRES doctor-M-SG
'My father is a doctor'

(5) Me miró con una curiosidad creciente.
me look-3SG-PT with a-F-SG curiosity-F-SG growing
'He looked at me with *a growing curiosity'

When referring to a person's job in Spanish, the count noun does not require an indefinite determiner, as illustrated in (4). Example (5) demonstrates that a mass noun in Spanish can sometimes be preceded by an indefinite determiner. Neither of these two examples is possible in English.

Both mass and count nouns in Spanish can be used without a determiner when they form prepositional complements (Bosque, 1999). Some examples are *pastel de manzana* (apple pie) and *nubes de algodón* (cotton clouds). There are some instances where English behaves like Spanish, such as with *hecho con manzana* (made with apple). Both mass nouns and count nouns can appear in similar constructions, however the count noun allows for a more specific interpretation (*hecho con una manzana* / made with an apple).

There are nouns in both Spanish and English that can occur as either a mass noun or a count noun depending on the syntax and the intended referent. It has been argued, however, that nouns in general are more flexible in Spanish than they are in English (Gathercole, 1997). The following examples are taken from Bosque (1999:10):

(6) Tienes huevo en la corbata.
have-2SG-PRES egg-M-SG on the-F-SG tie-F-SG
'you have egg on your tie'

(7) Tienes un huevo en el plato.
have-2SG-PRES a-M-SG egg-M-SG on the-M-SG plate-M-SG
'you have an egg on your plate'

The noun *egg* in example (6) is used with mass syntax and refers to an unspecified quantity of egg on the person's tie. In example (7) *egg* is preceded by an indefinite determiner which permits a count interpretation of the phrase. Used with count syntax, the noun refers to a single individual egg on the person's plate.

Unlike indefinite determiners, definite determiners and demonstratives can be compatible with both count and mass interpretations. Singular definite determiners and singular demonstratives can occur with singular count and mass nouns in both Spanish and English. English also only has one definite determiner *the* that can be used with singular and plural count nouns as well as mass nouns. In Spanish the definite determiner must agree in gender and number with the noun it precedes (*el, la, los, las*). The Spanish demonstratives must also agree in gender and number with the noun (*este, esta, estos, estas*). An interesting difference between Spanish and English is that the definite determiner in Spanish may allow for both a count and a generic interpretation (Bosque, 1999:11):

- (8) A María no le gusta el café.
to Mary NO-NEG her like-3SG-PRES the-M-SG coffee-M-SG
'Mary does not like the coffee'

The ambiguous Spanish sentence in example (8) may be interpreted in two ways. The continuous interpretation of the sentence suggests that Mary does not like coffee in general (generic interpretation). The discontinuous interpretation implies that Mary does not like the specific cup of coffee in front of her that she may be currently drinking (count interpretation). In English, the ambiguity would not exist because the presence of the definite determiner does not allow for the interpretation of coffee as a generalization. *The coffee* could mean that she does not like the type of coffee that she is drinking, which would be a mass interpretation (*Mary does not like the coffee*). With further context, Mary might be implying that she does not like this

particular brand of coffee and will not be purchasing it again. It could also mean that she does not like that specific cup of coffee. It does not mean, however, that she does not like coffee as a drink, just as someone may not like tea or soda. For this general interpretation in English, the sentence would have to be given without a determiner (*Mary does not like coffee*).

Spanish and English mass-count syntax also differs with regards to the indefinite quantifiers in each language (Bosque, 1999). The only difference between indefinite quantifiers for mass and count nouns in Spanish is that the quantifiers can take plural morphology (*mucho-muchos, poco-pocos*). In English there are two sets of indefinite quantifiers, one set for mass nouns and another for count nouns. Unlike in Spanish, the English quantifiers do not take plural morphology. *Much* and *little* are used for mass nouns while *many* and *few* precede count nouns. There are other quantifiers in Spanish that can only be combined with singular count nouns. Some examples are quantifiers such as *cualquier, todo, cada, and medio*: **cualquier sangre* (*any blood*), **todo aire* (*all air*), **medio aire* (*half air*). Mass nouns can be combined with quantifiers like *todo* (*all*) and *mitad* (*half*) if the nouns are preceded by a definite determiner (*toda el agua / all the air, la mitad del aire / half of the air*).

One of the most interesting properties of the Spanish nominal system, compared with that of other languages such as English, is the flexible allowance of nouns to be categorized and recategorized as mass or count (Bosque, 1999). Many mass nouns in Spanish can be recategorized as count when used with count syntax. When this occurs, the default interpretation of these nouns is that they denote a class. For instance, *varias arenas* (**several sands*) can be interpreted as *varios tipos de arena* (*several types of sand*). Abstract nouns, along with concrete nouns, can also be syntactically recategorized as count nouns: *varios entusiasmos* (**several*

entusiasms) gives the interpretation of *varias clases de entusiasmo* (*several classes of enthusiasm*).

In Spanish, as well as in English, there exist words that may be interpreted as count or mass depending on the structure, although the number of these words appears to be more limited in English. These flexible nouns are also a source of variation across both languages. Take for example the noun *jamón* (*ham*). If used with mass syntax, such as in the cases of *No quiero más jamón* (*I don't want more ham*) or *Huele a jamón* (*It smells like ham*), the absence of an indefinite determiner forces the interpretation of *jamón* as a term denoting matter (Bosque, 1999). In contrast, if the noun *jamón* is preceded by an indefinite determiner, the resulting interpretation is that the noun refers to an individual countable entity: *Le regalaron un jamón* (*They gave him a ham as a gift*). Some other nouns that can be recategorized in both languages are: *pollo* (*chicken*), *pelo* (*hair*), *huevo* (*egg*), *manzana* (*apple*), and *corcho* (*cork*). There are several other nouns, however, that are flexible in Spanish but cannot be used as count nouns in English: *ajo* (*garlic*), *algodón* (*cotton*), *pan* (*bread*), *queso* (*cheese*), and *madera* (*wood*) among others. An interesting result of recategorization is that the meaning also varies depending on the noun. With some mass nouns, when they are preceded by an indefinite determiner the resulting denotation is the same as if the noun was preceded by a classifier. For example, when *café* (*coffee*) is used with an indefinite quantifier – *un café* (*a coffee*), the recategorized noun is interpreted as *una taza de café* (*a cup of coffee*). In Spanish this also holds true for the word *papel* (*paper*): *un papel* (*a paper*) also means *una hoja de papel* (*a sheet of paper*). The meaning of *a paper* in English is debatable. Some argue that *a paper* is only used in English when referring to the newspaper, or to an essay or assignment in school (Bloom, 1990), whereas others

suggest that *a paper* is acceptable to refer to a sheet of paper³. Another example that is shared by both Spanish and English is the word for beer (*cerveza*), which can also be recategorized in both languages using an indefinite determiner to denote *a bottle of beer* (*una botella de cerveza*). There are also other nouns that do not have the same meaning with an indefinite determiner as with a classifier. For instance, *un queso* (**a cheese*) does not refer to *una loncha de queso* (*a slice of cheese*) but instead actually refers to a small cheese wheel. *Pan* (*bread*) in Spanish also works in a similar manner. When preceded by an indefinite determiner, the noun does not denote *un trozo de pan* (*a piece of bread*) but instead refers to a small loaf of bread similar to a small baguette.

Until this point in the present chapter it has been established that mass nouns only occur in the singular and only count nouns can take plural morphology and thus have plural verb agreement. There exists another classification of the common noun that is shared by both Spanish and English. This classification consists of nouns that occur only in the plural form and take plural verb agreement. These nouns are called *pluralia tantum*, which is a Latin term meaning *only plurals* (Bosque, 1999). The nouns that fall into this classification, such as *celos* (**jealousies*) and *ganas* (*desires*) in Spanish, or *guts* and *bowels* in English, can be interpreted as denoting a notion of being inherently multiple. *Pluralia tantum* behave like mass nouns in that they cannot be quantified with numerals but they can be preceded by indefinite determiners. According to Bosque (1999: 30): ‘...los continuos la rechazan [la cuantificación cardinal] porque designan magnitudes, no individuos. Algo muy parecido sucede en los *pluralia tantum*: no constituyen plurales desde el punto de vista semántico, sino desde el morfológico...y por tanto no designan conjuntos de entidades.’

³ Personal communication with members of the Language Acquisition Lab at the University of Ottawa.

The *pluralia tantum* also consist of nouns for objects that have multiple parts⁴. In English, for example, *pants* and *scissors* are objects made up of two parts that function as a whole, and will not be able to perform their function if separated. Bosque (1999) also lists both *pantalones* (*pants*) and *tijeras* (*scissors*) as *pluralia tantum*, along with *gafas* (*glasses*), *bigotes* (*mustache*) and *bragas* (*panties*). Two comments should be made regarding this list of nouns. First, it is obvious that there is variation between the English and Spanish lexical items. In Spanish *bigotes* can be classified as *pluralia tantum*, whereas in English *mustache* is a count noun. Second, several of the words from Bosque's list can be used in the singular. It would not be ungrammatical or unacceptable to say *una tijera*, *un pantalón*, or *una braga*. These dual terms can occur in the singular with singular verb agreement in Spanish, but not in English (**a scissor*).

To summarize, common nouns consist of four classifications: mass and count nouns, numerable and *pluralia tantum*, individuals and collectives, and abstract and concrete nouns. Nouns in the latter three classifications also fall into the first classification of mass or count. For instance, *beauty* is an abstract mass noun, whereas *woman* is a concrete count noun. In general, mass nouns tend to denote substances, matter or unindividuated entities, and count nouns tend to refer to individuals. Nouns in both Spanish and English fall under these classifications, although there do exist cross-linguistic variations. Many mass nouns can be recategorized as count nouns when used with count syntax and vice versa. Mass nouns can also form count phrases when accompanied by a classifier. The *pluralia tantum* are a special classification of nouns that behave like mass nouns because they cannot co-occur with cardinal numerals, but at the same time they have plural morphology. The *pluralia tantum* differ in English and Spanish with respect to the dual objects. In English, these nouns cannot be used in the singular, whereas some dual object

⁴ Bosque (1999) uses the term *Duales Léxicos* and Wierzbicka (1985) refers to these nouns as Dual Status.

nouns in Spanish can be used either in the plural or singular, even when referring to one entity (ie. *un par de pantalones / a pair of pants*).

It has been demonstrated then, that there are both similarities and differences between the nominal systems in Spanish and English. There exist nouns in both languages that can be interpreted as either mass or count, depending on the structure in which the noun is embedded. Additionally, there are non-flexible nouns that may only be categorized as either count or mass. Count nouns can be preceded by numerals, an indefinite determiner, and can take plural morphology. Mass nouns cannot be quantified with cardinal numbers, or an indefinite determiner. Both count and mass nouns can co-occur with an indefinite quantifier, although in English there are two separate sets while in Spanish there is one set used for both count and mass. Both count and mass nouns in English and Spanish can be used with classifiers.

To reiterate, there are three main differences between the Spanish and English systems with respect to the mass-count distinction. First, Spanish has only one set of indefinite quantifiers (*mucho/poco*) whereas English has two (*much/many – little/few*). Second, nouns are not as restricted for number in Spanish as they are in English: 'In principle, any noun can occur in either the singular or the plural' (Gathercole, 1997:834). Third, the Spanish nominal system appears to be more flexible where syntactic recategorization is involved. Given these differences, Gathercole (1997) questions whether or not Spanish actually has a linguistic mass-count distinction. She argues that, unlike English, Spanish does not obligatorily assign nouns to one category or the other: 'In English, the mass / count distinction obligatorily applies to every noun and determines the distributional opportunities for that noun, and it determines the way in which the referent of the noun is viewed by the speaker / hearer' (Gathercole, 1997:833). She does continue to say (and contradict herself) that there are nouns in English that are 'polysemic', such

as *hamburger* and *cake*, which can be used as either a count or mass noun. There are in fact several polysemic nouns in English: *chicken*, *stone*, *string*, *pie* among others. What is true, however, is that the mass-count distinction does determine how the referent is perceived by the speaker / hearer.

In essence, Gathercole's (1997: 834) argument is as follows:

'If certain nouns in Spanish must obligatorily occur in the singular and certain others in the plural when quantified, and this externally imposes a mass / count viewpoint on the referent, then this would qualify as a linguistic mass / count distinction. However, this is not what we find in Spanish. Spanish nouns are not generally restricted for number as they are in English.'

Gathercole further adds that even if there is a tendency for continuous entities to occur in the singular and countable entities to occur in the plural, this is not the equivalent of a linguistic mass-count distinction. She argues that as an alternative, Spanish is a natural mass-count language. This means that nouns are not strictly classified as mass or count. Instead, their status is determined by the referent or the speaker's point of view. She concludes that in English, distributional privileges indicate how to view the referent, which means the form indicates semantics, whereas in Spanish the form of the noun is determined by the nature of the referent, which means the form is suggested by ontology and it is not imposed obligatorily by the language. This does not mean, however, that Spanish speakers are not able to make a cognitive distinction between substances and objects, even if there is not a linguistic distinction that forces the categorization of the referents.

Although Gathercole (1997) presents an interesting argument, we find the claims to be too rigid and therefore not entirely accurate. To begin, not every noun in English is obligatorily

assigned to one category or another. As mentioned previously, there are several nouns in English that can type-shift into either a mass or count noun depending on the referent and the phrasal syntax in which the noun is embedded. Also, some nouns are not as flexible as others in Spanish. For example, a Spanish speaker would not quantify *arena* (*sand*) with a cardinal number (**tres arenas*). Gathercole (1997) also argues that Spanish does not have a linguistic mass-count distinction because there is only one set of indefinite quantifiers (*mucho-poco*). It may be true that lexically speaking there is one set, however only count nouns may be preceded by indefinite quantifiers in their plural form (*muchos gatos/many cats*). Therefore, it is our view that both English and Spanish have a mass-count distinction that is determined by the referent and the syntactic properties; however, there are certain lexical items that may be assigned or may conform to the properties of both.

Borer (2005) and Chierchia (1998) support the proposal that the mass-count distinction in English is a grammatical one, and not one of ontology. Borer explains that even if our perception of the world may lead us to prefer a certain structure over another, it can be overridden by grammatical factors. The authors support their argument by discussing in particular the flexibility of the mass-count distinction. It is proposed that the mass-count distinction is not grammatically marked on the lexeme, but rather on the structure (Chierchia, 1998). That is to say, nouns do not come marked as either count or mass, but instead are modified by a specific grammatical operation. Chierchia (1998) suggests that mass nouns (in an 'Italian-type' language) are lexically marked as plural, and only can occur as count nouns through 'type-shifting' (or recategorization, as discussed previously in this chapter). Borer (2005) points out that when the noun is marked by overt inflection, then recategorization is impossible. For example, *rabbit* may be interpreted as count or mass, but *rabbits* can only be interpreted as count and plural. Thus,

nouns grammatically marked as plural cannot be type-shifted into a mass interpretation. Borer (2005:104) gives the following examples to illustrate this point:

(9) *There is a portion of rabbits in my stew.

(10) *A rabbits was singled out.

(11) *Much rabbit are hopping about.

Borer (2005:105) concludes: ‘that the ungrammaticality of (9) – (11) cannot be overridden by any context, no matter how salient, thus suggests that the mass-count distinction ... is not grammatically marked on the listemes themselves, but rather, on the structure within which they embed.’ As an alternative to Chierchia’s (1998) proposal, Borer (2005) suggests that all nouns are unspecified for properties, and that as a default they will be interpreted as mass unless further structure is provided.

1.2 The Semantic View

It has long been debated whether syntax provides the foundations for conceptual development, and in particular for the mass-count distinction, or if the distinction is rooted in ontological knowledge. In early studies from the 1970’s, linguists and philosophers held the position that the mass – count distinction was an ontological one, based on differences in the objects found in the world (Cheng, 1973; Grandy, 1973; Laycock, 1979). Cheng (1973) proposed that a mass noun referred to a ‘mass object’, which can be described by the following conditions:

- 1) Given a part of the mass object to be w , then any part of the mass object is w
- 2) The sum (or the whole) of parts of mass object which are w is itself w
- 3) Any part of the whole of the mass object which is w is w

In other words, a mass object is characterized by the 'internal uniformity of its discernible composition' (Cheng, 1973: 287).

One of the two main criticisms of the ontological view is that 'there does not appear to be a direct relationship between the classification of words as mass or count terms and the characteristics of their referents in the world' (Gathercole, 1986: 155). There are many instances where the same entity is named with both mass and count nouns, as with the examples *clothes* and *garments*, *noodles* and *spaghetti*, where the first word is a mass noun and the second is a plural count noun (Bloom, 1990; Gathercole, 1985). This also holds true for Spanish where there are corresponding count and mass lexical equivalents: *billete* – *dinero* (bill – money), *prenda* – *ropa* (garment – clothing), *zapato* – *calzado* (shoe – footwear) (Bosque, 1999). Additionally, as illustrated by Ware (1979:22), there is too much variation with the classification of nouns that refer to similar entities to allow for an ontological view:

'There is a count/mass difference between *fruit* and *vegetable* but they apply to things that for all accounts and purposes seem to be alike. Nor can I see anything that would explain the count/mass difference between *footwear* and *shoe*, *clothing* and *clothes*, *shit* and *turd*, or *fuzz* and *cop*. These are normally count nouns and mass nouns for basically the same thing. It is also difficult to understand why *knowledge* is a mass noun while *belief* is normally a count noun when our theories tell us they are about such similar material⁵ ...'

The second criticism comes from the argument that, rather than an object – matter distinction based on worldly objects, there should be an individual – type distinction (Gathercole,

⁵ It is interesting to note that again there is variation between Spanish and English. In Spanish both *conocimiento* (knowledge) and *creencia* (belief) can be count nouns.

1985). Some of the arguments against an object – matter distinction are as follows. First, there are several abstract nouns that do not refer to objects or substances but are classified as either count or mass nouns. (eg. *opinion* and *advice*). Second, there are several superordinates that have mass noun syntax even though they describe discrete objects. As we have seen before, *clothing*, *furniture*, and *money* are mass noun superordinates that refer to objects. At the same time, we have count noun superordinates that also refer to objects, such as *animal* and *vegetable*, but there does not seem to be an explanation for why *clothing* is a mass superordinate and *animal* is a count superordinate. Third, there are multiple categorizations that exist cross-linguistically and within the same language, which means that the same entity in the world can have both a mass and count term. As mentioned in previously, the collective mass nouns *cop* and *fuzz* both refer to the police in English. Cross-linguistic examples include *furniture*, which is a mass noun in English, but is a count noun in French (*un meuble*). Gordon (1988: 111) proposes that there are cross-linguistic differences due to how a language quantifies a noun, independent of whether it refers to objects, substances, or abstract ideas. In the case of *furniture*, he states that the French treat the equivalent *mueble* as a term that may be individuated when quantified, whereas English considers the term *furniture* as an inflexible noun that may not be individuated unless it is accompanied by a classifier.

In response to this criticism of an object-matter distinction, researchers have suggested that the mass – count syntax marks a general distinction between cognitively individuated and unindividuated entities (Bloom, 1990; Bloom, 1992, 1994; Bloom and Kelemen, 1995; Middleton, Wisniewski, Trindel and Imai, 2004; Papafragou, 2005; Wierzbicka, 1985; Wisniewski, Imai and Casey, 1996; Wisniewski, Lamb and Middleton, 2003). This current

theory, termed the *cognitive individuation* hypothesis, proposes that mass nouns denote unindividuated unbound entities while count nouns denote individuated bound entities.

In current work, researchers have developed and empirically tested the *cognitive individuation* hypothesis in English as an alternative semantic explanation for the mass – count distinction (Bloom, 1990; Bloom, 1992, 1994; Bloom *et al.*, 1995; Middleton *et al.*, 2004; Papafragou, 2005; Wierzbicka, 1985; Wisniewski *et al.*, 1996; Wisniewski *et al.*, 2003). According to this hypothesis, whether a person uses a mass or count noun depends on if they interpret the referent as an individual or as a non-individuated entity. In other words, whether an entity is labeled with a count noun or a mass noun is dependent on whether the speaker conceptualizes the entity as an individual or a non-individuated entity (Middleton *et al.*, 2004).

Unlike the notion of prototypical object, the notion of individual is more abstract and flexible. There are many individual entities that are not objects, such as parts of objects (eg. *a finger*), bounded substances (eg. *a puddle*), cognitive events (eg. *an idea*), physical events (eg. *a party*), and sounds (eg. *a bang*) (Bloom *et al.*, 1995). There are also non-individuated entities that are not substances, including cognitive events (eg. *anxiety*), physical events (eg. *sleep*), and sounds (eg. *thunder*). This raises the question, however, of why we conceptualize some entities as individuals and others as non-individuated entities, if the object-substance distinction does not always apply.

According to Wierzbicka (1985), there are important characteristics of entities that predispose their conceptualization: the first is how we interact with the entity, the second is the ease of distinguishing the entity as an individual, and the third is the divisibility of the entity. To illustrate the first point, Wierzbicka uses the English examples of *onion* and *garlic*. We can see that both are similar in size (yellow onion and a head of garlic), but unlike *onion*, entire heads of

garlic are not usually pickled or cooked whole. In Russian, however, both *onion* and *garlic* are mass nouns (*luk, česnok*). She suggests that one possible explanation is that onions are usually chopped, similar to garlic, rather than served or used whole. The factor of how we interact with an entity can also be extended to include mass superordinates. Mass superordinate categories should not be confused with taxonomic supercategories (*bird, tree*). *Bird* and *tree* belong to hierarchies of items of one kind, whereas *furniture* and *silverware* are grouped together on the basis of similarity of function rather than similarity of form.

Recent studies provide evidence that a conceptual difference exists due to how people interact with count and mass superordinates (Wisniewski *et al.*, 1996; Middleton *et al.*, 2004). In the experiment by Wisniewski, Imai and Casey (1996), participants saw two words that named members of a count category and two words that named members of a mass category on a computer screen. They were then asked to judge which pair co-occurred more often. The findings showed that we usually interact with a single member of a count superordinate (*vehicles – a car*), however we typically interact with multiple entities of mass superordinates (*silverware – table and chair*). In the Middleton, Wisniewski, Trindel and Imai (2004) study, 24 participants rated how often they interact with or use one or a few of the elements of an aggregate using a scale from 1-9. The results showed that the rated probability of interacting with one or a few elements of an aggregate is related to whether the aggregate is a count or mass noun. In other words, we usually interact with individual members of count noun aggregates, but interact with more than one member of mass noun aggregates.

The second factor advanced by Wierzbicka (1985) states that the ease of distinguishing an entity also affects whether a speaker perceives the entity as an individual. For example, *beans* is a count noun and *rice* is a mass noun because beans are more perceptually distinguishable than

individual grains of rice. Therefore, a bean is perceived as a distinct individual while rice is perceived as a non-individuated entity. This factor also applies to substances like *sand* and *gravel*, which are entities with distinct parts that are not seen as individual objects because they are too insignificant individually and as such will not fulfill their function. The study mentioned above by Middleton, Wisniewski, Trindel and Imai (2004) also tested this characteristic. Twenty-five undergraduates were asked to view word lists of groups of similar things on a computer screen, and then asked to imagine a typical group of the entity listed before rating how easy it is to distinguish its individual units. For example, a student would read a singular count noun (*a toothpick*) or a mass noun with the quantifier 'unit' (*a unit of rice*). After imagining a group of toothpicks, for example, the participant would rate the item on a scale of 1-9 indicating how easy or difficult it was to see and distinguish the individual unit in a group. The participants rated the count noun aggregates as easier to distinguish as individual units than the mass noun aggregates (*ie. toothpick vs. rice*), thus supporting Wierzbicka's (1985) hypothesis that aggregates consisting of harder to perceive items are named mass nouns while aggregates named count nouns are usually easily perceptible entities.

The third factor is the divisibility of the entity. Mass nouns tend to denote entities that can be divided without losing their original structure. For instance, if water is divided into portions, the portions still consist of water. The substance does not change. If a chair is divided, however, it no longer can be recognized as a chair. It should be noted that this factor does not apply equally to all mass nouns. If one was to divide up silverware, the result would be either separate pieces of silverware that would then be identified as its individual pieces (*ie. a fork, a spoon etc.*), or it would consist of small pieces of metal, depending on how the division was performed. In either case, the silverware would not retain its original form, although Gillon

(1992, 1999) argues that divided silverware could still be silverware, just as divided clothing could still be clothing, depending on the method of division (ie. cut in pieces or simply separated). Furthermore, there are count nouns that also permit divisibility (Gillon, 1992, 1999). Items such as *rope*, *rock*, and *ash* permit the divisibility of reference. A rope cut into two pieces equals two ropes, just as a rock divided in two becomes two rocks. Thus, divisibility is not as reliable as the previous two factors in explaining why a person would perceive an entity as a non-individual.

The *cognitive individuation* hypothesis can be used to refute the claim that some pairs of mass and count terms are co-referential (Wisniewski *et al.*, 1996). If a mass superordinate noun is used to refer to an unindividuated group but a count superordinate noun is used to refer to one or more individual objects, then it is possible that the same objects can have both a mass and count noun label, because the conceptualization of the objects will be different in each case. An experiment in the study by Wisniewski, Imai and Casey (1996) included testing the processing differences between mass and count noun pairs that are associated with the same objects, for example, *wildlife – animal*, *produce – vegetable*, *hardware – tool*. Participants were asked to judge the truth of sentences in the form, “an X is a kind of Z”, where X represented a member of either a count or mass superordinate category Z. According to the authors, this type of sentence emphasizes the membership of an individual in a category, and therefore, the participants should verify the sentences for count categories faster than for mass categories. Their findings revealed that ‘the verification of category membership of a single object was slower for mass categories than for count categories’ (Wisniewski *et al.*, 1996:293).

To summarize, it has been proposed that language users conceptualize the referents of count nouns as countable, distinct, individuated things, and they conceptualize those of mass

nouns as uncountable, non-distinct, undivided things. This proposal is supported by the claims that items denoted as count are more easily distinguished as individual entities, and they are also used as individual items. Additionally, these count items cannot have divisibility of reference. There exist counter-arguments to this claim. According to Gillon (1992, 1999), there are nouns in English that denote individuals and can also be divided, such as *footwear* and *silverware*. However, in order for these 'object-mass' entities to be divided, they need to preserve their minimal parts, considering for example, that half a chair would not be perceived as furniture.

A recent study by Barner and Snedeker (2005) examined the referential entailment of object-mass nouns like *furniture* in English with both adults and children. In their first experiment, they tested the interpretation of object-mass nouns in comparison with object-count nouns. Their objective was to see whether or not adults and children would treat object-mass nouns as count nouns and quantify by number, or if they would quantify by over-all mass. Their predictions were as follows: if all mass nouns refer to non-individuals, then the participants should not quantify by number when interpreting object-mass nouns. However, if the object-mass nouns individuate, then the participants should quantify by number and not by overall mass. For their experiment, the participants were shown photos of characters holding items, and were asked to choose which character had more (eg. *who has more mail?*). One photo showed the character holding one large object (or substance), and the other had three small objects (or portions of a substance). Some examples of the objects were silverware, shoes, and toothpaste. The results showed that both the children and adults interpreted some of the mass nouns as quantifying over individuals. The participants quantified by overall mass for the substance mass nouns, but by number for the object-mass nouns and the count nouns. These findings did not

support the hypothesis that all mass nouns quantify over individuals, but it did support Gillon's (1992, 1999) hypothesis.

In the first experiment, the investigators asked questions using neutral syntax. In a subsequent experiment, Barner and Snedeker (2005:53) evaluated: 'whether judgments are guided by mass-count syntax, as opposed to the ontological category of references'. Using a similar procedure, the participants were shown photos of characters holding objects. In this experiment, the stimuli consisted of four flexible terms: *string*, *chocolate*, *paper*, and *stone*. The participants were asked questions using either mass or count syntax: *Who has more stone/s?* *Who has more paper/s?* The results from the experiment showed that both the children and adult participants based their quantity judgments on the nominal structure. When the participants hear the noun in count syntax they based their judgment on number, and when they heard the noun in mass syntax they interpreted the noun as quantifying over mass or volume.

The results from the study by Barner and Snedeker (2005) do not support the cognitive individuation hypothesis. If all mass nouns denote unindividuated entities, then the participants should have made quantity judgments based on mass or volume for all of the mass nouns, including the object-mass nouns (*furniture*, *silverware*). The results also do not support the proposal by Gillon (1992, 1999) that the individuation of nouns is unspecified linguistically but instead is determined by world knowledge of the referent. This proposal cannot account for flexible terms such as *string* and *stone* that can denote both individuated and non-individuated entities. As an alternative to these views, Barner and Snedeker (2005:58) proposed the following: 'the referential entailments of a noun phrase can have either lexical or syntactic origins. Specifically, the referential entailments for a particular noun phrase might be contributed either

by the phrasal syntax itself or by the lexical item acting as a head noun.’ Their proposal can be outlined in four points (Barner *et al.*, 2005:58):

1. For most lexical items, this entailment of reference to individuals is created when used in a count noun context ... resulting from the interpretation of phrasal count syntax.
2. Mass syntax is unspecified with regards to quantification over individuals.
3. Linguistic individuation must always result from linguistic features. In the absence of linguistic individuation quantification can occur along any number of dimensions.
4. In the case of certain terms such as *furniture*, lexical features combine with unmarked mass syntax to create entailments about reference to individuals.

To conclude, for most terms the quantity judgments are determined by the type of syntax in which the noun is embedded. Count nouns in particular refer to individuals and quantify based on number, whereas mass nouns do not because they are unspecified with regards to individuation by mass syntax.

Considering the reviews of the current research, it is our position that Barner and Snedeker (2005)’s proposal is the most comprehensive account for the mass-count distinction in English. The proposal may also be extended to include other languages such as Spanish, even though it is not specifically discussed in their research. Both English and Spanish nouns may be unspecified with regards to quantity and their quantification over individuals. However, the quantity value may be specified depending on the type of determiner used. In turn, the syntactic

structure of the DP will determine the semantic interpretation of the quantity value⁶. Consider the following examples:⁷

- (12) a. [_D Ø] [_Q Ø] mud
b. [_D Ø] [_Q Ø] lodo

- (13) a. a [_Q bucket] of mud
b. un [_Q cubo] de lodo

In (12a) and (12b) the bare noun phrase has an unspecified quantity value, and is also unspecified with regards to quantification over individuals. The classifier phrase (13a and 13b), however, specifies the quantity value via a measure noun. The measure noun denotes an individual portion of the mass substance.

This proposal from Barner *et al.* (2005) explains why mass nouns can convey individuality, but it does not necessarily predict which nouns show flexibility in English and Spanish. Therefore, to the best of our knowledge, we do not currently have a proposal that allows us to explain why some nouns are flexible and others are not.

1.3 Conclusions

This chapter has explored both the syntax and semantics that establish the mass-count distinction. Gathercole (1997) has proposed that Spanish, unlike English, does not have a linguistic distinction but instead is based on the referent in the world. Borer (2005) and Chierchia

⁶ The syntactic features of the DP are also central to the aspectual feature of telicity. By specifying the quantity of a noun, the predicate would be interpreted as telic: John drank a glass of beer (Gavruseva, 2008:406). In contrast, by not specifying the quantity, the predicate would have an atelic interpretation: John drank beer. The lexical aspectual features of verbs also affect [\pm telic] interpretations, however that will not be discussed in this dissertation.

⁷ The English examples are from Gavruseva (2008)'s discussion of telicity in English, based on Löbel (1989). The Spanish examples are our own.

(1998) have argued that the distinction in English and also Italian-type languages is a grammatical one. In contrast, the semantic view holds that the mass-count distinction is based on how the speaker-hearer perceives the referent in the world, whether the entity is viewed as an individual or non-individual (Bloom, 1990; Wierzbicka, 1985; Wisniewski *et al.*, 1996 among others). Finally, Barner and Snedeker (2005) have proposed a lexical-syntactic view of individuation, which holds that the referential entailment of the noun is a result of the phrasal syntax. Count syntax causes the quantity judgment to be based on number, whereas mass syntax is unspecified. Given that mass syntax is unmarked with regards to individuation, lexical features can create entailments about reference to individuals.

CHAPTER TWO

2.0 Introduction

This chapter presents a review of the theories in first language acquisition research. Section 2.1 discusses the nativist theory of early language acquisition that includes the topics of Universal Grammar, the Poverty-of-Stimulus argument, the Language Acquisition Device metaphor, and the Principles and Parameters framework. Section 2.2 addresses the word learning problem of how children acquire word meanings. The theories of word learning biases as well as word mappings are discussed. The acquisition of verbs and non-concrete nouns via syntax to semantics mapping is discussed in section 2.3. Section 2.4 explains the theory of semantic bootstrapping, and 2.5 presents a theory that attempts to combine syntax with both semantics mapping and the semantic bootstrapping theories. An alternative view of early word learning is presented in section 2.6, which posits that language acquisition can be attributed to bi-directional mappings between syntactic structure and cognition. Section 2.7 discusses the issue of universal language mechanisms versus language specific influences in the acquisition of mass and count nouns. The final section 2.8 concludes the chapter.

2.1 Universal Grammar and First Language Acquisition

According to the nativist theory that was developed by Noam Chomsky in the 50's and 60's, children are born with an unlearned core of linguistic knowledge, often called Universal Grammar, which serves as the initial state of the language acquisition process (Chomsky, 1965). UG is a limited set of rules for organizing language in the human brain that is common to all languages. In order to acquire a language, humans must move from the initial state of UG to

acquiring the properties of adult competence that are not universal (ie. principles that constrain all languages) and must be learned by processing linguistic input. Cook and Newson (2007: 185) use the analogy of a seed in the mind to describe UG: 'the entire possibility of the plant is inherent in the seed; the environment only dictates the extent to which its inherent potentialities are realized'. All the possibilities of language are present at birth, but they need experience to mature and develop.

Support for the presence of UG comes primarily from two areas: the poverty of the stimulus argument (POTS) and the existence of creole languages. At the core of the POTS argument is the claim that much of our linguistic knowledge must come from the internal structure of the mind itself because the input we receive is limited (Adger, 2003; Cook *et al.*, 2007; O'Grady, 1997). In order to acquire knowledge from experience, the child needs different types of evidence. One type of evidence is positive, which naturally occurs in the form grammatical sentences. In contrast, negative evidence is rarely encountered by an L1 learner (O'Grady, 1997). Some examples of negative evidence are corrections of wrong sentences or explanations of what should not be done. Given that both types of evidence should be necessary for language acquisition, the knowledge cannot be acquired and must already be present. Cook and Newson (2007:57) summarize the the POTS argument into four steps:

1. A native speaker of a particular language knows a particular aspect of syntax.
2. This aspect of syntax could not have been acquired from the language input typically available to children.
3. We conclude that this aspect of syntax is not learnt from the outside.
4. We deduce that this aspect of syntax is built into the mind.

Children may also be affected by other forms of evidence such as *imitation*, *direct teaching*, and *social interaction* (Cook *et al.*, 2007). According to the authors, imitation is completely based on positive evidence, as children only imitate what they actually hear¹. Nevertheless, imitation is not enough on its own, as language knowledge is creative and imitation alone would not be enough for children to produce new sentences they had never heard before. Unlike imitation, direct teaching consists of both positive and negative evidence in the forms of explanation and correction. An adult may correct the mistakes of the child and/or explain the grammatical alternative. Again, direct teaching does not provide sufficient evidence for the child. The learner would have to make many different types of errors and receive a variety of corrections and explanations in order to learn all the grammatical structures used in a given language. A third form of evidence, social interaction, consists of social routines that may include correction, approval, and/or imitation. Social interaction allows the learner to use the language in real-life situations, which facilitates the learning process. This type of evidence, however, helps with pragmatic competence rather than grammatical competence. It is not possible for a child to learn the principles of UG through social interaction. While it is assumed that UG is the biological endowment which makes it possible for the child to acquire any language they are in contact with, it is also assumed that need be exposed to grammatical constructions and vocabulary in the L1 so that they may acquire the properties of adult competence. Children may only move away from the initial state of the UG by processing linguistic input.

¹ In fact, children may only produce the structures that are available to them in their current grammar, and they are not able to imitate all structures given in the input (personal communication with Dr. Joyce Bruhn de Garavito).

An additional form of input that is particular to L1 learners is *motherese*², which is a form of speech used with children by their caregivers (O'Grady, 1997). Motherese usually consists of short, simple sentences, and restricted vocabulary. The speech may also be slower with a greater pitch range, as well as exaggerated intonation and stress. This form of input is widely used, especially by parents in Western cultures, even though it is not necessary for syntactic development (O'Grady, 1997). It may be used with such frequency because it may help communication with the child by increasing the comprehensibility of the adult utterances.

The formation of creoles from pidgins provides further evidence to support the POTS argument. When adults from different cultures who speak mutually unintelligible languages migrate to the same area and need to find a way to communicate with one another, what emerges is a linguistic system that has a small vocabulary and a few basic rules (a *pidgin*) (DeGraff, 1999). In the 1870s large numbers of immigrants from China, Korea, Japan, Portugal, and the Philippines migrated to Hawaii to work in the sugar fields. There was little access to the superstrate language, which meant there was a lack of language input from the dominant culture or the prestige variety on the island. Therefore, due to an urgent need for interethnic communication, a language of exigency was created. Since a pidgin language is one that is not spoken by anyone as an L1 it does not have the characteristics of a native language (Cook *et al.*, 2007). The adult speakers are not able to create a new complete language; however, when the speakers of the pidgin have children, the children are able to use the impoverished input from the pidgin and transform it into a creole that has the characteristics of a native language (Bickerton, 1996). Something inherent in the minds of the children allows them to acquire a complete language system from only partially developed input.

² Other terms for this type of speech include *child-directed speech* or *parantese* (Clark, 2003:27).

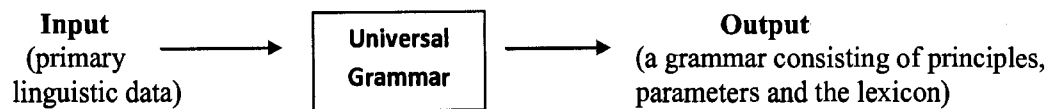
The POTS argument does not come without criticism. The first critique is that positive evidence is actually enough to learn the various linguistic patterns that the argument claims are unlearnable without negative evidence (Bates and Elman, 1996). Bates and Elman (1996) claim to have programmed computers through neural networks and statistical methods to learn rules like verb movement and extract hierarchical structures using positive input alone. The second critique argues that negative evidence is actually present in linguistic input (Pullum and Scholz, 2002). Researchers claim that if we consider statistical learning as negative evidence then it occurs in abundance. According to Pullum and Scholz (2002), if a pattern is never encountered, but if the pattern were true the probability of it being encountered would be high, and the language learner could consider its absence as a form of negative evidence. This kind of evidence is an example of 'indirect negative evidence'; however the claim of the POTS argument is that this form of evidence is not sufficient for language acquisition to occur without UG.

As mentioned previously, the nativist approach views UG as the starting point of the acquisition process. From there, the child must also learn properties of a language that are not universal. It has been proposed that UG is part of a language acquisition device (LAD) that is sometimes referred to metaphorically as the 'black box' (Cook *et al.*, 2007; O'Grady, 1997). Children receive linguistic data from their caregivers which they process within the black box in their brain. The output from the box is a generative grammar. The stages of the process that occur in the device are as follows (adapted from Cook *et al.*, 2007:53):

1. Children hear a number of sentences said by their parents and other caretakers (primary linguistic data).
2. They process the sentences within the LAD.
3. Children acquire linguistic competence in their mind (a generative grammar).

As a result of this process the brain can create a theory of language based on the example input.

In more recent work, Chomsky describes the LAD as ‘whatever mediates between the initial state of the language faculty and the states it can attain’ (Chomsky in Cook *et al.* 2007: 54), which means the LAD can also be interpreted as UG itself. The following is a diagram of the revised Universal Grammar model as illustrated in Cook and Newson (2007: 54):



Chomsky’s original proposal was revised in Chomsky and Lasnik’s (1993) Principles and Parameters theory. The central idea of this proposal is that there is 1) a finite set of fundamental principles common to all languages, and 2) that there is also a finite set of principles that determine syntactic variability. These principles and parameters are a part of UG that is present in all humans (Adger, 2003). They are present at birth and are triggered through exposure to language. Cook and Newson (2007: 58) sum up the model as follows:

‘UG is present in the child’s mind as a system of principles and parameters. In response to evidence from the environment, the child creates a grammar S_s that assigns values to all the parameters, yielding one of the allowable human languages ... To start with, the child’s mind is open to any human language; it ends by acquiring one particular language.’

The child comes into the world with an innate knowledge of principles and the parameters associated with those principles. The child then learns the values of the parameters as well as the lexicon. The language is successfully acquired when all the parameters of UG are set

appropriately (Liceras and Carter, in press). For instance, it has been proposed that languages are parameterized according to whether telicity is depicted as the compositional telicity option, such as in the cases of Spanish and English, or specific morphemes as in the case of Slavic languages. If we compare English and Russian, both languages contain the lexical categories of Noun and Verb, however the two languages differ in that English has the category of Determiner (D), whereas Russian has no overt determiners (Gavruseva, 2008). Child learners of English would need to set the specifications of D, including the value of Quantity (Q) that is provided by the different types of D. On the other hand, if we compare English and Spanish, we can see that they share the same option of the parameter, given that their predicates have compositional telicity, which means their predicates become telic or atelic depending on whether the object NP is a mass or count noun. Thus, in English and Spanish, *Peter drank beer/ Pedro bebió cerveza* is an atelic predicate while *Peter drank the beer / Pedro bebió la cerveza* is a telic predicate. It should be noted, however, that English and Spanish are parametrically different in terms of the bare nouns property, in that Spanish is [+ARG] and English is [-ARG], which means that only English allows bare noun phrases in the argument position, whereas Spanish does not. If we consider for a moment the example of generic noun phrases, we can see that in English the bare NPs in argument position *Elephants are grey* and *garbage is disgusting* are acceptable, however Spanish does not permit bare NPs in this position but instead require the use of a definite determiner: *los elefantes son grises* and *la basura es un asco*³.

Considering the example of mass and count nouns, the telicity parameter may be explained in further detail as follows. According to Gavruseva (2008), there may be a correlation

³ For a further discussion of generic NPs in English and 'Italian-type' languages, please refer to Chierchia (1998) and his discussion of the *Nominal Mapping Parameter*.

between the acquisition of the category D and the values of Q that are provided by the different determiners, and the acquisition of the aspectual feature of telicity. If a mass noun or a plural count noun is used in a bare NP, and thus the determiner is null, then the Q is unspecified and the NP may be interpreted as atelic: [_D Ø] [_Q Ø] tree-s (Chierchia, 1998; Gavruseva, 2008; Löbel, 1989). If a count noun is combined with a numeral determiner (NUM), then Q has a specific value via number and may be interpreted as telic: [_{NUM} three] [_Q Ø] tree-s. Q can also be specified for mass nouns through a classifier phrase, which again would give a telic interpretation: a [_Q glass] of water. Both mass and count nouns may co-occur with the definite determiner 'the', through which Q is interpreted as a specific quantity: [_D the] [_Q Ø] mud. Thus, by specifying the Q, the predicate may be interpreted as telic, whereas an unspecified Q gives an atelic interpretation.

2.2 The Problem of Word Learning

Research in L1 acquisition often attempts to explain language development through the interaction between UG and cognitive structures. Specifically, Pinker (1987, 1994) and Grimshaw (1994) have developed a theory that focuses on the L1 acquisition of grammatical categories, and other researchers have examined the problem of word learning (Bloom, 1990, 1992, 1994, 2000; Landau, Jones and Smith, 1992; Landau, Smith and Jones, 1988; Markman, 1989, 1990, 1994; Markman and Watchtel, 1988; Soja, Carey and Spelke, 1991; Subrahmanyam, Landau and Gelman, 1999; Waxman, 1990). Researchers argue that there exist unlearned mechanisms or biases that facilitate language acquisition, such as UG and word learning constraints. An alternative view from Bloom (1992, 1994) aims to explain where the word learning constraints come from. He proposes that there should be a shift in focus from learning

mechanisms to children's knowledge of *mappings* between syntactic structure and cognitive structure in order to better explain early language development. More specifically, the role of constraints and mappings in the acquisition of count and mass nouns is discussed. The subsequent sections present these theories with the aim of explaining how the various constraints and mapping procedures function within the language learning process.

The core problems addressed in the study of the acquisition of the lexicon are as follows: how do children know that labels identify objects or describe actions, and how do they acquire word meanings (Guasti, 2002)? To take an example, imagine a child's mother holding an apple. How does the child understand that a given word labels the object she is holding instead of labeling the colour or the action of holding? One proposal is that children learn word meanings by a hypothesis formation and testing procedure (Guasti, 2002). The child notices the co-occurrence between a word and its referent or corresponding action. The child then forms a hypothesis about the referent and tests it in new contexts that use the same word. As a result the learner associates a word with what is perceived in the world and forms a *word-to-world mapping*. One problem with this view is that a particular scenario may be compatible with multiple hypotheses or be subject to multiple interpretations. Take for example the situation that Guasti (2002:76) presents where a cat is sitting on a mat under a table. This scene can be described by multiple sentences, such as:

- a) The cat is under the table.
- b) The cat is on the mat.
- c) The mat is under the cat.

The above example illustrates that a given scene is open to multiple interpretations, and that it is very difficult to interpret the correct meaning of the words just from the extralinguistic context. This problem is often referred to as the *problem of induction*.

One possible solution to this problem is that there exist constraints or biases that rule out classes of hypotheses so that the child quickly determines the possibilities that adults intend to express. These constraints are part of the learning mechanism activated during the early years of language development. Markman (1994) has proposed three biases that facilitate word learning: the *whole object bias*, the *mutual exclusivity bias*, and the *taxonomic bias*.

According to Markman (1989, 1990, 1994), children tend to treat a novel label as referring to whole object, rather than a part, substance, or colour. The *whole object bias* prevents children from categorizing new words as parts of objects or properties of objects, which means a child would never think *dog* refers to the leg of the dog or the dog's fur. A study by Woodward (1992) confirmed that for 18-month olds (around the time of the vocabulary 'explosion'), English speaking children do treat novel words as referring to objects. The whole-object constraint promotes the rapid learning of object labels because it greatly reduces the number of hypotheses that children have to consider when acquiring the meaning of a novel object label. However, there are exceptions that appear in the speech of one and two year old children. For example, mass substance nouns like *water* and *mud* violate the whole object constraint, as well as abstract count nouns such as *day* (Bloom, 1992, 1994). Markman's *mutual exclusivity bias* accounts for these counter-examples.

The *mutual exclusivity bias* enables children to acquire novel words other than object labels (Markman, 1990). The bias states that each object has only one label, which means, for example, that a single object could not be both an apple and an orange. In a situation where two

objects are presented, with one being labeled, Markman (1990: 68) illustrates the application of the bias as follows:

1. On the whole object assumption, look for an object as a first hypothesis about the meaning of the label;
2. On the mutual exclusivity assumption, reject the already labeled object; and
3. Therefore, assume the other object is being referred to by the novel label.

The assumption helps children acquire novel words during the initial stages of acquisition. It also explains why children make certain errors, such as why they find class inclusion difficult, since they would have to dismiss the mutual exclusivity assumption in order to acquire class-inclusion relations. Markman and Wachtel (1988) found supporting evidence of the mutual exclusivity hypothesis in a series of five studies with three and four year old children. When children were given a novel term for an object that already had a label, they tended to reject the new label for the object, and instead assumed the label referred to a part of the object instead.

The mutual exclusivity bias can also explain why young bilingual children often reject multiple labels across languages in the earliest stages of acquisition. They may only accept one label for an object despite being exposed to the term in both languages. This typically lasts only for a few months until the children have a vocabulary of about 150 words (Clark, 1987), when they start to have doublets, which are equivalent terms from both languages. This also suggests that the children start to accept doublets because they are acquiring two separate lexicons, rather than treating equivalent terms in two languages as they would synonyms in a single lexicon. This suggests that constraints and biases need to be adjusted to take into account bilingual acquisition.

The *taxonomic constraint* states that 'terms refer to entities of the same kind' rather than to objects that are thematically related (Markman, 1994). Thus an object term refers to objects of

the same kind, and an action term refers to actions of the same kind, but these terms do not describe sequences of entities that have thematic relationships. Children expect labels to refer to things of like kind, rather than to the object and its spatial location or the object and the person holding it. For example, there can be a word like *pencil* used to describe members of a category, but not to describe pencils, people who use pencils, things that pencils write on, etc. (Bloom, 1992). In a supporting study by Bauer and Mandler (1989), their findings showed that even with no labels, 75% of the time children were sorting taxonomically. However, they were not able to test whether the children adhered to the taxonomic constraint.

A subsequent version of the Bauer and Mandler (1989) study was conducted by Markman and Wasow (see Markman, 1994: 210). The children were shown a target picture followed by two choice pictures. Then with the use of a frog hand puppet, they were asked to help the frog find the items he wanted to put in his new house. The two experimental conditions were the No Label Condition and the Novel Label condition. One of the pictures was a distractor, and the other correct choice was thematically related to the target for half of the trials and taxonomically related for the second half. The investigators performed the study with different age groups: 21.5 months, 18 months, and 16 months. The oldest group adhered to the taxonomic assumption. That is to say, they extended object labels to objects of like kind rather than to objects that were thematically related. The 16 month old children selected the taxonomic choice only 34% of the time when the object was unlabeled and they chose it 39% of the time when it was labeled. The middle age group (18 months) selected the taxonomic choice in the No Label condition 28% of the time, but increased to 54% in the Novel Label condition. The investigators hypothesized that they did not find a labeling effect with the 16 month olds because the Novel Label condition violated the mutual exclusivity bias (see section 1.3), thus creating a conflict. To

test this, they ran another version of the study using novel objects; however, again they failed to find an effect of labeling with the 16 month olds. These results suggest that the taxonomic constraint may not be strong enough at that age.

Landau, Smith and Jones (1988) have advanced the proposal that in the early development stages shape may provide a clue to the label of a concrete object. Children may extend object names to unfamiliar objects if they share the same shape as the known object. The authors explain the shape bias as ‘the bias to group objects by shape *in the presence of a novel count noun*’ (1992:87). Shape is a perceptual property that is closely connected to a child’s notion of object *kind*. The *shape bias* creates a link between two pairs of relationships: object name and object kind; as well as object name and object shape (Landau, 1994). When they hear a novel label ‘This is an X’ children may assume that the label refers to the kind of object, which may lead to incorrect extensions of the object name. For example, classifying *a fish* and *whale* together based on shape would lead to an extension error, but it suggests that children may categorize objects based on shape in absence of richer information (Landau *et al.*, 1988). Perceptually, *a whale* is shaped much more like *a fish* rather than its fellow mammals.

In a study by Landau, Smith and Jones (1988) the investigators tested how specific dimensions (shape, size, texture) affected word extensions for 2 – 3 year olds. They conducted four experiments in which children either had to extend a novel count noun to a novel object, or put together objects that went together in a non-word classification task. Results showed that when naming was involved, children relied heavily on shape. In the non-word tasks, the shape bias increased with the age of the participant. For the very young children, the shape bias was much stronger in the word extension tasks.

The authors suggest that the shape bias originates in language learning rather than from perception, and may actually stem from learning count nouns. When children learn count nouns, they learn that the terms commonly extend to objects that are similar in shape. Objects that are count nouns are rigid in shape and remain constant in motion, whereas substances can change shape and deform radically when they move (Landau, 1994). The shape bias is not applicable to substances because they do not conform to the same spatial constraints as objects.

When learning words for substances, research has shown that children generalize labels for novel substance nouns on the basis of material (Soja *et al.*, 1991; Subrahmanyam *et al.*, 1999). Soja, Carey and Spelke (1991: 182-183) conducted a series of experiments with two year olds in order to test their proposal that children apply the following two procedures in the process of word learning:

1. Procedure one:

- a. Step 1. Test to see if the speaker could be talking about a solid object; if yes,
- b. Step 2. Conclude that the word refers to individual whole objects of the same type as the referent.

2. Procedure two:

- a. Step 1. Test to see if the speaker could be talking about a non-solid substance; if yes,
- b. Step 2. Conclude that the word refers to portions of substance of the same type as the referent.

In the experiments, English speaking children were presented with two word learning tasks. In the first one, they were taught a new term for a solid object, while in the second one,

they were taught a new term for a non-solid substance. When they had learned the new term, the children were tested for the generalization of two new instances: the first matched the original instance in shape and number but not substance, and the second matched the original with substance but not shape and number. Their findings showed that when two year olds are presented with novel words, they respected the shape and the number of the original referent when it was an object, and they ignored the shape and number when the referent was a substance. The investigators concluded that children generalize novel words referring to objects on the basis of shape, and they generalize novel words referring to substances on the basis of kind of substance, while ignoring the shape and size of the referent.

In sum, children build their lexicon by assigning word forms to meanings. One view is that the process occurs through a word-to-world mapping procedure where children learn a word meaning by observing the situations in which it is used. Since there are often multiple hypotheses about a given situation, it has been argued that children are born with the knowledge of a set of constraints on possible word meanings, which serve to limit the number of possibilities. Children tend to generalize novel nouns for objects on the basis of shape. Likewise, they tend to generalize novel nouns for substances on the basis of material. These constraints, however, do not account for how children assign meaning to all words. For instance, all languages contain proper names and pronouns, adjectives, superordinates, abstract nouns, and verbs. The next section discusses how children may assign meaning to other classes of words.

2.3 Syntax to Semantics Mapping

Initially a child's vocabulary consists mostly of nouns. The meanings of most of these nouns, such as the concrete nouns, can be acquired by using the word-to-world mapping

procedure where the word is mapped onto the referent object (as discussed in the previous section). At approximately twenty months of age, most children have a vocabulary spurt and start using between fifty and two hundred words (Guasti, 2002; O'Grady and Cho, 2005). Once children start using words such as abstract nouns, substance mass nouns, and verbs, the following question is raised: how do they acquire the meanings of non-concrete nouns and verbs when the biases and constraints do not apply? This is where the word-to-world mapping procedure is replaced by a sentence-to-world mapping procedure, in which the syntactic context helps determine the meaning of a word (Guasti, 2002).

Gleitman (1990) argues that children acquire verb meanings through the use of syntactic information that is present in the sentence, assuming that there is a correlation between syntax and semantics. This process begins only after a period where the child has learned their first word meanings through situational contexts. Gleitman proposes that, after this initial period, children learn verb meaning from verb syntax, rather than infer their meanings observationally. To demonstrate Gleitman's hypothesis, Guasti (2002: 83) uses the following examples with nonce verbs:

- a. John *gorped* that Mary came.
- b. Bill *sibbed*.
- c. John *stog* from Milan to Naples.

The child hears these sentences and can interpret certain aspects of the meanings of the nonce words by observing the structural environment in which they are embedded (eg. transitive or intransitive frame). The syntax does not give the exact meaning of the words, but rather limits the possibilities available for the given situation so that the child focuses on only the interpretations that are compatible. In example (a), one can guess that *gorped* means *say* or *think* because it takes a clausal complement, whereas in (b), the verb has possible meanings such as

laugh. The third example (c) has several possible meanings that imply movement along a path, and its exact meaning can only be assessed by looking at the extra-linguistic context in which the verb is used. This is also true for situations where the sentence offers the possibility of semantically close options such as *break*, *tear*, *shatter*, and *crumble*. The child will have to observe the extra-linguistic context in order to establish the specific interpretation for the verb (Gleitman, 1990). If the extra-linguistic information is still not enough to deduce the meaning of the novel word, then it is necessary to look at other syntactic frames in which the verb occurs (Guasti, 2002).

2.4 Semantic Bootstrapping

In order for children to be able to use the procedure of syntax-to-semantics mapping (section 2.3), they must be able to 'build some kind of structural representation, parse sentences, categorize words, and figure out the grammatical function of arguments (Guasti, 2002: 90). Only with these abilities can children successfully assign meanings to novel verbs (and nouns). This procedure raises two important questions: how do children acquire this knowledge and how do they break into syntax initially? When children are born, they have innate constraints provided by UG (see section 2.1) on the form of possible grammars. They know that there are nouns and verbs (grammatical categories) and that there are subjects and objects (grammatical functions). The semantic bootstrapping hypothesis aims to explain how children can use this knowledge and build structural representations of sentences when they do not know which word belongs to which syntactic category.

According to Pinker's (1994) view, the language learner exploits contingencies between perceptual and syntactic categories, mediated by semantic categories. In other words, children

interpret semantic and conceptual information, which allows them to bootstrap into syntax. Guasti (2002: 94) explains the semantic bootstrapping procedure as follows. Children have innate access to semantically transparent notions such as person, thing, and action. From there, they can deduce the syntactic category of words. The learner assumes that a word for a thing belongs to the category Noun, and that the word describing an action belongs to the category Verb. Once the children have syntactic notions, they can learn the lexical category of words as well as the grammatical function of arguments.

2.5 Reconciliation

Grimshaw (1994) proposes that a reconciliation of the two bootstrapping hypotheses (syntactic and semantic bootstrapping) is the best explanation for lexical learning. She argues that learning occurs when the semantic representation from an event matches with the word's lexical syntax. Neither observation nor syntax alone is enough to facilitate the acquisition of words. Grimshaw (1994: 423) outlines the steps in *reconciliation* as follows:

- 1) The learner interprets a scene or situation, hears a sentence and detects the verb.
- 2) The learner finds a relationship R among participants in the situation that is sensible given the interpretation of the observed situation.
- 3) The learner checks that R involves participants consistent with the content of the expressions in the sentence, and rejects an R that does not meet this requirement.

- 4) The learner constructs a lexical conceptual structure which is consistent with R, and assigns candidate argument expressions in the sentence to argument positions in the lexical conceptual structure.
- 5) This lexical conceptual structure is fed through the semantics-to-syntax mapping principles of UG (*universal grammar*) in their language particular instantiation.
- 6) The s-structure predicted by step 5 is compared to the observed s-structure.
- 7) If they do not match then no learning takes place.
- 8) If they do match then the morpheme is entered into the lexicon with the hypothesized lexical conceptual structure.

When possible, *reconciliation* uses semantics to predict syntax (relying on UG), but also uses syntax to eliminate invalid semantic candidates.

2.6 Semantic Competence Approach

So far I have discussed theories that address the grammatical assignment problem (Pinker, 1994; Gleitman, 1990; Grimshaw, 1994) and others that address the word learning problem (Landau *et al.*, 1988; Landau *et al.*, 1992; Markman, 1989, 1990, 1994; Soja *et al.*, 1991; Subrahmanyam *et al.*, 1999) in early language development. This section presents another proposal advanced by Bloom (1992, 1994) that attempts to explain where the constraints on word meaning come from. Bloom also suggests that by shifting the focus from the mechanisms of language acquisition to children's knowledge of the mappings between syntactic structure and cognitive structure we can better explain transitions in language development.

Although Gleitman (1990) and Pinker (1994) specifically address the acquisition of verbs via syntactic and semantic bootstrapping, Bloom (1994) uses an adapted version of their

hypothesis to explain the acquisition of mass and count nouns through lexical mappings. He argues that children use both linguistic cues and conceptual cues to acquire novel nouns, although linguistic cues prove to be more reliable because perception can be interpreted in different ways. In English, for example, the presence of the indefinite determiner 'a' is an immediate linguistic cue that indicates the noun is a count noun. The conceptual cue would be whether or not the entity was an individual (count noun) or a kind of portion (mass noun). However, there are some objects that are categorized as mass nouns (eg. *bread*). In this case, if a child relied solely on perception, they could misconstrue the object as a count noun. Bloom argues that the syntactic-semantic cues allow the following three mappings:

- 1) Lexical NPs (*Fred, he*) refer to individuals
- 2) Count nouns (*dog*) refer to kinds of individuals
- 3) Mass nouns (*water*) refer to kinds of non-individuated entities

He explains that there are mappings between the count-mass syntax and the cognitive contrast between individuals and portions, and 'we are biased to construe physical objects as individuals and nonsolid substances as portions' (Bloom, 1994: 46). An interesting aspect of Bloom's view is that, unlike word learning biases such as the whole object bias and the taxonomic bias, the syntax-semantics mappings are available to both children and adults.

One of Bloom's (1990) criticism of the syntactic and semantic bootstrapping hypotheses put forth by Pinker (1987, 1994) and Gleitman (1990) is that if children use syntax to acquire meaning and use meaning to acquire syntax then both of these cannot be true at the beginning of language acquisition because one must be the starting point (Bloom, 1994). Bloom suggests that

children can learn the meanings of some words without syntactic support, such as the names for objects and substances. They then can use meaning to syntactically categorize new words belonging to specific grammatical categories, after which the children have enough syntactic knowledge to use mappings. For some words, such as verbs like *think* or abstract nouns like *news*, syntactic information plays a crucial role in the acquisition process. However, syntax does not help in the acquisition of the difference between words like *dog* and *cat*. Since children can learn the semantic differences between these words it suggests that children can also learn properties of meanings in the absence of syntax. Therefore, the semantics-first procedure seems the most probable choice as the starting point of child language acquisition.

As discussed previously in section 2.2, Markman (1989, 1990, 1994), Landau, Smith and Jones (1988), Landau, Jones and Smith (1992), and Soja, Carey and Spelke (1991) hypothesized that there are innate constraints available to children to facilitate the acquisition of words (ie. whole object, taxonomic, shape, material biases). One of the criticisms of the theory of constraints and biases is that there exist exceptions even in the early speech of children (Bloom, 1992, 1994). One and two year olds use words that do not refer to taxonomies (eg. proper names), or to whole objects (eg. verbs, nouns like *family*). Second, the constraints do not necessarily apply to adult language (Bloom, 1992, 1994). Therefore, it is assumed that they are present during the early stages of language development then disappear or are overridden by other properties of language.

Although the word learning biases may help limit the possible meanings of a word, Bloom states that they are overly powerful and cannot explain how children acquire words that are not limited by these constraints. Bloom (1992, 1994) proposes that if we look at word learning in terms of general properties of linguistic competence, it may be possible to explain

these exceptions. Under the *Theory of Semantic Competence* it is argued that the constraints are not on words, but rather on 'possible meanings of members of certain syntactic categories' (Bloom, 1994: 63). According to the hypothesis, children possess the cognitive understanding of the *notion* of individual and they map this notion onto the grammatical category of count noun. By having the syntax-semantics mapping of count nouns to kinds of individuals, the exceptions associated with Markman's constraints disappear. For example, words like *nap* and *forest* are not whole objects, but they do refer to kinds of individuals and therefore are count nouns. Furthermore, the mappings are true of both child and adult language.

If children do have a semantic understanding of count and mass and have the cognitive bias to construe objects as individuals and stuff as portions, then they should be able to categorize novel nouns through perception. That is to say, if a child perceives the object as an individual entity, then they will categorize the object as a count noun. If they perceive the entity as a portion, then they will categorize it as a mass noun. At the same time, children may miscategorize novel mass nouns as count nouns if they could be perceptually interpreted as individuals or as portions. For example, if the child hears the object mass noun *furniture* in neutral syntax (*furniture* or *the furniture*), the child may mistake the noun for a count noun. Previous work by Gordon (1988) showed that children will not use perceptual cues to override linguistic cues, however, in the absence of linguistic cues they will use perceptual information, which may cause them to miscategorize novel nouns. To test the role of perception in the categorization of mass nouns, Bloom (1990) analyzed the spontaneous speech data transcripts from the CHILDES database for five children (age range from 1;6 to 5;2). He extracted all utterances with words from two classes of mass nouns: discrete objects (*furniture, bread, bacon, celery etc.*) and substance mass nouns (*milk, sand, water etc.*). Bloom considered usages as

errors when the mass nouns were used as count nouns (eg. *eating a bacon*). The results showed that, although errors in general were rare, the children miscategorized object mass nouns more frequently than substance mass nouns. His findings support the hypothesis that children do use conceptual cues when assigning form to meaning for a novel word.

In sum, Bloom (1992, 1994) has proposed that due to the many exceptions in early child language, and the lack of word learning biases in adult language⁴, the problem of word learning can be better explained through mapping procedures. In this manner, all nouns are included, and the mappings are present in both child and adult language. To reiterate, NPs refer to individuals, count nouns refer to kinds of individuals, and mass nouns refer to kinds of portions. For young children, the mappings act in conjunction with non-linguistic biases, such as the bias to construe whole objects as individuals. In the case of count nouns, the whole object, taxonomic and shape biases can be collapsed into the following hypothesis (Bloom, 1994: 308): count nouns refer to kinds of whole objects and children are biased to extend them on the basis of shape. In the case of mass nouns, words describing substances refer to portions of substances. When a child hears a novel label for an object mass noun (ie. *wood*), their first interpretation is that it refers to the kind of object, not the material of the object. This interpretation of its meaning may lead the child to initially miscategorize the object noun as a count noun.

2.6 Universal biases or language specific influences?

Although a great deal of research has been done that focuses on the innate biases children use to learn word meanings, most of the empirical data in the studies are from English speaking

⁴ Bloom (1994a, 1994b) argues that the biases are not present in adult languages because there are words that violate the biases. Other studies have shown that adults do rely on constraints when acquiring novel words, however the constraints are language specific (Subrahmanyam and Chen, 2000).

children. What the studies show is that English speaking children have learned something about the structure of nouns in English and that they are relying on this knowledge when learning novel nouns (Gathercole *et al.*, 2000). Current research has proposed that children's responses to new nouns may 'differ across languages in ways that are consistent with differences in the languages they are learning' (Gathercole *et al.*, 2000).

In a recent study by Subrahmanyam and Chen (2006), the investigators took a cross-linguistic approach to investigate whether there are universal or language specific influences on children's attention when they are learning object and substance names. The experiment consisted of a labeling and a non-labeling task where the participants saw either an object or a substance standard in a labeling (eg. 'Is this also the ruff?') or non-labeling context (eg. 'Is this the same as this?') (Subrahmanyam *et al.*, 2006: 141). The participants were three year old, four year old, and adult English and Mandarin Chinese speakers. They predicted that if the object/substance status of the referent were universal, then the young speakers across different languages should generalize the novel label for an object on the basis of shape, and on the basis of material if the referent was a substance. On the other hand, if the influences were language specific, then only the English speaking children would label a novel object on the basis of shape and label a substance on the basis of material. The Chinese speaking children and adults would generalize novel labels based on the material of the referent. The researchers chose to work with English and Chinese because the two languages have very different noun phrase structures. English has a distinction between mass and count nouns that is realized morphosyntactically and semantically. Chinese, however, is a classifier language and does not distinguish between mass and count nouns (Subrahmanyam *et al.*, 2006). The results from the experiment were not consistent between languages and age groups. For both the object and substance standards, the

four year old and adult Chinese speakers attended to material, and the three year old Chinese children made decisions based on shape. The English speaking three year olds also attended to shape for both the object and substance standards. The English speaking adults, however, took into account the object/substance status of the referent. The four year old English speakers attended to shape for the object standards, but showed no preference for the substances. The results suggest that at an early age (three years old), most children label both object and substances on the basis of shape. At later stages in development, 'children start to attend to other sources of information, such as a referent's material versus its object/substance status' (Subrahmanyam *et al.*, 2006:155).

Another cross-linguistic study of English and a classifier language was conducted by Imai and Gentner (1997). The authors compared Japanese speaking and English speaking two, two and a half, and four year old children and adults. The participants were introduced to new names for three types of novel stimuli: complex objects, simple objects, and substances. The participants were instructed to apply the new name to an entity that was a) the same shape but a different material, b) a single portion, or c) multiple portions of the same material. The researchers found that both English and Japanese speakers of all ages extended on the basis of shape for complex objects (objects with complex shapes and functions). With simple objects (simply shaped solid objects), all ages of the American participants showed a preference for shape, whereas the Japanese children gave random responses and the Japanese adults gave more material responses than shape responses. With substances, the two year old American participants preferred substances while the Japanese children of the same age showed no preference. The other Japanese children and adults showed a preference for material, whereas the American two and half and four year olds and adults performed at random. Overall, the findings

showed that when learning names for complex objects young children generalize novel labels on the basis of shape. When learning names for simple objects and substances, the language being learned influenced their generalization. In English, there is a mass-count distinction that separates entities into individual objects and substances, whereas in Japanese the quantification of a noun occurs when it is used with a noun classifier. Also, Japanese does not morphosyntactically distinguish between plural and singular, nor does the language distinguish between discrete objects and substances. Imai and Gentner (1997) concluded that the influence of the language interacts with universal cognitive abilities, and in turn influences the interpretation of new words.

A similar study was conducted by Gathercole and Min (1997) to compare the performance of English, Korean, and Spanish speaking children. Korean is similar to Japanese in that it is a classifier language and the nouns usually occur in the singular. Spanish has a singular-plural distinction, but has more flexibility than English with the mass and count status of nouns. Gathercole goes so far as to argue that Spanish does not have a mass-count distinction because in principle all nouns may occur in both singular and plural forms (Gathercole, 1997; Gathercole *et al.*, 1997). In a similar procedure to that of Imai and Gentner (1997), the participants were tested for their extension of novel nouns to referents that shared shape, substance, and/or functional properties with the original referent. The authors found that the Korean children performed differently from the English and Spanish children. The Korean took functional properties into account and gave more substance based responses, whereas the English and Spanish children did not. The results supported the position that the structure of the language that the children are learning influences their first best guesses about the meanings of new words.

Further support for the role of language structure during early word learning comes from a study by Gathercole, Thomas, and Evans (2000). The authors examined children's abilities to interpret novel words referring to collections (ie. *forest*). The participants were English, Spanish, and Welsh speaking three, four, and five year olds. Similar to English and Spanish, Welsh nouns are considered unmarked in the singular and marked in the plural form. However, unlike English and Spanish, some Welsh nouns refer to a set or collection in their marked form, and refer to a single member of that set in the unmarked form (eg. *plant/plentyn* – *child/children*). There are also several different ways to morphologically mark plurals in Welsh. For example, for some nouns the plural may be marked by an internal vowel change (eg. *sarff-seirff* – *snake/snakes*), whereas for others it may be marked by both an internal vowel change as well as a plural suffix (eg. *mab/meibion* – *son/sons*). Due to these characteristics of Welsh, the authors hypothesized that if the whole-object bias was not a universal constraint, then the Welsh children would produce different responses than the English and Spanish speaking children. The findings showed support for Gathercole, Thomas and Evans (2000) predictions and led the authors to conclude that children's first best guesses about the meaning of novel words are a result of what the children have already learned about the structure of nouns and noun phrases in their language.

2.7 Conclusions

The current chapter has presented several proposals that aim to answer the question of how children learn new word meanings. It has been suggested that children are born with a set of constraints on word learning that help narrow down the many possibilities of what a novel word may mean. Under the whole-object bias (Markman, 1989, 1990, 1994), children tend to extend a

novel label to the whole object rather than a part of the object or its material. Landau *et al.* (1988) have proposed that children generalize the names for count nouns on the basis of shape. A third proposal advanced by Soja, Carey and Spelke (1991) posits that children will label novel substances on the basis of material. There are, of course, criticisms of these proposals. First, Bloom (1992, 1994) argued that a theory of word learning should be able to account for all words, including the many exceptions to the biases that are present in child language. He proposed that the biases work in conjunction with a set of mappings that are available to both adult and children. According to his theory, count nouns refer to kinds of whole objects (instead of the objects themselves), and children may extend the labels on the basis of shape. His theory also proposes that mass nouns refer to kinds of portions, and children may extend on the basis of material. Other researchers have also argued that the proposed constraints on word learning are not universal, but instead are influenced by the distinct language (Gathercole *et al.*, 1997; Gathercole *et al.*, 2000; Imai *et al.*, 1997; Subrahmanyam *et al.*, 2006). The subsequent chapter presents a study that examines the question of universal constraints on word learning by comparing the use of object and substance mass nouns by English speaking and Spanish speaking children.

CHAPTER THREE

3.0 Introduction

The current chapter is a study of the role of conceptual cues and early word learning biases in the acquisition of the mass-count distinction in English and Spanish. The chapter consists of an error-analysis of the spontaneous speech transcripts from monolingual English, monolingual Spanish, and bilingual English-Spanish speaking children presented in two studies. In the first study, the data is analyzed according to two mass noun categories: discrete objects and substance nouns; in the second study, the same data is analyzed in further detail according to substances and subcategories of discrete objects (objects, flexible nouns, superordinates, aggregates, and dual objects).

3.1 Background

Considerable research has examined the role of biases in early word learning (Bloom, 1990, 1992, 1994, 2000; Bloom *et al.*, 1995; Clark, 1987; Landau *et al.*, 1988; Markman, 1989, 1990, 1994; Markman *et al.*, 1988; Waxman, 1990). It has been hypothesized that English speaking children tend to label objects as count nouns on the basis of shape (Landau *et al.* 1988), and they label non-solid substances on the basis of material (Soja *et al.*, 1991; Subrahmanyam *et al.*, 1999). In the case of nouns that refer to objects, children perceive the objects as bound individuals, and subsequently map the notion of individual onto the grammatical category of count noun (Bloom, 1990, 1992, 1994). In a similar mapping process, children construe substances as unbound non-individuated entities and categorize the substances as mass nouns. The mapping between

the cognitive notions and the two categories is bi-directional. If a child hears a novel word with count syntax, then they will interpret the referent as individual and assign the feature [+INDIVIDUAL] (Bloom, 1990). If they hear a word with mass syntax, they will assign the feature [-INDIVIDUAL]. However, children often hear words in neutral syntax where the determiner *the* selects for both [+INDIVIDUAL] and [-INDIVIDUAL] nouns (eg. *the cat, the wood*). In this case, children may use conceptual cues to assign the correct feature. Unfortunately, this learning strategy is not always accurate, given that there are some mass nouns in English that may be perceived as bounded individuals (ie. *bread*). When children hear a word used to describe a novel bounded entity, their first interpretation of its meaning is that it refers to the kind of object rather than the material (Bloom, 1994). This means that children may misconstrue mass nouns referring to objects as bounded individuals and miscategorize them as count nouns (eg. *a rice*). When they hear a novel word for a substance mass noun, the children should not miscategorize the noun as count, since they will not misperceive the substance as a bound discrete object.

As we have shown in the previous chapter, most of the research has only examined mapping and biases in English, and has neglected data from other languages. Recent research suggests that young children's attention to conceptual cues (such as shape and material) may not be based on internal biases or universal word learning mechanisms, but instead maybe driven by the structure of the language being learned (Gathercole *et al.*, 1997; Gathercole *et al.*, 2000; Subrahmanyam *et al.*, 2006). The hypothesis is that children who are acquiring different native languages may not all show the effects of word-learning biases, or may show the effects to different degrees. In other

words, the native language may play a role in determining the meanings a child may assign to a novel word. Categories that are important for English, may not be relevant in another language.

The present study addresses the issue of universal word-learning mechanisms by comparing the use of object and substance mass nouns in English and Spanish. In English, nouns and modifiers are assigned to one category or another, either mass or count (ie. *much/little* and *many/few*)¹. Count nouns can be preceded by an indefinite determiner, can be pluralized, and can co-occur with numerals. Mass nouns traditionally can only occur in the singular and cannot be preceded by an indefinite determiner. The linguistic mass-count distinction is correlated with the ontological distinction between objects and substances. In general, substances are categorized as mass nouns and objects are count nouns. The categorization of a count noun is often tied with the shape of the object. The importance of shape in the identification of objects is therefore highlighted by the mass-count distinction in English.

The structure in Spanish is distinct from English in that Spanish nouns have more flexibility (Gathercole, 1997; Gathercole *et al.*, 1997). There is only one pair of quantifiers (*mucho/poco*) that can be used with either count or mass nouns, and many nouns can be used as either count or mass, depending on the referent (ie. *queso/cheese – un queso/*a cheese*). Many more nouns in Spanish than in English can be used in both mass and count noun contexts, and in principle, any noun can occur in the singular or plural. This does not mean that Spanish speakers cannot or do not make a cognitive distinction between substances and objects, rather ‘their language does not *force* them to

¹ It should be noted here that there are some nouns in English that can be used as a count or mass noun, depending on the context and referent. For example, *cake* and *pie* can be used in either context, depending on whether or not the referent is an entire cake or pie (count) or if it is a portion (mass).

classify every nominal form into one class or the other' (Gathercole *et al.*, 1997). Given the flexibility of nouns in the Spanish language, Spanish-speaking children may pay more attention to functional information than conceptual cues because they have fewer preconceived notions of the categorization of the referents.

The present study examines the role of conceptual cues and the universality of constraints in early word learning by analyzing the spontaneous speech transcriptions from monolingual English, monolingual Spanish, and bilingual Spanish-English speaking children. Transcripts from bilingual children have been included for two reasons: to investigate whether or not the children behave like their monolingual peers, and to observe any cross-linguistic influence between the two languages.

3.2 Study One: Objectives and Predictions

The objectives of the first study are as follows:

1. to investigate children's use of conceptual cues (ie. shape and material) when assigning new words to the noun categories of mass and count
2. to test objective 1 cross-linguistically in both Spanish and English in order to examine the universality of word-learning biases

If the mappings between syntax and meaning are innate and universal (ie. count NPs are mapped onto individuals), then the results should be similar for the English and Spanish speaking children. However, if the results are asymmetrical, then the findings could challenge the notion that children have universal word-learning biases. The findings would support the alternative hypothesis that a child's native language plays a

role in determining the meanings of novel words (Gathercole, 1997; Gathercole *et al.*, 1997; Gathercole *et al.*, 2000).

3.3 Methodology

3.3.1 Participants

The present study analyzes the spontaneous speech data from seven monolingual English, seven monolingual Spanish, and three bilingual Spanish-English children (table 3.1). The children's ages range from 0;11 to 3;11 years. All of the Spanish children are from Spain. There are only three bilingual children included in the study due to the lack of available data. The bilingual twins Simon and Leo reside in Spain. They receive English input from their mother, who only communicates with them in English. The twins speak Spanish with their father, and at school or with friends. The bilingual Manuela lives in England².

Table 3.1 Transcription information.

Language	Author	Child Name	Child Age	Dates
Eng. Monolingual	McWhinney	Ross	1;4.11 - 2;10.22	05/06/1979 - 11/16/1980
	Clark	Shem	2;2.16 - 3;2.02	04/12/1976 - 04/07/1977
	Brown	Adam	2;3.04 - 3;11.01	4/6/1964
	Brown	Eve	1;6 - 2;3	10/15/62 - 07/23/63
	Nelson	Emily	1;9.24 - 2;7	12/08/81 - 10/25/82
	Snow	Nathaniel	2;5.18 - 3;9.04	02/03/79 - 05/20/80
	Suppes	Nina	1;11.16 - 3;3.21	11/05/70 - /3/12/72
Sp. Monolingual	Linaza	Juan	1;7.02 - 3;6	Not specified in files
	Ornat	María	1;7 - 3;10	Not specified in files
	Serra, M.	Eduard	1;4 - 3;10	4/5/2004
	Aquirre	Mag	1;7 - 2;10.24	05/01/1992 - 12/24/1992

² No other information on Manuela was available at the time of the study.

	Diezitta	Child ³	3;2.09 - 3;10.09	09/1996 - 04/13/1997
	n/a	Irene	0;11.01 - 3;2.19	07/24/1998 - 11/12/2000
	Vila	Emilio	0;11.09 - 3;11.26	Not specified in files
Bilingual (eng)	Deuchar	Manuela	1;3.08 - 2;2.21	10/02/1986 - 01/14/1988
	Fuentes et al.	Leo	1;01.23 - 3;9.13	02/19/2000 - 10/11/2002
	Fuentes et al.	Simon	1;01.23 - 3;9.13	02/19/2000 - 10/11/2002
Bilingual (sp)	Deuchar	Manuela	1;3.04 - 2;6.02	09/28/1986 - 12/26/1987
	Fuentes et al.	Leo	1;02 - 3;09	02/19/1999 - 10/23/2002
	Fuentes et al.	Simon	1;02 - 3;09	02/19/1999 - 10/23/2002

3.3.2 Materials and Procedure

Data were extracted from discontinuous longitudinal transcripts from the CHILDES database. The word list used for this study is based on the list of object and substance mass nouns used in Bloom's (1990) study, Jackson-Maldonado, Thal, Marchman, Bates & Gutierrez-Clellen's (1993) list of early lexical Spanish items, and Markman's (1985) cross-linguistic study of superordinate nouns. Table 3.2 lists the searched words in both English and Spanish. The mass substance nouns searched are identical to those used in Bloom's study: *juice*, *milk*, *water*, *sand*, and *mud*, along with their Spanish equivalents: *zum**o*, *leche*, *agua*, *arena*, and *lodo*⁴. The other 19 words are categorized as discrete objects. In addition to the list of discrete objects from Bloom (1990) (*bacon*, *bread*, *cheese*, *celery*, *furniture*, *fruit*, *jewelry*, *lettuce*, *mail*, *money*, *paper*, *spaghetti*, *toast*), we have included *meat*, *chocolate*, *cake*, *rice*, *grass*, *clothes*, and *food* (*carne*, *chocolate*, *tarta*, *arroz*, *hierba*, *ropa*, and *comida*).

³ 'Child' is the name used in the transcriptions to identify the child participant. No other name is given.

⁴ Post-analysis, we searched for possible alternative lexical equivalents for *mud* and *juice* in Spanish: *barro* and *jugo*, respectively. The search of the Spanish transcripts did not generate any examples of either *barro* or *jugo*. In future studies, word frequency will be considered in order to account for any cross-linguistic and intralinguistic variation.

Table 3.2 Word list in English and Spanish.

juice	zumο
milk	leche
water	agua
sand	arena
mud	lodo
meat	carne
cheese	queso
bread	pan
paper	papel
bacon	bacon
celery	apio
lettuce	lechuga
toast	tostada
chocolate	chocolate
cake	tarta ⁵
clothes	ropa
furniture	muebles
money	dinero
mail	correo
fruit	fruta
food	comida
rice	arroz
grass	hierba
spaghetti	espaguetis

All of the available transcripts up to the age of 3;11 were searched for non-adult usages of the words listed in table 3.2. Mass noun usages were considered as non-adult when used in an unacceptable count noun context; for example, if the mass nouns were preceded by the determiners *a*, *another* in English, *un*, *otro* in Spanish, or with numerals. In this study, the words *error*, and *ungrammatical item* were also used interchangeably to describe the non-adult usages made by the children. One difficulty that arose from transcript analysis was that *a*, *on*, *in* and *of* were often written as they are pronounced:

⁵ We would like to note here that *pastel* is also another option in Spanish, which was made apparent post-analysis, from personal communication with Juana Liceras. *Pastel* may be used as an equivalent for *cake*, whereas *tarta* can mean *pie*.

'uh'. I omitted any instances where *uh* was written in the transcriptions because I was unable to determine if the *uh* should be an indefinite or definite article⁶. I also omitted any compound words that contained the searched item (eg. *water hydrant*). Once extracted, the data was analyzed for error frequency per language group, per child, and per category in each language (homogeneous substances and discrete objects).

3.4 Results and Analysis

The following tables 3.3 – 3.7 depict the extracted ungrammatical items (Ung. Items), grammatical items (Gr. Items), total number of items (Total N), and the percentage of ungrammatical items out of the total number (Ung./total N) for each mass noun. The results are grouped according to the mass noun categories: unbound substances and discrete objects. The data are further divided according to language group, separating the results for the monolingual English, monolingual Spanish, and bilingual children.

A chi-square test of independence was run with the monolingual English unbound substance and discrete object data to test if there was a relationship between the errors made by the children and the classification of the mass nouns. In other words, I tested whether or not the children produce more ungrammatical items with discrete objects than with substances. As predicted, the children did make more errors with discrete objects than with substances. The chi-square test showed there was a significant relationship between the mass noun category and the errors for the monolingual English children ($\chi^2(1, N=1497) p<0.05$).

⁶ There is also the possibility that *uh* in the transcripts is a monosyllabic placeholder or filler, and therefore should be omitted also for that reason.

Table 3.3 Monolingual English unbound substances.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
juice	4	180	184	2.17
milk	19	130	149	12.75
water	6	284	290	2.07
sand	0	28	28	0
mud	0	12	12	0
Total	29	634	663	4.37

Table 3.4 Monolingual English discrete objects.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
meat	1	37	38	2.63
cheese	2	42	44	4.55
bread	1	59	60	1.67
paper	15	155	170	8.82
bacon	1	1	2	50.00
celery	1	11	12	8.33
lettuce	0	2	2	0
toast	1	15	16	6.25
chocolate	0	15	15	0
cake	3	18	21	14.29
furniture	3	15	18	16.67
clothes	4	77	81	4.94
money	7	40	47	14.89
mail	1	16	17	5.88
fruit	7	14	21	33.33
food	2	145	147	1.36
rice	3	16	19	15.79
grass	4	65	69	5.80
spaghetti	1	43	44	2.27
Total	57	786	843	6.76

A chi-square test of independence was also run with the Spanish monolingual data to test whether or not there was a significant relationship between the ungrammatical items produced by the children and the mass noun categories: unbound substances and discrete objects. It was necessary to perform an exact test, due to the much smaller sample size and number of errors (N=10). The test showed that the relationship between

the categories and the errors was not significant ($p>0.1$). A separate exact test was run to compare the number of errors between the two language groups. The test supports that there is a greater probability that monolingual English children will produce more non-adult usages of discrete object mass nouns than the monolingual Spanish children (the results approached significance: $p=0.07$).

Table 3.5 Monolingual Spanish unbound substances.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
zumo	0	0	0	0
leche	3	36	39	7.69
agua	0	157	157	0
arena	1	3	4	25
lodo	0	2	2	0
Total	4	198	202	1.98

Table 3.6 Monolingual Spanish discrete objects.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
carne	0	2	2	0
bacon	0	0	0	0
apio	0	0	0	0
lechuga	0	0	0	0
chocolate	0	9	9	0
tarta	0	8	8	0
pan	0	13	13	0
papel	0	1	1	0
queso	0	1	1	0
tostada	0	3	3	0
muebles	0	0	0	0
ropa	2	7	9	22.22
dinero	1	10	11	9.09
correo	0	0	0	0
fruta	0	8	8	0
comida	2	37	39	5.13
arroz	1	9	10	10
hierba	0	3	0	0
espaguetis	0	0	0	0
Total	6	111	114	5.26

The bilingual results are treated separately here because the sample size is too small to make a reliable statistical comparison with the other two language groups. Currently the only bilingual Spanish-English transcripts available from the CHILDES database and from the Language Lab at the University of Ottawa are from these three children. In table 3.7 we can see that there are only two ungrammatical items in total, one made by Leo when he was speaking English, and a second one made by Manuela when she was speaking Spanish:

(1) Leo: I want a apple juice.

(2) Manuela: un papel.
a-M-SG paper-M-SG
*‘a paper’

Mother: quieres papel que vas a hacer dibujar?
want-2SG-Pres paper-M-SG that go-2SG-Pres to do-INF draw-INF
‘do you want paper because you’re going to draw?’

Example (2) is considered an error here because of the context of the utterance. The child is immediately corrected by the mother, however, given that the interpretation of the data in this case is subjective, the ungrammaticality of the item is debatable. Without the use of video, it is difficult to determine the exact context of the scene with the mother, and therefore it is possible that Manuela is asking for a sheet of paper as *un papel*. It should also be noted here that the mother is not a native-Spanish speaker, which would explain the non-native-like response ‘*que vas a hacer dibujar*’.

Table 3.7 Bilingual English and Spanish discrete objects and substances combined.

Participants		Ung. Items	Gr. Items	Total N	%Ung./ Total N
Bi – Eng	M	0	8	8	0
	Leo	1	56	57	1.75
	Simon	0	63	63	0
	Total	1	130	131	0.76
Bi – Sp	M	1	10	11	9.09
	Leo	0	13	13	0
	Simon	0	6	6	0
	Total	1	29	30	3.33

In tables 3.8 and 3.9 we can see a breakdown of the total number of ungrammatical items, grammatical items, and percentage of ungrammatical items out of the total number per child. By creating this table, we can have a better view of the distribution of errors per child. In table 3.8 it is evident that not all of the children produced ungrammatical items with unbound substances. The few non-adult usages in this category were produced by: Shem, Adam, Eve, Nathaniel, and Nina in English, María and Mag in Spanish. There were no errors made by the bilingual children.

Table 3.8 Unbound substances per child for all language groups.

Language	Participant	Ung. Items	Gr. Items	Total N	% Ung/ Total N
Mono- Eng	Ross	0	27	27	0.00
	Shem	3	73	76	3.95
	Adam	6	142	148	4.05
	Eve	1	72	73	1.37
	Emily	0	7	7	0.00
	Nathaniel	4	61	65	6.15
	Nina	4	262	266	1.50

Mono-Sp	Juan	0	11	11	0.00
	María	1	66	67	1.49
	Mag	1	65	66	1.52
	Child	0	22	22	0.00
	Irene	0	28	28	0.00
	Koki	0	10	10	0.00
	Emilio	0	16	16	0.00
Bi-Eng	Manuela	0	7	7	0.00
	Leo	1	45	46	2.17
	Simon	0	50	50	0.00
Bi-Sp	Manuela	0	0	0	0.00
	Leo	0	0	0	0.00
	Simon	0	4	4	0.00

In table 3.9 we can see the distribution of errors per child for all language groups for the discrete object mass noun category. Again it is visible that not all the children produced ungrammatical items. All of the monolingual English speaking children produced discrete object mass noun errors except Emily (who only had six items in total). The direct object mass noun errors were produced by María, Mag, and Irene in Spanish, and only by the bilingual child Manuela during her Spanish transcripts.

Table 3.9 Discrete objects per child for all language groups.

Language	Participant	Ung. Items	Gr. Items	Total N	% Ung/ Total N
Mono-Eng	Ross	2	34	36	5.56
	Shem	15	106	121	12.40
	Adam	7	178	184	3.80
	Eve	5	73	78	6.41
	Emily	0	6	6	0.00
	Nathaniel	4	83	87	4.60
	Nina	22	306	328	6.71
Mono-Sp	Juan	0	2	2	0.00
	María	2	35	37	5.41
	Mag	1	10	11	9.09
	Child	0	41	41	0.00
	Irene	2	17	19	10.53
	Koki	0	14	14	0.00
	Emilio	0	6	6	0.00
Bi-Eng	Manuela	0	1	1	0.00
	Leo	0	12	12	0.00
	Simon	0	13	13	0.00
Bi-Sp	Manuela	1	4	5	20.00*
	Leo	0	12	12	0.00
	Simon	0	2	2	0.00

By comparing the above tables 3.8 and 3.9 we can note that the following children did not produce any ungrammatical items in either category: the monolingual English child Emily; Juan, Child, Koki, and Emilio in Spanish; and the bilingual child Simon.

In summary, the statistical analysis of the monolingual English data showed that there was a significant relationship between the mass noun category and the

* Although this percentage is high compared to the other results, it should be noted that there is only one ungrammatical item out of a total of five items, and the production itself was highly debatable as a non-adult usage in the given context (*un papel*).

ungrammatical items. There was a higher probability that the children would produce more non-adult usages in English with discrete object mass nouns than with substance mass nouns. The analysis of the monolingual Spanish data revealed no such significant relationship, although a more thorough test could be performed if the sample size were larger. The comparison between the two language groups and the errors showed that the monolingual English children tend to produce more ungrammatical items than the monolingual Spanish children. The bilingual children produced the least amount of errors (N=2), however the sample size was significantly smaller than those of the monolingual groups.

3.5 Study Two: Objectives and Predictions

One criticism of the methodology from study one is that not all of the words originally used by Bloom (1990) in the discrete object category shared exactly the same properties. Object mass nouns in both English and Spanish can be divided into subcategories, based on their referents in the world. Wierzbicka (1985) suggests that nouns can be categorized based on how the speaker perceives the referent or how they interact with the referent in their culture (see Chapter one for a detailed discussion).

The objective of the second study is to reanalyze the CHILDES data according to a further categorical division of the selected mass noun items. Based on previous studies (Barner and Snedeker, 2005; Barner, Wagner and Snedeker, 2008; Wierzbicka, 1985), the categories tested in study two are as follows: unbound substances, discrete objects, flexible nouns, superordinates, aggregates, and dual objects. If children use conceptual cues in the absence of syntactic cues, they should make the least number of errors with

unbound substances, because the children tend not to confuse substances for count nouns. If we further extend this hypothesis, the children may be confused by other perceptual and syntactic factors. For instance, flexible nouns can carry both count and mass noun syntax, depending on the intended meaning of the word (eg. *some cake* vs. *a cake*). Aggregates and superordinates may cause confusion because they are individual items grouped together. It is also possible that dual objects will be problematic due to their plural morphology⁷.

3.6. Methodology

3.6.1 Participants

The same groups of monolingual participants were used from study one: seven monolingual English and seven monolingual Spanish speaking children, with ages ranging from 1;02 to 3;11 years (see table 3.1). The bilingual data was not included due to the small number of ungrammatical items found in experiment one (N = 2).

3.6.2 Materials and Procedure

The word list from study one was also used in study two with the addition of *scissors* (*tijeras*) and *pants* (*pantalones*) in order to include nouns from the dual object category. In this portion of the study, the non-substance nouns have been further divided into categories based on the detailed discussion put forth initially by Wierzbicka (1985) (see Chapter one). Table 3.10 contains the categorized word list in English and Spanish.

⁷ In Spanish, dual object nouns can occur in the singular and in the plural form, unlike in English, which only allows dual object nouns in the plural form. For both languages, the transcripts have been searched for cases of non-agreement between the sentence syntax and the dual object mass noun. Specifically for English, the transcripts were also examined for count usages of the dual object nouns.

Table 3.10 Word list divided according to category.

Unbound homogeneous substances		Discrete objects	
juice -	zumο	meat -	carne
milk -	leche	bacon -	bacon
water -	agua	celery -	apio
sand -	arena	lettuce -	lechuga
mud -	lodo	cheese	
		bread	
		paper	
		toast	
Flexible nouns		Superordinates	
chocolate -	chocolate	clothes -	ropa
cake -	tarta	furniture -	muebles
	pan (bread)	money -	dinero
	papel (paper)	mail -	correo
	queso (cheese)	fruit -	fruta
	tostada (toast)	food -	comida
Aggregates		Dual objects	
rice -	arroz	scissors -	tijeras
grass -	hierba	pants -	pantalones
spaghetti -	espaguetis		

3.7 Results and Analysis

The following tables 3.11 – 3.16 depict the extracted ungrammatical items (Ung. Items), grammatical items (Gr. Items), total number of items (Total N), and the percentage of ungrammatical items out of the total number (Ung./Total N) for each mass noun. The results are grouped according to the mass noun category: unbound substances, discrete objects, flexible nouns, superordinates, aggregates, and dual objects. The data is further divided according to language group, separating the results for monolingual English and monolingual Spanish.

A chi-square test of independence was run using the monolingual English data in order to test if there is a relationship between the six categories (unbound substances, discrete objects, flexible nouns, aggregates, superordinates, and dual objects) and whether the children make an error. The findings revealed that using an ungrammatical item does not depend on the category ($p > 0.3$). Therefore, we cannot support through a statistical analysis the claim that monolingual children make more errors with one category of mass nouns over another.

For the monolingual English unbound substances it was possible to run a separate chi-square test to observe whether or not there was a relationship between the individual word and the grammatical use of the word. The chi-square test revealed that there *is* a relationship between the word and its grammatical usage by the monolingual English speaking children ($\chi^2 (4, N=657) p < 0.0001$). There is a greater probability that the children will produce non-adult usages of the word *milk* over the other substance mass nouns. Unfortunately, the same test was not reliable for the other categories because of their much smaller sample sizes.

Table 3.11 Monolingual English unbound substances.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
juice	4	165	169	2.37
milk	19	139	158	12.03
water	6	284	290	2.07
sand	0	28	28	0
mud	0	12	12	0
Total	29	628	657	4.41

From table 3.11 it should be noted that the use of *milk* occurs ungrammatically 19 times, making it the most occurring error out of all the English mass nouns, even over *paper* (15 times) as seen in table 3.12:

(3) Adam: I need one milk too.

(4) Nina: I want to take a milk out, ok?

This is not consistent with Bloom's (1990) results that have the word *paper* making up over 50% of all non-adult usages in his study. However, Bloom also only had five monolingual English participants instead of seven.

Table 3.12 Monolingual English discrete objects.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
meat	1	37	38	2.63
cheese	2	42	44	4.55
bread	1	59	60	1.67
paper	15	154	169	8.88
bacon	1	1	2	50.00
celery	1	11	12	8.33
lettuce	0	2	2	0
toast	1	15	16	6.25
Total	22	321	343	6.41

In this study (table 3.12) *paper* makes up the largest percentage of errors (15 errors out of 170 uses of the word *paper* = 8.82%). Eight of the non-adult usages were given by the same participant Shem, with the remainder distributed over the other English monolinguals.

(5) Shem: I want a paper.

(6) Adam: Dis is a paper. Tell you when the paper cut.

Table 3.13 Monolingual English flexible nouns.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
chocolate	0	15	15	0
cake	3	18	21	14.29
Total	3	33	36	8.33

There were only 3 non-adult usages in the flexible noun category, all of which were with the noun *cake*.

(7) Shem: He's eating a cake in the bathtub.

(8) Mother: What else did you eat at the fair?

Nina: a cake.

Mother: cake? Was it good?

Table 3.14 Monolingual English superordinates.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
furniture	3	15	18	16.67
clothes	4	77	81	4.94
money	7	39	46	15.22
mail	1	16	17	5.88
fruit	7	13	20	35.00
food	2	145	147	1.36
Total	24	305	329	7.29

Out of a total number of 329 items in the superordinate category, 24 were non-adult usages. The highest percentage of errors was found with *fruit* (35%), *furniture* (16.67%), and *money* (15.22%).

(9) Adam: Dese are moneys.

(10) Nina: We're gonna share these fruit tomorrow.

Table 3.15 Monolingual English aggregates.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
rice	3	16	19	15.79
grass	4	65	69	5.80
spaghetti	1	43	44	2.27
Total	8	124	132	6.06

In the aggregates category, shown above in table 3.15, the highest percentage of non-adult usages was with *rice* (15.79%), followed by *grass* (5.80%).

(11) Shem: I want some juice and a rice.

(12) Nina: This is a grass.

Table 3.16 Monolingual English dual objects.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
scissors	4	33	37	10.81
pants	5	72	77	6.49
Total	9	105	114	7.89

In table 3.16 we can see the results for the dual objects. The highest percentage of errors was with *scissors* (10.81%) followed by *pants* (6.49%).

(13) Nethaniel: Two pants.

(14) Nina: And that's the scissors.

In summary, the monolingual English data reveals that the production of ungrammatical items is not dependent on the mass noun category. Although the homogeneous unbound substances had the lowest percentage of errors overall, *milk* was the highest occurring mass noun out of all six categories combined.

Tables 3.17-3.22 contain the results from the monolingual Spanish analysis, displayed in the same manner as the monolingual English data in tables 3.11 – 3.16. The same chi-square test was run for the monolingual Spanish categories to test whether or not the categories in Spanish are independent. The results showed that there was a significant difference between the six categories (χ^2 (4, N=360) $p < 0.0001$). There is a higher probability that a child will make an error in the superordinates and dual objects categories. Chi-square tests were not run for each separate category to check for a relationship between the individual words and the grammatical usages because the small sample sizes would have made the results unreliable.

Table 3.17 Monolingual Spanish unbound substances.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
zumo	0	0	0	0
leche	3	35	38	7.89
agua	0	154	162	0
arena	1	3	18	5.56
lodo	0	2	2	0
Total	4	194	220	1.82

In the category of unbound substances, there were only 4 non-adult usages out of 200 items in total. 3 errors were found with *leche* (7.69%) and 1 was found with *arena* (25%).

(15) María: Mira, le voy a dar un leche.
 Look-2SG-IMPV him go-1SG-Pres to give-INF a-M-SG milk-M-SG
 'Look, I'm going to give him *a milk'

(16) Irene: Con una arena pero que ensucia.
 with a-F-SG sand-F-SG but that dirties-3SG-Pres
 'With *a sand, but it makes one dirty'

Table 3.18 Monolingual Spanish discrete objects.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
carne	0	2	2	0
bacon	0	0	0	0
apio	0	0	0	0
lechuga	0	0	0	0
Total	0	2	2	0

Table 3.18 shows there were only 2 examples of discrete object mass nouns, both of which were grammatical usages. In table 3.19 below we can see that there were no non-adult usages of the flexible nouns in Spanish.

Table 3.19 Monolingual Spanish flexible nouns.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
chocolate	0	9	9	0
tarta	0	7	7	0
pan	0	15	15	0
papel	0	1	1	0
queso	0	1	1	0
tostada	0	3	3	0
Total	0	36	36	0

Table 3.20 Monolingual Spanish superordinates.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
muebles	0	0	0	0
ropa	2	7	9	22.22
dinero	1	12	13	7.69
correo	0	23	23	0
fruta	0	8	8	0
comida	2	25	27	7.41
Total	5	75	80	6.25

In the category of superordinates (table 3.20), the highest percentage of errors was with *ropa* (22.22%), followed by *dinero* (7.69%) and *comida* (7.41%), summing to a total of 5 non-adult usages out of a total of 67 items.

(17) María: Señora, me da unos pendientes y una ropa?
 Lady-F-SG me give-3SG-Pres a-M-PL earrings-M-PL and a-F-SG clothes-F-SG
 'Lady, can you give me some earrings and (a) clothes?'

(18) Mother: Me lo cuentas tú a mí?
 me it-M tell-2SG-Pres you to me
 'Will you tell it to me?'

Mag: Una comida.
 a-F-SG food-F-SG
 '(a) food'

Table 3.21 Monolingual Spanish aggregates.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
arroz	1	8	9	11.11
hierba	0	3	3	0
espaguetis	0	0	0	0
Total	1	12	12	8.33

Table 3.21 shows that there was only one non-adult usage in the aggregates category with the word *arroz*.

Table 3.22 Monolingual Spanish dual objects.

	Ung. Items	Gr. Items	Total N	%Ung/ Total N
tijeras	2	15	17	11.76
pantalones	0	5	5	0
Total	2	20	22	9.09

Both of the non-adult usages in the dual objects category were with the word *tijeras* (11.76%). Unlike in English, in this category dual objects in Spanish may be used in the singular or plural form. The usages were considered non-adult if the child used singular syntax with a pluralized noun or vice versa.

(19) Mag: Ya he cortado cuento. Una tijeras.
 already have-1SG-AUX cut-PP story-M-SG. a-F-SG scissors-F-PL.
 'I have already cut the story. *A scissors.'

(20) Mag: Una tijeras ha roto.
 a-F-SG scissors-F-PL has-3SG-AUX broken-PP
 '*a scissors has broken?'

To summarize the monolingual Spanish results, the data show that the production of errors is dependent on the mass noun category. There is a higher probability that the children will use an ungrammatical item with superordinates and dual objects.

Table 3.23 Ungrammatical items per language and category.

	English		Spanish	
	Ung/Total N	%	Ung/Total N	%
Unbound substances	29/657	4.41	4/220	1.82
Discrete objects	22/343	6.41	0/2	0
Flexible nouns	3/36	8.33	0/36	0
Superordinates	24/329	7.29	5/80	6.25
Aggregates	8/132	6.06	1/12	8.33
Dual objects	9/114	7.89	2/22	9.09

The above table 3.32 summarizes the non-adult usages and the percentage of non-adult usages out of the total number per language group according to each mass noun category. For the English results, there was no significant difference between the six categories. The Spanish results did show a significant difference. There was a higher probability that the children would produce non-adult usages with dual objects and

superordinates. Although the percentage of the non-adult usages in the aggregate category is higher than in the superordinate category, the raw data was not significant.

3.8 General Discussion

Study one aimed to test the hypothesis that children use conceptual cues in order to assign the correct feature and map syntax onto the word from the meaning. The study also tested whether or not the shape and material biases are present for both English and Spanish speaking children. According to Bloom's (1990) results, children sometimes misconstrue mass nouns referring to objects as bounded individuals and miscategorize them as [+INDIVIDUAL]. The English speaking children produced fewer non-adult usages with the substance nouns, because the children tend not to misperceive the substances as bound discrete objects. In the current study, the monolingual English results supported Bloom's findings. There is a higher probability that English speaking children will produce more ungrammatical items with discrete objects than with unbound substances. The statistical analysis of the Spanish monolingual data did not yield the same results. The test showed an insignificant relationship between the substance and discrete object categories. These findings challenge the notion that the word learning biases are universal.

The bilingual data contained only 1 non-adult usage in each of the two language groups (Spanish and English production), which was not enough to run any significant analyses. The study may be repeated again in the future once more bilingual Spanish-English participants are available on the CHILDES database. It would also be beneficial to conduct an experimental study with bilingual children, during which specific data

could be elicited for mass and count responses. What can be said at this point is that the bilingual children are not making more grammatical errors than the monolingual children, despite learning two languages simultaneously.

The findings from study two were quite different for each of the monolingual language groups (bilingual data were omitted from the second study due to the lack of item production). The English results showed that whether or not the child produces a non-adult usage of a mass noun does not depend on the mass noun category. The results from the Spanish data showed that there is a much greater chance a child will use a dual object or a superordinate mass noun ungrammatically. At the same time, there is a minimal chance that a child will use flexible mass nouns and discrete objects ungrammatically.

Overall, the Spanish monolingual children produced less non-adult usages than the English monolingual speaking children. These results support the initial hypothesis that Spanish children do not rely on the shape bias as much as the English children because they have fewer preconceived notions of the categorization of the referents. In Spanish, the linguistic mass-count distinction is not as fixed as it is in English, which means the learners may not automatically assign the notion of individual to count nouns based on the shape of the object. Furthermore, there are fewer opportunities to produce errors given that there are more grammatical options in Spanish due to the flexibility of the nouns.

3.9 Conclusions

At the time of the study the amount of monolingual Spanish data and bilingual data available on CHILDES was significantly less than the monolingual English data, which prevented the possibility of cross-linguistic statistical analysis. However, if we compare the available separate analyses, we see a significant difference between the three language groups. In general, the monolingual English-speaking children produced the greatest number of non-adult usages of mass nouns, with the bilingual children producing the least number. When the data was divided into two categories, the monolingual data also revealed that children miscategorized discrete object mass nouns more often than substance mass nouns, supporting the theory that English speaking children use conceptual cues (the shape and material biases) when mapping meaning onto a word in the absence of syntactic cues, since the children may misconstrue discrete objects as count nouns and as individuals due to their semantic feature of boundedness. When the discrete object mass noun items were further divided into more specific categories, only the Spanish data showed any significant difference between the categories. Given that the English data and the Spanish data did not yield the same results, the current findings support the hypothesis that there are language-specific influences on children's attention when learning object and substance names.

The findings from the present study have raised further questions that may be answered once a larger body of monolingual Spanish and bilingual data is available. One question that cannot be answered at this time is why the production of mass nouns in the spontaneous speech data in general is much lower with the Spanish monolingual and the bilingual children. It may have to do with the circumstances and topics discussed during

recording sessions, since many of the mass nouns were food items, and they may not have been part of the recorded conversations. The results may also have been affected by the lexical items that were included in the analysis. The aforementioned question could be answered by running a cross-linguistic analysis of the frequency of each word in English and Spanish that was used in the study. Further research could include a developmental analysis of different age ranges and MLUs by increasing the age range of the children up to seven or eight years. Unfortunately, the current transcripts available on CHILDES do not include the same age range for each recorded child.

In conclusion, the present study provides evidence that object and substance labeling may be affected by language-specific influences. It is possible that even if constraints and biases play a role in early language acquisition, the language-specific influences may override universal tendencies. Further research is needed to compare the presence of biases at different age intervals.

CHAPTER FOUR

4.0 Introduction

Topics in the field of second language acquisition research and how they are related to first language acquisition are the focus of the present chapter. These topics include the availability of Universal Grammar to the second language learner, the role of the first language in SLA, and the organization of the non-native mental lexicon. In section 4.1, the theories of L1 acquisition previously discussed in chapter two are compared to the nativist and empiricist views of SLA. The second section 4.2 examines the role of the L1 in the acquisition of a second language, which includes the involvement of the L1 in projecting the L2 grammar. Section 4.3 reviews the current theories and research concerned with the organization of the bilingual mental lexicon and how L2 learners map form to meaning. The chapter is summarized and concluded in the final section 4.4.

4.1 Universal Grammar and Second Language Acquisition

The current approaches to the study of SLA can be divided into two groups: the nativist models and the empiricist models. The nativist models tend to attribute the acquisition of a second language to setting the parameters of the Universal Grammar, whereas the empiricist models view SLA as a data-driven process that does not depend on linguistic universals. There are also researchers who have a nativist view of first language acquisition, but hold an alternative view of second language acquisition (Clahsen and Muysken, 1986, Schachter, 1989). Their claim is that children have access to UG only until the onset of puberty, although the age of the 'critical period' has been under debate (Cook, 1995; Johnson and Newport, 1989; Robertson, 2002;

Singleton, 1995; Zhao and Morgan, 2004). In the present section, the focus is centered on the UG model of first and second language acquisition.

To recall the theories reviewed in chapter two (section 2.1), supporters of the nativist view argue that children must have an innate knowledge of language that allows them to acquire a specific language, given that the amount of input a child receives is too limited to be the only source of knowledge. The same argument can be extended to SLA: if L2 learners are able to have knowledge of language that could not have been acquired from input alone, there must be an innate source in their own minds (Cook *et al.*, 2007; White, 2007). Similar to the model presented in chapter two for L1 acquisition, Cook and Newson (2007: 228) illustrate the poverty-of-stimulus (POS) argument for SLA as follows:

Step A: An L2 user of a particular language knows a particular aspect of L2 syntax.

Step B: This aspect of syntax could not have been acquired from the language input typically available to L2 learners.

Step C: (They) conclude that this aspect of L2 syntax is not learnt from outside (or transferred from the L1).

Step D: (They) deduce that this aspect of L2 syntax is built in to the mind.

Cook and Newson (2007) provide support for their argument by discussing the positive and negative evidence available to the L2 learner: imitation, direct teaching, social interaction, and other faculties. With regards to imitation, it only provides positive evidence, and does not present the learner with what cannot be said. This is true for both L1 and L2 learners. Direct teaching, however, is usually only provided to L2 learners, and more specifically only to those L2 learners who are receiving classroom instruction. Direct teaching does not account for how students learn what they are not taught explicitly. In a classroom setting, the learners are only taught the

structures that the teacher is aware of. L2 learners, unlike L1 learners, are also often presented with feedback and corrections, in both a classroom setting and even in natural situations. The authors point out that even with correction, it is unlikely that it is applied to the type of mistake necessary to acquire UG principles¹. In addition to direct teaching, L2 learners are also exposed to natural and non-natural social exchanges. Natural exchanges are the same as the experiences of L1 learners, while non-natural situations may be provided by teachers and can include exchanges such as guided classroom activities or the use of recasts (ie. the teacher paraphrases the learner's mistakes). Whether it is a natural or non-natural exchange, neither attempts to teach UG principles and are 'an unlikely vehicle for the acquisition of core UG syntax' (Cook *et al.* 2007: 227). The authors conclude their discussion of L2 evidence by addressing the question of the use of other mental faculties. They give the same argument for both L1 and L2 acquisition: the language principles are too unique to depend on other faculties. They argue that production and comprehension depends on other mental faculties, whereas language acquisition does not. The language knowledge learnt is too complex to be attributed to sensorimotor intelligence and cognitive development (Chomsky in Cook *et al.*, 2007). It should be noted that the L2 learner is at a later stage of development than the L1 learner, and consequently is at a later stage of cognitive development. Furthermore, the L2 learner already has the knowledge of their L1, which means they have a different starting point than an L1 learner.

The issue of the initial state of an L2 learner has been one of controversy over the past decades. There are four alternatives put forth as possible initial second language states: 1) the L2

¹ Cook *et al.*, (2007) give Locality as an example of a UG principle. In Cook (2003) the author administered a grammaticality judgment task to L1 speakers of English and L2 speakers from different language backgrounds. The task included sentences involving different parameters, including ones that violated the Locality Principle (eg. *Is Sam is the cat that black?). The native speakers rejected 99.6% of the sentences that violated the principle, even though they would never have heard examples of English sentences that violate the principle in the input. The L2 learners also rejected the ungrammatical sentences with structure-dependency violations. Only nine of the L2 learners scored less than 5/6 correct. This study is discussed further under the Full Access Hypothesis, this chapter.

learner does not have access to the UG; 2) the L2 learner has a second copy of the UG; 3) the L2 learner can build on the UG that was available to acquire the L1; or 4) the L2 learner can partly build on the UG (Cook *et al.*, 2007: 232).

According to the first claim (No UG Hypothesis), there is no UG available for the L2 learner because it was somehow completely used up by the acquisition of the L1 (Cook *et al.*, 2007). This means that the L2 grammar is learnt from another source, such as a general learning process. A similar proposal is the Fundamental Difference Hypothesis, which points out the important differences between L1 and L2 learners (Gass *et al.*, 2008). Some of the arguments in support of this hypothesis are as follows. L1 learners ultimately achieve a complete knowledge of their target language whereas for an L2 learner the target language usually becomes fossilized and the learner rarely attains complete knowledge. Another difference is that children are capable of learning any language as long as they are exposed to the input. Furthermore, all languages are equally learnable by all L1 learners (Schachter, 1989). With L2 learners, on the other hand, some languages are harder to learn than others, depending on the L1. For example, Spanish speakers have less difficulty learning Italian than they do Japanese. In addition, unlike children learning a first language, L2 learners have the knowledge of a full linguistic system, which means they already know certain performance-level differences such as the use of different registers of language for different social settings (Gass *et al.*, 2008).

In contrast to the No UG Hypothesis, the Full Access Hypothesis posits that an L2 learner can build an L2 in exactly the same way that they built the L1, by instantiating the principles and setting the parameters (Cook *et al.*, 2007). According to this hypothesis, the initial state of the L2 learner has a copy of the UG that has been unaffected by the acquisition of the L1. The support for this hypothesis comes from evidence showing that L2 learners know principles and

parameters that they could not have learnt. Cook (2003) found supporting evidence by giving a grammaticality judgment task to 140 L2 learners of English across six different L1s. The task tested three structures: violations of movement restrictions (**Is Joe is the dog that black?*), unmoved forms (*Joe is the dog that is black*) and questions with a relative clause (*Is Joe the dog that is black?*). The results showed that 131 out of 140 participants rejected the movement violations (over 83%). The L1s of the participants included languages that did not have overt movement, such as Japanese, Chinese, and Arabic. The investigators concluded then that the knowledge about structure-dependency did not come from the steady-state (S_s) of the L1, but instead was something the L2 learners had not acquired from outside their own minds.²

A third alternative view is that instead of a copy, the original elements of UG are still available and can be adapted and reset from the S_s to create a second grammar (Cook *et al.*, 2007). If there were elements that were not activated in the S_s , they are still present in UG and can be instantiated for the L2 if necessary. For this theory, entitled the Full Transfer/Full Access Hypothesis, the final state of L1 acquisition is the initial state of L2 acquisition (Schwartz and Sprouse, 1996). The starting L2 grammar takes the S_s and builds a distinctive separate grammar using UG principles and parameters.

The fourth alternative, referred to as the Partial Access Hypothesis, posits that not all of the elements of UG are available in the initial L2 state (Cook *et al.*, 2007). The Partial Access Hypothesis can be broken down further into three proposals: the Minimal Trees Hypothesis, the Valueless Features Hypothesis, and the Failed Functional Features Hypothesis. The Minimal Trees Hypothesis posits that the initial second language state has an L1 grammar and a UG that

² If S_0 is the zero state of knowing no language, then S_s is the steady-state of knowing all the grammar of the language (Cook *et al.*, 2007). The S_s is the final state attained by an L1 learner, whereas the final state of an L2 learner is the combination of the S_s of the L1 and the S_s of the L2. The language faculty also has states in between the S_0 and S_s depending on the stage of language acquisition.

contains lexical categories (ie. NP and PP) but lacks functional categories (ie. IP and DP). The Valueless Features Hypothesis also proposes that the L2 initial state has an L1 grammar and a UG, however the hypothesis differs from the Minimal Trees in that the Valueless Features Hypothesis proposes that the L1 has the functional categories already present but lacks their parameter settings. The third hypothesis (Failed Functional Features) posits that the initial L2 state contains the L1 grammar minus the unset parameter settings. The parameter values are filled in as the learner progresses.

It is evident from the above review of the competing theories that there is still no consensus as to the initial state of SLA and the role of UG. Another area of research that has also given rise to a multitude of hypotheses is the final state of SLA (Cook *et al.*, 2007). Most researchers agree that the final outcome of SLA is not often a complete knowledge or 'language mastery', but instead failure to attain full competence as a child does with an L1 is much more typical of the L2 learner. Instead, their incomplete second language becomes fossilized while still containing some rules that do not belong to the target language system (Selinker in Ellis, 1986).

4.2 The Interlanguage

An important difference between L1 and L2 acquisition is the initial state of acquisition. The mind of an L1 learner is exposed to all the aspects of a language for the first time, whereas an L2 learner is in a different situation. They receive input from the L2 but at the same time are still influenced by the L1. As a result, L2 learners have what has been termed an interlanguage

grammar (IL) (Selinker, 1972)³. The interlanguage can be illustrated as follows (Archibald, 2005):

L1 → interlanguage grammar ← L2

Support for the interlanguage hypothesis comes from the presence of non-native-like pronunciation of the second language, as well as L1 influences on vocabulary and grammar (Ellis, 1986). The interference of the L1 can be viewed as both a positive and negative phenomena (Gass *et al.*, 1994). For example, if the writing system and grammar structures are similar in both the L1 and L2, the L1 may have a facilitating affect on the acquisition of the L2 (such as with Spanish and Italian). However, if the writing systems are different, the word order is different (SOV instead of SVO), and only one of the languages has plural morphology and a mass-count noun distinction, then the L1 could have a negative effect on the learning process (for example, English and Japanese).

The interlanguage system is considered to have three essential characteristics: it is permeable, dynamic, and systematic (Ellis, 1986). As a permeable system, the rules of the IL at any one stage are not fixed and may evolve over time. The rules are constantly being revised and extended in order to develop new hypotheses about the target language system. These changes to the rules are made systematically, rather than at random and in an unpredictable manner.

Selinker (1972) suggests that there are processes that operate in the IL while the learner is trying to internalize the L2 system, such as language transfer, the overgeneralization of target language rules, and fossilization. In the case of language transfer, the learner formulates hypotheses about the L2 based on the L1, and may constitute any aspect of language from phonetics to syntax. For instance, an English speaking learner of Spanish may pronounce 'r' as

³ The interlanguage is also referred to as L2 grammar or non-native grammar. The term was originally used to account for the difference between L1 and L2 grammars with respect to the presence of the L1 for the L2 learner.

the English /r/ instead of the /r̄/ used in Spanish⁴. Another example would be if a French learner of Spanish put a direct object pronoun in front of an infinitive verb instead of attached to the end:

(1) French source: Je veux le voir.
I want-1SG it-M-SG see-INF
'I want to see it.'

(2) Transfer to Spanish: *Yo quiero lo ver.
I want-1SG it-M-SG see-INF
'I want to see it.'

(3) Target Spanish: Yo quiero verlo.
I want-1SG see-INF it-M-SG
'I want to see it.'

The process of transfer can also refer to the influence of language on thought (Odlin, 2005). For example, *conceptual transfer* may occur if two languages differ in how they describe spatial relations and shape. Lucy and Gaskins (2001) found that the way speakers conceptualize the shapes and materials of objects could be influenced by language. Some languages, such as Japanese and Yucatec Mayan, do not morphosyntactically realize the mass-count distinction, which means they do not grammatically distinguish between bound objects and unbound substances. The study by Lucy and Gaskins (2001) showed that the Yucatec Mayans attend more to the materials and substances that comprise the objects rather than to the shape of the object. A Mayan or Japanese learner may be affected by the difference in the concepts underlying the mass-count distinction when learning Spanish or English as an L2. However, if both the L1 and L2 realize a mass-count distinction, positive transfer of the L1 concepts to the L2 should facilitate the acquisition process and not create interference. Nouns that have the same mass status in both the L1 (English) and L2 (Spanish) should not be misused by the L2 learner while nouns that have a different status in the L2 may. For example, the word *cheese* in English can

⁴ Examples are our own.

only be used as a mass noun in a mass context. In order to individualize *cheese*, the noun needs to be preceded by a quantifier, such as *wheel* or *piece of*. In Spanish, however, noun referring to cheese is flexible and can have either a count or mass status depending on the context and syntax (eg. *queso/cheese – un queso/*a cheese*). Until the L2 learner has acquired the concept underlying *un queso*, they may rely on the existing concept from the L1 and avoid the new structure altogether.

Another learning process, the overgeneralization of language rules, involves the extension of existing L2 knowledge to new interlanguage forms (Selinker, 1972). For example, learners of Spanish may put a feminine indefinite article with words such as *problema* (problem) or *sistema* (system) because they overgeneralize the rule that nouns ending in *-a* are feminine⁵. They will repeat the error until they learn a new rule that states that words in Spanish of Greek origin that end in *-ma* are masculine. The process of overgeneralization can also be illustrated with an example involving flexible nouns in Spanish. The noun *ajo* (garlic), for instance, is a flexible noun that may be used as a mass noun to refer to the substance of garlic, or it may be converted to a count noun with count syntax: *ajo* (garlic) vs. *un ajo* (*a garlic). As a count noun, *un ajo* actually refers to a clove of garlic, which may also be called *un diente de ajo*. It does not refer to the entire head of garlic. An L2 learner of Spanish may possibly overextend this rule to other items such as *cebolla* (onion). If the process of overgeneralization were to occur, the learner may use *una cebolla* to refer to *una capa de cebolla* (a layer of onion), even though *una cebolla* can only be used to denote a whole onion.

In this section we have discussed the initial state of SLA as it compares with that of L1 acquisition, as well as the influence of the L1 on the L2 grammar. Another difference between L1 and L2 acquisition concerns the final state. In the case of the L1, language learners achieve a

⁵ Example is our own.

final state of full knowledge of the language, including the principles, the parameter settings and the lexicon⁶. L2 learners, however, may cease to progress toward mastering the target language, even if the exposure to the L2 is continued. This process is referred to as *fossilization* (Selinker, 1972; Selinker and Lakshamanan, 1992). In essence, fossilization entails the aspects of the L2 grammar that are non-target that have become permanent, even if there is further instruction. According to Selinker (1972), only 5% of L2 learners may overcome fossilization, whereas the majority of learners cannot. Consider the example of what may be considered *restaurant talk* in Spanish. Native-Spanish speakers may naturally request *tres vinos* or *tres vinitos* when ordering three glasses of wine at a bar or restaurant, which would be considered unacceptable in English (**three wines*). An English learner of Spanish may always ask for *tres copas de vino* (*three glasses of wine*), and thus continue to sound non-native in that context.

4.3 The Bilingual Mental Lexicon

This section is primarily concerned with the relationship between first and second language mental representations and the organization of the mental lexicon. To clarify, the mental lexicon is considered to be the total number of words that are stored in the brain. Over the past few decades researchers have been debating whether or not the L1 and L2 mental lexicons have similarities (Chanell, 1990; Liceras *et al.*, in press; Meara, 1984; Wolter, 2001). Based on the results from a series of word association experiments, both Chanell (1990) and Meara (1984) concluded that the L1 and L2 mental representations have few similarities. Specifically, Meara (1984) found that a) a native speaker's representations are more stable than those of a non-native speaker; b) phonology plays a more prominent role in the organization of an L2 learner's mental

⁶ The native adult speaker can still acquire new vocabulary or even lose some items, but the linguistic competence is complete once it has been attained (Cook *et al.*, 2007).

lexicon; and c) there is a difference in the semantic connections that are present between words. One criticism of their research is that the experiments cited as supporting evidence used a small number of common prompt words (Liceras *et al.*, in press; Wolter, 2001). Furthermore, when the word association tasks involved low frequency words, the participants gave such a variety of responses that even the native speakers gave what they classified as non-native answers.

Contrary to the findings of Chanell (1990) and Meara (1984), Wolter (2001) argues that the organization of the L1 and L2 mental lexicon may be structurally similar. He also argues that the Depth of World Knowledge (ie. how well the word is known) plays a more important role than the word frequency. In order to test these two hypotheses, Wolter (2001) examined the response types in word association tests and also the use of low frequency prompt words. Commonly, the response types elicited by word association tests fall into three categories: paradigmatic, syntagmatic, and phonological ('clang' responses). Paradigmatic responses are from the same word class as the prompt word and can also perform the same grammatical function. There are four main types of paradigmatic responses: coordinates (ie. the prompt *dog* elicits the response *cat*), superordinates (ie. *dog* elicits *animal*), subordinates (ie. *dog* elicits *German Sheppard*), and synonyms (ie. *dog* elicits the response of *canine*). Syntagmatic responses are usually from a different word class than the prompt word but have a collocational relationship (ie. *dog* elicits *bark*). The third type of response, the clang response, only resembles the prompt word phonologically and has no semantic connection (ie. *dog* elicits *bog*).

Research with native speaker school children has shown that older children produce more paradigmatic responses than younger children as well as fewer clang responses (Brown and Berko 1960; Ervin 1961; Palermo 1971). This phenomenon, termed the syntagmatic-paradigmatic shift, was believed to be related to cognitive development. Studies with L2 learners

of English with different L1s have also shown similar results. Piper and Leicester (1980) administered a continuous response word association test to beginner and advanced Japanese learners of English and a control group of native speakers. The findings showed that the proportion of paradigmatic responses increased with each proficiency level. The control group produced more paradigmatic responses than the advanced learners who in turn produced more than the beginner group. A study by Söderman (1993) also revealed similar findings. The investigator tested four groups of Finish and Swedish learners of English at different ages and different proficiency levels. Söderman found that the mean number of paradigmatic responses and the proficiency level were positively correlated. At the same time, the number of clang responses decreased as proficiency increased.

Further support for a structurally similar L1 and L2 mental lexicon comes from tests using low frequency prompt words. Stolz and Tiffany (1972) administered a word association test to a group of native speaker university students to assess how they would respond to low frequency words. The findings revealed that the prompt words elicited non-native-like responses, such as clang responses and also unclassifiable words. Words that were judged to be more familiar to the participants resulted in a higher proportion of paradigmatic responses. Similar results were found by Postman (1970) who analyzed data from 1000 native speakers in order to test the number of different responses in relation to word-frequency. According to the analysis, the number of different responses increased as the word frequency decreased.

In sum, there are three supporting patterns found when comparing the native and non-native responses to word association tests:

1. Both native speakers and L2 learners of English show a syntagmatic-paradigmatic shift in their responses,

2. When presented with low frequency prompt words, both native speakers and L2 learners of English at different proficiency levels produce clang responses and unrelated response,
3. Both native speakers and L2 learners of English produce a diversity of responses when presented with low frequency prompt words.

In response to these patterns, Wolter (2001) proposed the Depth of Individual Word Knowledge Model, which can be summed up as follows: the mental lexicon is not conditioned by word frequency or language proficiency, but instead by how well a word is known to a speaker. This view holds true for both L1 and L2 speakers of a given language. If the mental lexicon were to be viewed as a storage unit for all the known words in a speaker's mind, the well known words would be at the central core with the slightly known words in the outer parameters. It is important to note that an L2 learner will most likely have a fewer number of words stored in their mental lexicon than a native speaker. Additionally, native speakers and especially L2 learners are continually acquiring new words just as some words may be lost, and even the words that are present in the lexicon may be known to varying degrees rather than at an equal level.

Wolter (2001) tested the Depth of Individual Word Knowledge Model by administering an aural-oral word association test to 13 Japanese speakers of English and 9 native English speakers. The test consisted of two lists of prompt words containing nouns, verbs, and adjectives from a range of frequencies. Any possible Japanese cognates were omitted from the prompt list, along with any words that might elicit responses that would be difficult to classify. The responses were classified into four groups: paradigmatic, syntagmatic, clang, and no response. After the word association test was completed, the participants were presented with a vocabulary knowledge test, for which they were required to give a self-assessment of the words from the word association test. The responses from both tests were compared and analyzed for patterns

according to each vocabulary knowledge test category. The results from the study supported the second hypothesis that the depth of world knowledge is related to the response types for both native and non-native speakers. There were differences, however, between the L1 and L2 results. The author found that for the L2 learner sometimes the phonological connections took precedence over the semantic connections for words that were only moderately well known. Once the learner had a better understanding of the individual words, then the semantic connections become dominant.

So far the discussion has been whether or not the L1 and L2 mental lexicons are structurally similar. Another topic of discussion and debate in the field of psycholinguistics concerns the actual storage of the two languages in the brain. Several models have been proposed to answer two main questions (Dong, Gui and MacWhinney, 2005): do bilinguals use a single common store for the meanings of words or do they use two separate stores, one for each language? Additionally, if there is shared storage, do bilinguals or L2 learners access the meanings for the words in the L2 in the same way they access words in the L1? The Separate Storage Model posits that there are two separate language representational systems. According to this model, each word in a translation pair would have its own conceptual representation. Recent studies using lexical decision tasks and semantic categorization tasks have revealed limitations to this model (De Groot and Nas, 1991; Dong *et al.*, 2005). De Groot and Nas (1991) obtained data from Dutch-English bilinguals that suggested that while cognate translations share conceptual representations, noncognates translations have separate conceptual representations. Other models, such as the Concept-Mediation Model, the Word-Association Model, and the Revised Hierarchical Model emphasize a shared storage system (Dong *et al.*, 2005; Kroll, 1993; Kroll and De Groot, 1997; Potter, So, Von Eckardt and Feldman, 1984).

Both the Concept-Mediation Model (CMM) and the Word-Association Model (WAM) distinguish between word representations and concept representations (Kroll, 1993; Kroll *et al.*, 1997; Potter *et al.*, 1984). The CMM proposes that each language has independent access to a common conceptual representation, whereas the WAM proposes that words in the L2 access concepts via words in the L1. Figure 4.1 below illustrates the two models (from Kroll, 1993 and Kroll *et al.*, 1997):

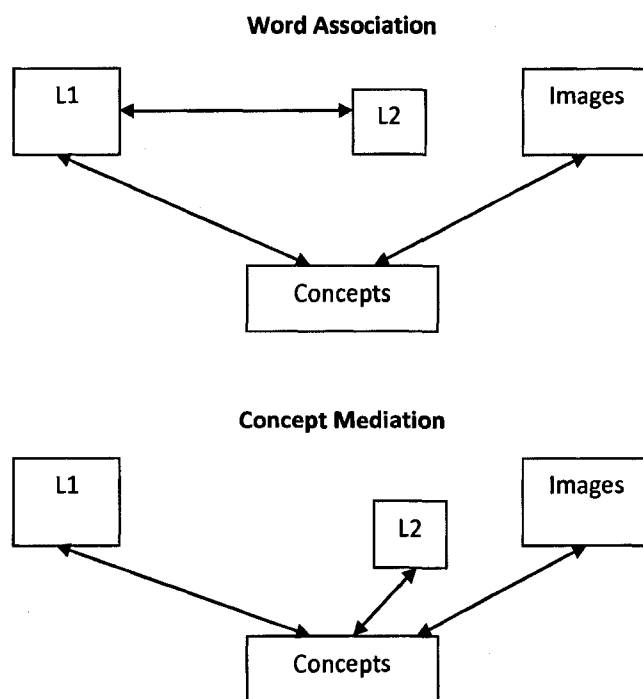


Figure 4.1 Two models of cross-language connection in which L2 words are associated to L1 words or directly linked to concepts.

Potter, So, Von Eckardt, and Feldman (1984) tested the models by administering a translation task and a picture naming task. The authors predicted that if a bilingual could access the conceptual representation directly, then the results would show an equal performance time for both the translation and the picture task; however, if the learner could by-pass the concept by

going directly to the L1 representation, then the translation task should be faster than the picture naming task. The study's findings supported the CMM, as both more and less fluent bilinguals performed the two tasks in the same amount of time. Further research was performed by Chen and Leung (1989) and Kroll and Curley (1988) with L2 learners at an earlier stage of acquisition. Their findings revealed that early L2 learners were faster with the translation tasks than with the picture naming tasks. The researchers concluded that when adults are at the early stages of L2 acquisition the L2 words are mediated through the L1 because the lexical representations are dominant. When they have acquired a greater fluency, there is an increase in the reliance on concept mediation. Further evidence for the development of lexical to conceptual processing comes from Chen and Ho (1986). They demonstrated that as L2 learners become more proficient in the L2, they experience a change from an initial point where they experience more interference from an L1 word than an L2 word when responding in their L2. As their fluency increases, they experience more interference from the L2 and less from the L1. Therefore, early L2 learners rely on the L1 until they are able to mediate conceptually directly in the L2.

Additional evidence in support of bilingual lexical mediation comes from research on cross-linguistic transfer concerning the role of cognates (Kroll *et al.*, 1997). Cognates are words that share aspects of form and meaning across both languages (eg. *tomato* in English and *tomate* in Spanish)⁷. A study by Dufour, Kroll, and Sholl (1996) examined the role of cognate status in the translation performance of English-French bilinguals. The results were that all of the bilinguals translated cognates faster than non-cognates. Further evidence comes from a recent study testing English-Spanish bilinguals and Japanese-English bilinguals (Hoshino and Kroll, 2008). Participants were shown 72 black and white line drawings and instructed to name the pictured objects in English as quickly as possible. Half of the drawings were cognates and the

⁷ Example is our own.

other half noncognates. In Spanish, the cognates shared both phonology and orthography, whereas the Japanese cognates shared only phonology. The results revealed that the bilinguals were faster to name a picture of a cognate in their L2, even when the languages had different writing scripts.

The question that arises from the results discussed above is whether or not the lexical connections between the L1 and L2 remain active once the conceptual links are acquired (Kroll, 1993). Two types of evidence provide support for the position that the conceptual links do remain active. First, many of the previous experiments used concrete nouns, mostly because they are considered to be the most representative of the lexicon of an L2 learner in the early stages. De Groot (1993) has pointed out that concrete nouns may be the only class of words that share conceptual representations in the L1 and L2. Abstract nouns and other grammatical categories may actually require lexical mediation. Second, studies have shown that translation from L2 to L1 is faster than from L1 to L2 (Kroll *et al.*, 1988; Kroll and Stewart, 1990, 1994). Neither the CMM or the WAM can account for the translation asymmetry, which has led Kroll and Stewart (1994) to develop a revised model of bilingual representation. The resulting Revised Hierarchical Model (RHM) includes aspects of both the CMM and the WAM, while addressing the asymmetrical relation between the L1 and the L2 (figure taken from Kroll, 1993: 69):

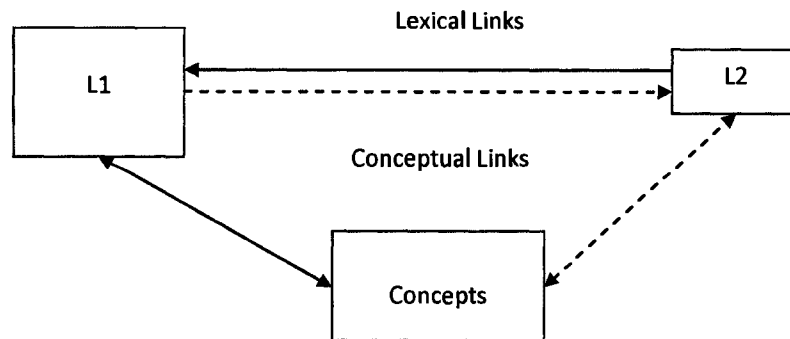


Figure 4.2 A revised model of lexical and conceptual representations in bilingual memory.

In the RHM, the L1 mental lexicon is assumed to be much larger than the L2 mental lexicon. Also, the link between the shared concept and the L1 is stronger than the link between the concept and the L2. The lexical connections between the L2 and L1 are also stronger than those between the L1 and L2. This means that for adult L2 learners, it is probable that a new L1 lexical entry has a mapping to the L1, while only a small number of L1 entries will have a mapping to the L2. Kroll (1993) and Kroll and Stewart (1994) suggest that as language proficiency increases, so does the reliance on conceptual mediation between the L1 and L2. At the same time, the lexical connections remain active.

Support for the Revised Hierarchical Model generally comes from translation tasks. Kroll and Stewart (1990, 1994) administered a naming and translation task to highly fluent Dutch-English Bilinguals. The results revealed that when the participants translated from L1 to L2, the responses were sensitive to the semantic context of the words, whereas when translating from L2 to L1, the responses were not sensitive. The participants took longer to translate words from L1 to L2 when the lists were semantically categorized.

Further evidence in support of a shared asymmetrical model comes from a recent study by Dong, Gui and MacWhinney (2005). The investigators conducted two experiments in order to test three research questions (Dong *et al.*, 2005: 224): 1) are a bilingual's vocabularies stored separately or shared at the conceptual level? 2) in the case of shared storage, do translation equivalents in the two languages access the shared concept in the same way? 3) if there is evidence of shared storage, what are the organizational and developmental patterns for the meaning components that are not equivalent between a pair of translation equivalents? In the first experiment, they used a priming paradigm to test for shared meanings. According to the results, there were significant priming effects for both the within-language and corresponding cross-language conditions. This led the investigators to conclude that there was a shared conceptual system for the two vocabularies in the mind of the bilingual. The results also showed that the participants responded faster to the L1 targets than the L2 targets, which supports the argument for a representational asymmetry. This means that the links between L1 names and concepts are stronger than those between L2 names and concepts. In their second experiment, they tested for the conceptual differences between pairs of translation equivalents. The results from the second experiment revealed two tendencies (Dong *et al.*, 2005: 232-233):

- 1) the conceptual differences between a pair of translation equivalents tend to converge in the mind of L2 learners. The more advanced the L2 is, the greater co-effects the two languages produce on the conceptual representations of the two languages...
- 2) the tendency to maintain the L1 conceptual system in the representation of the L1 word and to adopt the L2 conceptual system in the representation of the L2 word.

The investigators suggest that the acquisition of an L2 involves integrating the conceptual differences of the two languages, which requires a dynamic coordination of shared and separate conceptual representations. Figure 4.2 below illustrates Dong, Gui and MacWhinney's (2005) shared asymmetrical model:

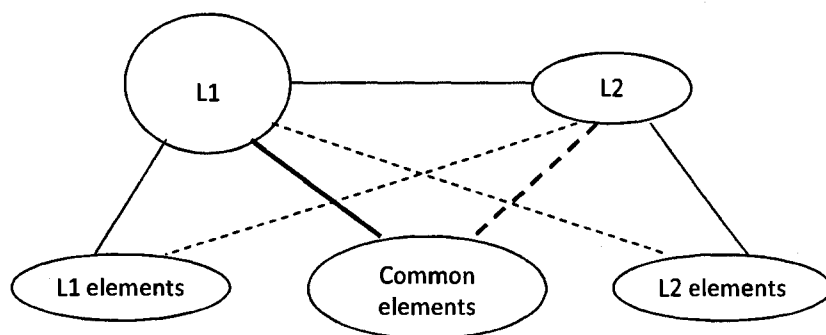


Figure 4.3 The Shared Asymmetrical Model.

The model displays three types of conceptual elements. The *common elements* are conceptual components that are translation equivalents in both languages. Additionally, the *L1* and *L2 elements* are cultural and language specific conceptual components. For most translation equivalents, the common elements are much greater than the specific language and cultural conceptual components. The link between the lexical names and common elements is stronger than the link between lexical names and the language specific elements, given that the common elements are key concepts in a lexical word. This is illustrated by a thicker line in the diagram.

4.4 Conclusions

This chapter has been concerned with a review of some of the most relevant theories in second language acquisition research, and how they are related to aspects of first language acquisition. The chapter began with a discussion of the initial state of the L2 learner and the involvement of UG in the acquisition of a second language. The theories of the initial state presented in this chapter included the No UG Hypothesis, the Full Access Hypothesis, the Full Transfer/Full Access Hypothesis, and the Partial Access Hypothesis. These three theories have different positions with regards to the availability of UG to the L2 learner. The first hypothesis claims that UG is not available to the L2 learner because it has been used up during the process of acquiring the L1, whereas the Full Access Hypothesis claims that the learner can acquire an L2 in the same way they acquired the L1. The third hypothesis is that the initial state of L2 acquisition is the final state of L1 acquisition. All of the original elements of UG are available and can be adapted and reset to create a second grammar. The fourth view is that only some of the elements of UG are available in the initial state of the L2.

Despite the differences between the above mentioned hypotheses, one important point that researchers can agree on regarding the initial state of L2 acquisition is the presence and influence of the L1. When children acquire their first language, their mind is a clean slate. When acquiring a second language, the learner has input from the L2 but is also influenced by the L1. The influence can have both a positive and negative effect on the learning process. The resulting state of the L2 and L1 influences was termed the *interlanguage grammar* by Selinker (1972), although today it is also referred to as L2 grammar or non-native grammar. The processes that operate in the interlanguage were discussed in section 4.2 of this chapter. These learning processes or strategies included *language transfer*, *overgeneralization*, and *fossilization*.

Another area of debate reviewed in this chapter was the organization of the bilingual mental lexicon. Some of the main points of discussion were the differences and similarities between the structure of the L1 and L2 mental lexicons, and the actual storage of the two languages in the brain. In order to address these research topics, several models were reviewed, such as the Depth of Individual Word Knowledge Model, the Revised Hierarchical Model, and the Shared Asymmetrical Model.

CHAPTER FIVE

5.0 Introduction

This final chapter presents an experimental study of the acquisition of mass nouns in Spanish by native English speakers. The background for the study is outlined in section 5.1, followed by the objectives and predictions in section 5.2. These objectives and predictions are initially given from a general perspective, after which they are listed specifically per task and task condition. Section 5.3 consists of the methodology, including a description of the participants, the materials and procedure, and the method of data analysis. In short, the participants were students enrolled in Spanish language courses at the University of Ottawa. They were asked to complete a translation task and a multiple choice task. The results from both tasks were analyzed and compared as percentages, and also in the form of raw data using a series of statistical tests. Section 5.4 presents the findings and analysis from both the translation and multiple choice tasks. A general discussion can be found in section 5.5, which includes a review of the findings and how they compare to the original hypotheses. The chapter is concluded in the final section 5.6.

5.1 Background

Chapter one of this thesis presented a discussion concerning the similarities and differences between the mass-count distinction in Spanish and English, considering both the syntactic and semantic views that attempt to explain the roots of the distinction. In both languages, mass nouns tend to denote uncountable non-individuals, whereas count nouns tend to

refer to discrete, countable individuals¹. Both languages also have nouns that may be recategorized as either mass or count, depending on the referent, as well as the phrasal syntax in which the noun is embedded. For instance, the term *jamón* (*ham*) can be used as a count noun if preceded by an indefinite determiner (*un jamón / a ham*) or a numeral or it can be used as a mass noun without an indefinite determiner or cardinal quantification (*quiero jamón / I want ham*). In either language, both count and mass nouns may be used with a classifier in order to permit quantification (*una taza de café / a cup of coffee*). Another similarity concerns dual lexical entries. In both languages, there are examples of entities that have two lexical representations, either a count or mass noun. For example, the mass noun *dinero* (*money*) and the count noun *billete* (*bill*) both refer to the same entity, although there is a difference in the conceptual interpretation of the referent. *Dinero* refers to money as a non-individual collection, whereas *billete* denotes a countable individuated item.

There are also several differences between the English and Spanish nominal systems. Gathercole (1997) argues that English has a linguistic mass-count distinction that obligatorily classifies most nouns as either mass or count (with the exception of the few flexible nouns in the language). Spanish, however, does not impose restrictions on number. Virtually any noun in Spanish can occur with plural morphology (*nacionalismos / *nationalisms*). Additionally, there are some syntactic environments where count nouns are given in bare NPs (*tengo coche / I have (a) car*) and other cases where a mass noun can be preceded by an indefinite determiner (*tiene una curiosidad / *He has a curiosity*). English and Spanish also differ with respect to their respective indefinite quantifiers. English has two sets, one for mass (*much-little*) and one for

¹ Recall that mass and count nouns in Spanish and English also affect the featural specification of Aspect, specifically the telic-atelic opposition. Specified quantity NPs (ie. *a dog / un perro, a glass of water / un vaso de agua, the sand / la arena*) are interpreted as telic, whereas unspecified quantity NPs give an atelic interpretation (ie. *I want Ø juice / quiero Ø zumo*).

count nouns (*many-few*), whereas Spanish has only one set used for both mass and count nouns (*mucho-poco*)². It should be noted, however, that English speakers often use the neutral quantifier *a lot of* to refer to both mass and count nouns.

The following study examines the use of mass and count nouns in Spanish by English speaking adults. More specifically, the study focuses on nouns that could be considered less-flexible and more-flexible in Spanish. Mass nouns such as *agua* (*water*) and *ropa* (*clothing*) tend to only be type-shifted in limited contexts. In contrast, nouns such as *pollo* (*chicken*) and *café* (*coffee*) are commonly recategorized as either mass or count depending on the context. This study also includes those flexible nouns in Spanish that are not flexible in English (*queso* – *un queso* / *cheese* – (*a*) *cheese*). By including both types of nouns (more and less flexible), it will be possible to observe the effects of flexibility in Spanish. Additionally, we will analyze the specific results for instances of L1 transfer (eg. *queso* instead of *un queso*) and overgeneralization (eg. *demasiadas gentes* /* *too many peoples*). The three language proficiency levels will be compared with each other, in order to observe any changes from the beginner to advanced stages of acquisition. The results from the multiple choice task will also be compared to those from the control group, in order to note any differences between the L2 learners and the native-speakers. The control group was not given the translation task because they would have been required to translate into their L2, which would have contradicted the original purpose of a control group.

5.2. Objectives and Predictions

From a broad perspective, the objective of this study is to provide L2 data and data analysis in an area that has been virtually untouched by Spanish acquisition researchers. Up until

² Although there is lexically one set in Spanish, only count nouns can be used with the plural form of the indefinite quantifiers (*muchos gatos* / *many cats*).

now, the investigation of the acquisition of the mass-count distinction has been limited to L1 research, primarily by psychologists (Bloom 1990, 1992, 1994; Barner *et al.*, 2006; Soja, 1990; Soja, 1992; Soja *et al.*, 1991), and the study of the acquisition of English by L1 speakers of classifier languages (Imai *et al.*, 1997; Subrahmanyam *et al.*, 2006). A few researchers have investigated the influence of the specific language on the primary acquisition of mass and count nouns by comparing experimental data from English and Spanish monolingual children to data from Korean and Welsh children (Gathercole *et al.*, 1997; Gathercole *et al.*, 2000). The current study contributes results from a translation task, which demonstrate comprehension of the mass noun morphosyntax. The translation task served to test the comprehension of the items used in the multiple choice task, and allow the participants to give their interpretation of the sentences, so that we could observe whether or not they would keep the mass or count structure of the Spanish sentence in their English response, or if they would not adhere to the specific status of the Spanish noun in their translation. The participants were also required to complete a multiple choice task. Given that the participants should already possess the concepts underlying the mass-count distinction in their L1 (English) as well as the morphosyntax of mass and count noun phrases, the multiple choice task aimed to determine whether the L2 learners would use the concepts and their knowledge of the morphosyntax when producing mass and count noun phrases in Spanish.

For the translation task, the specific predictions are as follows:

1. The participants should produce a high percentage of target responses for the items that contain bare mass noun phrases (ie. *beben leche/ drink milk*), since there is no variation between the structure of the Spanish sentences and the target translation equivalent in English.

2. The sentences that contain mass and count nouns with an indefinite quantifier should produce results similar to the sentences with bare mass nouns because again there is little variation between the Spanish items and the target responses. One difference may appear with the translation of *mucho*, as some participants may write the neutral quantifier *a lot of* instead of the mass-count specific quantifiers *much* and *many*. Non-target responses for this condition may be attributed to the difference between indefinite quantifiers in English and Spanish, considering that Spanish has only one pair of quantifiers for both mass and count nouns (*mucho/poco*).
3. The next set of sentences contains flexible nouns that are preceded by an indefinite article. As discussed in chapter 1 and the introduction of this chapter, flexible nouns are nouns that can be used as either mass or count nouns depending on the context and the syntax. For this condition, the prediction is that there will be two types of results, which is why the results for this condition will be analyzed as a whole group and again separately in two sub-groups. Half of the flexible nouns used as task items can be used the same way in English and should be seen as translation equivalents (ie. *un pollo/a chicken*). These items should yield mostly target responses. The second half of the flexible nouns, however, cannot be used in the same way in English, and should therefore cause the production of more non-target responses (ie. *un queso/*a cheese*). For these nouns, a target response in English would be a count phrase equivalent, which means the student is expected to use a classifier phrase. For example, *un queso* should be written as *a wheel of cheese* in English. If the participants do not possess the concept of *un queso* in their interlanguage, then they may produce the mass noun *cheese* and disregard the count status of the noun in Spanish since they may still recognize the lexical item *queso*.

4. The last type of sentence in the translation task contains a mass noun modified by a classifier (ie. *una taza de café/a cup of coffee*). These sentences should yield similar results to the first two conditions (bare mass nouns and nouns with an indefinite quantifier) since the target sentences are the exact translation equivalents of the task items.

The multiple choice task consists of the same sentence conditions as the translation task and therefore has similar predictions. One main difference, however, is that the participants are provided with four response options for each sentence, which restricts the possible productions (unlike the translation task where the participants produce entire sentences):

5. For the bare mass noun phrases the participants should only choose the bare noun option, since the other three options are not acceptable according to the context in Spanish or in English. The non target options list the mass noun with count morphosyntax (ie. **leches/*milks*), thereby eliminating the options as acceptable responses.
6. The second set of sentences in the multiple choice task contains mass nouns with an indefinite quantifier. This set differs slightly from the set used in the translation task, as the multiple choice task is limited to only mass nouns with an indefinite quantifier (instead of both mass and count nouns). Similar to the first condition, here the three non-target options provide the mass noun with count morphosyntax (ie. **pocas mantequillas/*littles butters*).
7. Similar to the translation task, the third set of sentences contains two types of flexible nouns preceded by an indefinite determiner. Half of the sentences require flexible nouns that are possible in English (ie. *un café/ a coffee*) and the second half require flexible nouns that are not grammatically possible in English (ie. *un ajo/*a garlic*). The

participants should produce less target responses for the sentences that are not grammatically possible in their L1.

8. The participants should produce a high percentage of target responses for the items containing mass nouns with a classifier, given that there is no variation between the sentence structure in Spanish and English.

Overall in both the translation task and the multiple choice task the predictions are as follows: first, if the L1 plays a positive role in terms of transfer, the participants should produce a higher percentage of target responses for the conditions that are morphosyntactically equivalent in both Spanish and English than for the conditions that have variation between the L1 and L2. Second, there should also be a visible overall increase in the production of target responses for each condition as the level of proficiency increases from the beginner group to the advanced group, since the beginner group will have had less exposure to the L2.

5.3. Methodology

5.3.1 Participants

The participants for the study were adult undergraduate students currently enrolled in Spanish language classes at the University of Ottawa, Canada. In addition to the undergraduate participants, the study also recruited ten native Spanish speakers from the graduate program in Spanish to be included as a control group. At the starting point, there was a total of forty-six participants from the Beginner II classes, forty-eight from the Intermediate II classes, and forty-four from the Advanced II classes. Prior to the study, the beginner students had undergone at least fifty-six hours of Spanish instruction in a classroom setting, the intermediate students had had at least one hundred sixty eight hours, and the advanced students had had at least two hundred eighty hours of classroom instruction. The students were not given monetary

compensation; however, they were offered a choice of a detailed written explanation of the grammatical structures targeted in the study, including examples of common errors, and/or a personal session with the investigator to discuss their results. They were also offered a certificate of participation that they could include in their Curriculum Vitae.

Initially the participants were given a background questionnaire (appendix III) to elicit information regarding their previous language experience. The questionnaire inquired about their parents' native languages, the participant's native language, any language instruction they received in school, and further exposure to the Spanish language outside of the classroom. These questionnaires later served to determine the final group of participants for the study, based on their responses and self-assessment. Only the participants who identified their native language as English were included in the data analysis. The final groups were divided as follows: twenty in level one (Beginner II), twenty in level two (Intermediate II), and fifteen in level three (Advanced II). The original goal was to have an equal number of participants from each level; however, due to a large amount of students with French or another language as their L1, it was not possible to have twenty in the advanced group. After filling out the background questionnaires, all participants received an information form and a consent form (appendix IV). They were instructed that participation was completely voluntary, and that their results would be kept anonymous. Once the consent forms were signed the participants were given the test materials.

5.3.2 Materials and Procedure

The participants were given two picture-vocabulary sheets (appendix V) and two tasks (the second one given upon completion of the first). Half of the participants were given a copy of

their tasks with the items numbered in reverse order. Both tasks contained sentences and vocabulary based on the text book from the Beginner group.

The first task was a translation task (appendix VI and VII) consisting of forty five items provided in a randomized order. The participants were instructed to translate the sentences into their native language, using only the picture-vocabulary sheets as a reference. The translation task contained four conditions and a set of distractor sentences (table 5.1):

Table 5.1 Translation task conditions.

Condition	Sentence type	Number of items
Condition 1	Bare mass noun phrases	x10
Condition 2	Nouns with an indefinite quantifier	x10
Condition 3	Flexible nouns with an indefinite article	x10
Condition 4	Mass nouns with a classifier	x10
Distractors	Distractor sentences	x5

The mass and count nouns chosen for the translation task were selected from a chapter written by Bosque (1999) concerning common nouns in Spanish. The mass nouns included substances (*leche/milk*), object mass nouns (*dinero/money*), and flexible mass nouns (*pollo/chicken*). The count nouns chosen for the sentences with an indefinite quantifier have mass noun lexical equivalents (Bosque, 1999). For example, *azucarillo* (*sugar cube*) has the equivalent mass noun *azúcar* (*sugar*). Table 5.2 below shows the list of target nouns included in the translation task³:

³ We did not include generic count nouns as a condition in our study. In English, these nouns occur in a bare NP, whereas in Spanish they are preceded by a definite article: *lions are dangerous / los leones son peligrosos*. These may be included in future research.

Table 5.2 Translation task word list.

Bare mass nouns	Mass nouns with indefinite quantifier	Count nouns with indefinite quantifier	Flexible nouns with indefinite determiner	Mass nouns with classifier	Count noun distractors
ajo	cerveza	azucarillo	ajo	ajo	bolígrafo
azúcar	dinero	libro	café	café	computadoras
leche	gente	moneda	cerveza	cerveza	gatos
literatura	nieve	persona	jamón	jamón	perro
madera	queso	prenda	madera	madera	sillas
mantequilla			manzana	manzana	
pan			pan	pan	
papel			papel	papel	
pollo			pollo	pollo	
ropa			queso	queso	

The following are examples of each condition taken from the translation task:

Condition 1 - 10 bare mass noun phrases (ie. nouns not preceded by a determiner)

- (1) Item: Normalmente los niños beben \emptyset leche por la mañana.
normalmente los-M-PL niños-M-PL beben-3PL-Pres leche-F-SG por la mañana.

Target: '*Normally children drink \emptyset milk in the morning*'.

Condition 2 - 10 nouns with an indefinite quantifier (ie. *mucho/much, poco/little*)

i) 5 count nouns with an indefinite quantifier:

- (2) Item: Tengo **demasiadas monedas** en mi cartera.
tengo-1SG-Pres demasiadas-F-PL monedas-F-PL en mi cartera-F-SG.

Target: '*I have **too many** coins in my wallet*'.

ii) 5 mass nouns with an indefinite quantifier:

- (3) Item: Marco bebe **demasiada cerveza**.
marco bebe-3SG-Pres demasiada-F-SG cerveza-F-SG

Target: '*Mark drinks **too much** beer*'.

Condition 3 - 10 flexible nouns with an indefinite article (ie. *un/a*)

i) 5 nouns that can be used with an indefinite article in English:

(4) Item: Vamos a tomar **un** **café** antes de ver la película.
vamos-2PL-Pres a tomar-INF un-M-SG café-M-SG antes de ver-INF la-F-SG película-F-SG

Target: *'We are going to have a coffee before watching the movie.'*

ii) 5 nouns that cannot be used with an indefinite article in English:

(5) Item: Voy a traer **un** **queso** Brie entero a la fiesta.
voy-1SG-Pres a traer-INF un-M-SG queso-M-SG Brie entero a la-F-SG fiesta-F-SG

Target: *'I'm going to bring a wheel of Brie cheese to the party.'*

Condition 4 - 10 mass nouns with a classifier (ie. *una taza de/a cup of*)

(6) Item: Voy a la panadería a comprar **una** **barra** de pan.
voy-1SG-Pres a la-F-SG panadería-F-SG a comprar-INF una-F-SG barra-F-SG de pan-M-SG

Target: *'I'm going to the bakery to buy a loaf of bread.'*

Distractors - 5 distractor sentences (count nouns not pertaining to the above conditions)

(7) Item: ¿Me prestas **tu** **bolígrafo**, por favor?
me prestas-2SG-Pres tu bolígrafo-M-SG, por favor

Target: *'Will you lend me your pen please?'*

The second task was a multiple choice test (appendix VIII and IX) consisting of forty items. Both the questions and the answer options were randomized following a Latin square design. The participants were instructed to choose the response that they felt was the most appropriate to fill in the blank. There was a total of forty items pertaining to four conditions and a set of distractors (table 5.3):

Table 5.3 Multiple choice task conditions.

Condition	Sentence type	Number of items
Condition 1	Bare mass noun phrases	x8
Condition 2	Mass nouns with an indefinite quantifier	x8
Condition 3	Flexible nouns with an indefinite article	x8
Condition 4	Mass nouns with a classifier	x8
Distractors	Distractor sentences	x8

For each item in the multiple choice task the participants were given one or two sentences as well as a hand-drawn illustration of the target noun to provide context.

The nouns selected for the multiple choice task were almost identical to the nouns used in the translation task. For the first two conditions, the eight nouns used in the bare mass noun phrases were also used in the sentences with indefinite quantifiers. Similarly, for conditions three and four, the flexible nouns that were used in the sentences with an indefinite article were also repeated in the sentences with a classifier. The distractor sentences had both singular and plural count nouns preceded by singular or plural definite determiners. The word list is as follows:

Table 5.4 Multiple choice task word list.

Bare mass nouns	Mass nouns with indefinite quantifier	Flexible nouns with indefinite determiner	Mass nouns with classifiers	Distractors
agua	agua	ajo	ajo	monedas
azúcar	azúcar	café	café	persona
dinero	dinero	cerveza	cerveza	prendas
gente	gente	jamón	jamón	azucarillo
leche	leche	madera	madera	perros
mantequilla	mantequilla	pan	pan	gato
nieve	nieve	pollo	pollo	computadora
ropa	ropa	queso	queso	bolígrafos

In condition one (bare mass nouns phrases) the participants had the choice of:

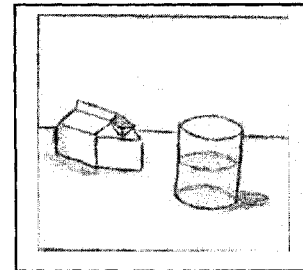
- a. the target response (bare mass noun)
- b. a pluralized bare mass noun
- c. a mass noun with an indefinite article
- d. a pluralized mass noun with a plural indefinite article.

Options b, c, and d give the mass noun with count morphosyntax, which is unacceptable in Spanish given the context, and would also be ungrammatical in the L1 (English) if translated.

Example of condition 1 - bare mass noun phrases:

(9) María tiene mucha sed porque está comiendo galletas.
A María le gusta beber _____ cuando come galletas⁴.

- a. leche
- b. leches
- c. una leche
- d. unas leches



In condition two (nouns with an indefinite quantifier) they had the choice of:

- a. the target response (mass noun preceded by an indefinite quantifier)
- b. a pluralized indefinite quantifier with a pluralized mass noun
- c. a singular mass noun with an indefinite article
- d. a pluralized mass noun with a plural indefinite article

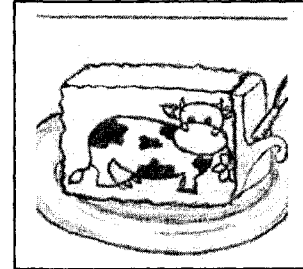
Similar to condition one, options b, c, and d provide the mass noun with count morphosyntax, thereby eliminating them as acceptable response choices.

⁴ Example (9) can be translated as follows: *María is very thirsty because she is eating cookies. María likes to drink milk when she eats cookies.*

Example of condition 2 - nouns with an indefinite quantifier:

(10) No quedan cereales ni pan para el desayuno.
Quiero preparar crepes pero hay _____⁵.

- a. poca mantequilla
- b. pocas mantequillas
- c. una mantequilla
- d. unas mantequillas



In the third condition (flexible noun preceded by an indefinite article) the choices were:

- a. the target response (flexible noun with an indefinite article)
- b. a bare mass noun
- c. a mass noun with an indefinite quantifier
- d. a noun with a definite article

Options b and c give the flexible noun with mass morphosyntax, while the fourth option provides the flexible noun with a neutral definite determiner. The items in the third condition were more difficult to design because it was challenging to provide sufficient context that would remove ambiguity and only accept a count phrase. In conditions one and two, the nouns were inflexible and could only take mass syntax. In conditions three and four, however, the mass options are possible in certain contexts, which means that with some items the target response may only be a 'preferred' response, rather than the only grammatical one.

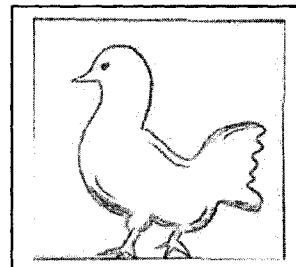
⁵ The translation of example (10) is: *There is no more cereal or bread for breakfast. I want to make pancakes but there is little butter.*

Example of condition 3 - flexible nouns with an indefinite article:

i) 4 nouns that could be used with an indefinite determiner if translated into English:

(11) Andrés vive en una granja y tiene varios animales ahí.
Tiene tres cerdos y _____⁶.

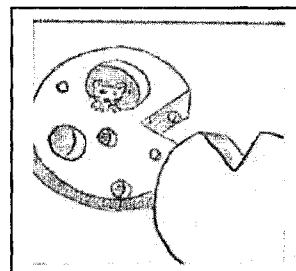
- a. un pollo
- b. pollo
- c. mucho pollo
- d. el pollo



ii) 4 nouns that cannot be used with an indefinite determiner if translated into English:

(12) A mi mamá le encanta el queso bueno.
Voy a regalarle _____ Roquefort⁷.

- a. un queso
- b. queso
- c. mucho queso
- d. el queso



In the fourth condition (mass nouns with a classifier) the participants could choose from:

- a. the target response (mass noun with a classifier)
- b. a bare mass noun
- c. a mass noun with an indefinite quantifier
- d. a mass noun with a definite article

Options b and c provided the noun with mass morphosyntax and the fourth option was the same noun preceded by a definite determiner. Similar to the third condition, it was problematic designing contexts that required only a classifier phrase as the acceptable response.

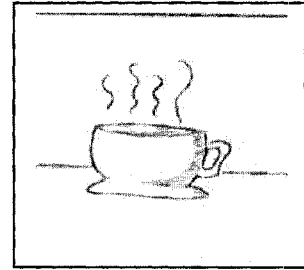
⁶ Example (11) may be translated as: *Andrés lives on a farm and has several animals there. He has three pigs and a chicken.*

⁷ The translation of (12) is as follows: *My mother loves good cheese. I'm going to give her *a Roquefort cheese.*

Example of condition 4 - mass nouns with a classifier:

(13) Hoy quiero salir a desayunar fuera en vez de comer en casa.
Voy a pedir _____ y una napolitana⁸.

- a. una taza de café
- b. café
- c. mucho café
- d. el café



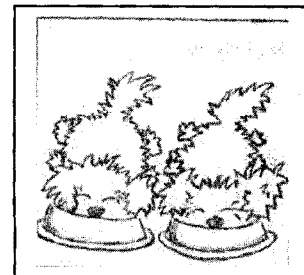
For the distractor sentences, the response choices were:

- a. the target response (either a singular or plural count noun with a definite article, depending on the item)
- b. the count noun with a definite article contrasted in number from the target response (ie. plural if the target was singular)
- c. a singular bare mass noun
- d. and a pluralized bare mass noun.

Examples of distractor sentences:

(14) A muchos animales les gusta jugar en la nieve.
_____ esquimales viven al aire libre en Nunavut⁹.

- a. los perros
- b. el perro
- c. perro
- d. perros



⁸ The translation of (13) is: *I want to go out to eat breakfast instead of eating at home. I'm going to order a cup of coffee and a napoliton.*

⁹ Example (14) is: *Many animals love to play in the snow. Eskimo dogs (Huskies) live outdoors in Nunavut.*

5.3.3 Data Analysis

Both the translation task and multiple choice task results were coded and recorded in an Excel 2007 file. The multiple choice task responses were coded according to the 4 possible answers in each condition. The possible responses for the translation task sentences were:

- a. target response
- b. inaccurate translation (ie. non equivalent lexical items)
- c. non-target direct translation
- d. count converted to mass (ie. a count noun in Spanish was translated as a mass noun in English instead of a count phrase with a classifier)
- e. mass converted to count (ie. a mass noun in Spanish was translated as a count noun in English)
- f. omission (ie. part or all of a sentence missing)

Not all codes were applicable in each condition. For example, in condition one (bare mass nouns) there would not be an instance of a count noun being converted to a mass noun, since the target was a mass noun; therefore, the code for converting a count noun to a mass noun would not be applicable.

Once the coding was completed, the results were subjected to a chi-square test to analyze whether or not there was a significance between the different responses for each level. In some cases a Mantel-Hanszel linear correlation test was also run. The results were also calculated using percentages and raw data comparisons. For both tasks, the results were compared across language levels, conditions, and response types.

5.4 Results and Analysis

In the following section the results are given separately for each task. The tables listing percentages and the graphs are provided for a clear reference. Tables listing the raw data are available in appendix X. The *p-values* from the chi-square tests and the linear correlation tests are also indicated in this section where applicable.

5.4.1 Translation Task

The results for the translation task were analyzed for each condition according to each language proficiency level. Conditions 2 and 3 were divided into their respective sub-conditions so that the results could be viewed in a clearer and more concise manner: condition 2, nouns with an indefinite quantifier, was broken down into mass nouns and count nouns; condition 3, flexible nouns with an indefinite determiner, was separated into equivalent and non-equivalent flexible nouns. Although initially there were only four conditions, the sub-groups were necessary in order to provide a more accurate analysis. At the end of this section, the results are also presented according to each individual item in conditions 2a, 2b, 3a, and 3b.

Fig. 5.1 and the corresponding table 5.5 show the percentage of target responses per condition according to each level. In all the conditions except for 2a (count nouns with an indefinite quantifier) and 4 (mass nouns with a classifier), the percentage of target responses increased with each level. For all the conditions, however, the level one participants had the lowest percentage of target responses.

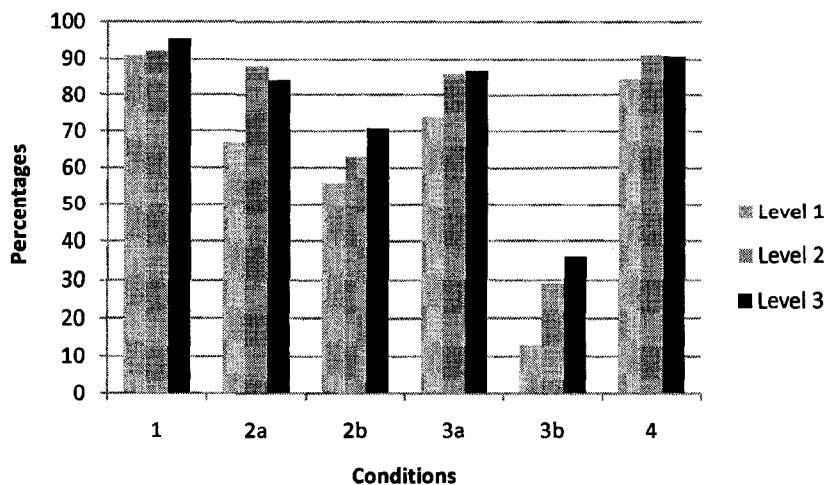


Figure 5.1 Translation task: percentage of target responses per condition by level.

Table 5.5 Translation task: percentage of target responses per condition by level.

Condition	Level 1	Level 2	Level 3
1	91	92	95.33
2a	67	88	84
2b	56	63	70.67
3a	74	86	86.67
3b	13	29	36
4	84.5	91	90.67

For all three levels, condition 3b (non-equivalent flexible nouns with an indefinite determiner) had the lowest percentage of target responses (level 1=13%, level 2=29%, level 3=36%). The condition that had the highest percentage of target responses from all three levels was condition one (bare noun phrases), (level 1=91%, level 2=92%, level 3=95.33%).

Figures 5.2 – 5.7 and their corresponding tables 5.6 – 5.11 compare the results between the three proficiency levels for each individual condition. All numbers are percentage values (see appendix X for the raw data).

Condition 1:

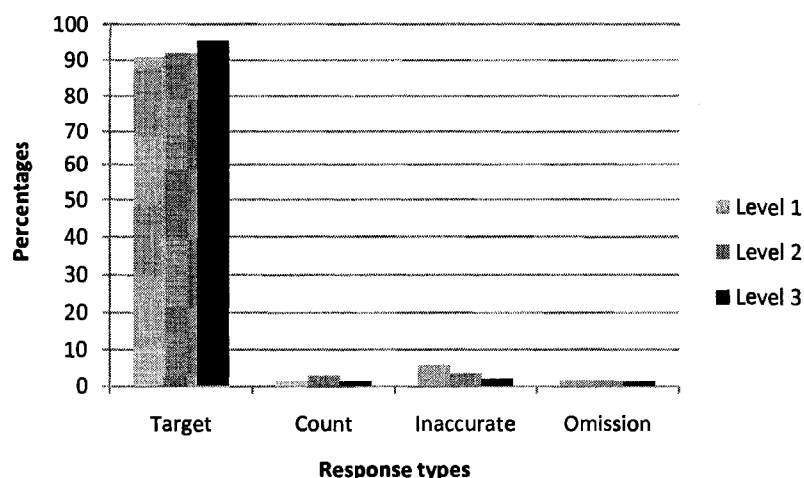


Figure 5.2 Translation task: condition 1, bare mass nouns.

Table 5.6 Translation task: condition 1, bare mass nouns (%).

	Target	Count	Inaccurate	Omission	Total
Level 1	91	1.5	6	1.5	100
Level 2	92	3	3.5	1.5	100
Level 3	95.33	1.33	2	1.33	100

In table 5.6 and fig. 5.2 are the results for condition one: bare mass noun phrases. The percentages were calculated out of the total number of items for the specific condition, and they were calculated separately for each proficiency level. Overall, the percentage of target responses increased with each level (level 1=91%, level 2=92%, level 3=95.33%). There were also very few omissions (level 1=1.5%, level 2=1.5%, level 3=1.33%). The level 1 participants had the highest percentage of inaccurate responses (level 1=6%, level 2=3.5%, level 3=2%), while the level 2 participants gave the highest percentage of count noun substitutions (level 1=1.5%, level 2=3%, level 3=1.33%). Given the low numbers of non-target responses, no observations could be made by performing a chi-square analysis of the non-target data.

Below is an example of the participants' non-target responses.

Count noun substitution produced by all three levels:

(15) Item: Hoy vamos a comprar ropa nueva.
 today go-2PL-PRES to buy-INF clothes-F-SG new-F-SG
 'Today we are going to buy new clothes'

Response: Today we are going to buy a new dress.

Condition 2a:

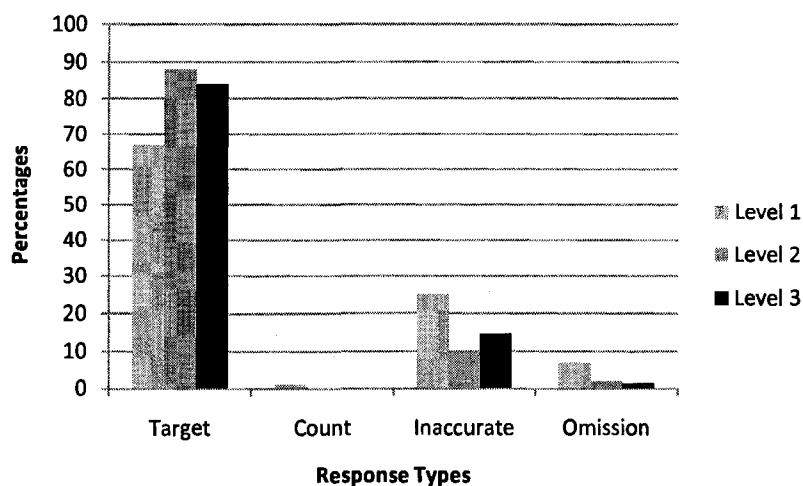


Figure 5.3 Translation task: condition 2a, mass nouns with indefinite quantifiers.

Table 5.7 Translation task: condition 2a, mass nouns with indefinite quantifiers.

	Target	Count	Inaccurate	Omission	Total
Level 1	67	1	25	7	100
Level 2	88	0	10	2	100
Level 3	84	0	14.67	1.33	100

The results for condition 2a, mass nouns with an indefinite quantifier, are given above in table 5.7 and fig. 5.3. The level one participants produced the lowest percentage of target

responses (level 1=67%, level 2=88%, level 3=84%), the highest number of inaccurate responses (level 1=25%, level 2=10%, level 3=14.67%), and the highest number of omissions (level 1=7%, level 2=2%, level 3=1.33%). It is interesting to note that the advanced level two participants did not produce a higher percentage of target responses than the intermediate level two participants. The sole count noun substitution was given by a level one participant:

Count noun substitution from level one:

(16) Item: Marco bebe demasiada cerveza.
 Marco drink-3SG-PRES too much-F beer-F-SG
 'Marco drinks too much beer'

Response: Marco drinks too many beers.

Condition 2b:

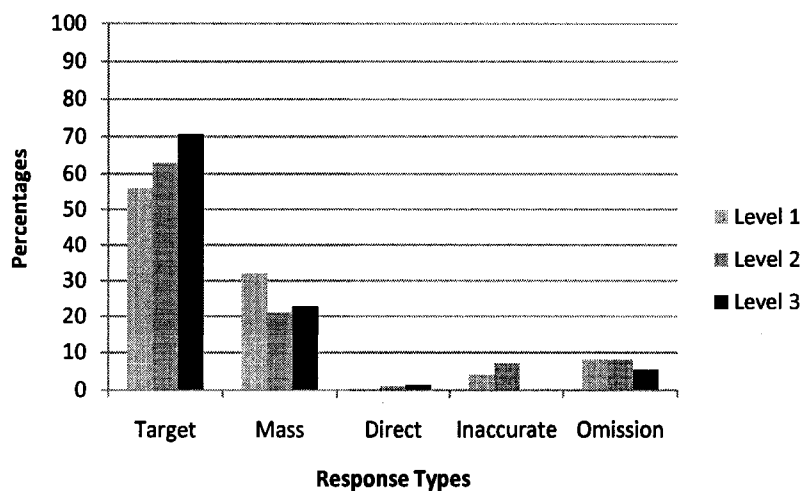


Figure 5.4 Translation task: condition 2b, count nouns with indefinite quantifiers.

Table 5.8 Translation task: condition 2b, count nouns with indefinite quantifiers.

	Target	Mass	Direct	Inaccurate	Omission	Total
Level 1	56	32	0	4	8	100
Level 2	63	21	1	7	8	100
Level 3	70.67	22.67	1.33	0	5.33	100

Table 5.8 and fig. 5.4 display the results from condition 2b: count nouns with an indefinite quantifier. For this condition, the percentage of target responses increases with each proficiency level (level 1=56%, level 2=63%, level 3=70.67%).

In this condition there were also *direct translations*. Normally this type of response only applies to phrases that are ungrammatical if translated directly into the target language (see condition 3b for more examples), which may raise questions here, considering a direct translation of items in this condition should yield target responses. There was one sentence, however, that elicited ungrammatical direct translations for both a level two and level three participant:

Direct translation from level two and three:

- (17) Item: No pongas tantos azucarillos en el café.
do not put-2SG-IMP so many-M-PL sugar cubes-M-PL in the-M-SG coffee-M-SG
'Don't put so many sugar cubes in the coffee'

Response: Don't put so many sugars in the coffee.

It could be argued that the participant did not know the exact meaning of *azucarillos* in Spanish, despite the permitted use of the picture-vocabulary reference sheets. If that was the case, however, then the participant could have produced the mass noun *sugar* instead of the ungrammatical pluralized mass noun **sugars*. Upon further examination of this item, the Spanish count noun *azucarillos* should be removed from future translation tasks for two reasons: first, in English the word for *azucarillo* is a compound noun that contains the mass noun *sugar*; second,

the noun may not be considered standard Spanish but instead may vary due to dialectic variation in some countries such as Argentina or Mexico.

A chi-square test of the non-target responses showed that there was a significantly higher number of mass conversions than other non-target responses: level 1 (χ^2 (3, N=42) $p < 0.0001$), level 2 (χ^2 (3, N=37) $p < 0.0001$), level 3 (χ^2 (3, N=22) $p < 0.0001$). Table 5.8 and figure 5.4 display the percentage of mass noun substitutions per level as follows: level 1=32%, level 2=21%, level 3=22.67%. The linear correlation test, however, did not show a significance between the proficiency level and the number of mass responses, which means that the proficiency level did not affect the number of mass responses given. The responses were considered mass substitutions if, rather than give the target response of a count noun with an indefinite quantifier, they produced a mass noun lexical equivalent. For example:

Mass substitution from level two and three:

(18) Item: Tengo demasiadas monedas en mi cartera.
 have-1SG-PRES too many-F-PL coins-F-PL en my wallet-F-SG
 'I have too many coins in my wallet'

Response: I have too much change in my wallet.

Mass substitution from level two:

(19) Item: No pongas tantos azucarillos en el café.
 do not put-2SG-IMPV-NEG so many-M-PL sugar cubes-M-PL in the-M-SG coffee-M-SG
 'Don't put so many sugar cubes in the coffee'

Response: Don't put so much sugar in the coffee.

These results show that, despite the presence of a count noun given with count syntax, the participants used the mass equivalent with mass syntax in their responses.

Condition 3a:

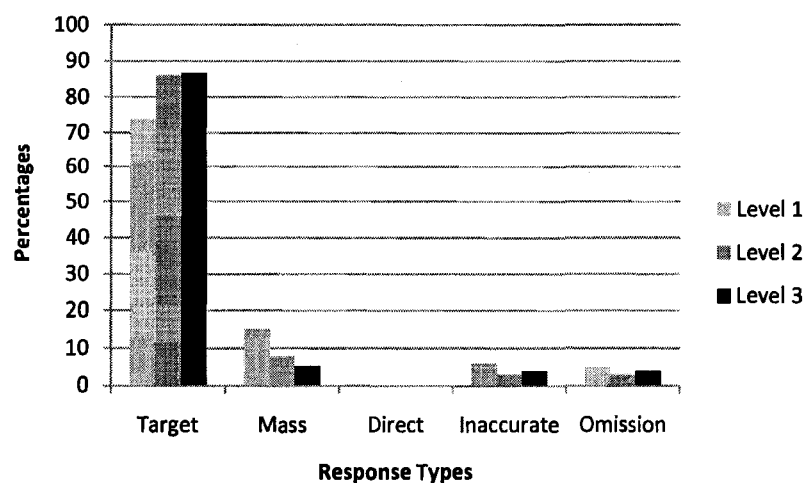


Figure 5.5 Translation task: condition 3a, equivalent flexible nouns with indefinite determiners.

Table 5.9 Translation task: condition 3a, equivalent flexible nouns with indefinite determiners (%).

	Target	Mass	Inaccurate	Omission	Total
Level 1	74	15	6	5	100
Level 2	86	8	3	3	100
Level 3	86.67	5.33	4	4	100

Condition 3a consists of sentences containing flexible nouns preceded by an indefinite determiner (table 5.9 and fig. 5.5). When these flexible nouns are translated into English they have the same morpho-syntactic structure (ie. *un pollo/a chicken*). In this condition the percentage of target responses increased with each level (level 1=74%, level 2=86%, level 3=86.67), and the percentage of mass noun substitutions decreased (level 1=15%, level 2=8%, level 3=5.33%). A chi-square test of independence was also run to test whether or not the difference in response types was significant. The results showed that only level 1 had

significantly more mass responses than inaccurate or omissions (χ^2 (2, N=26) $p < 0.05$). Below is an example of a non-target response from a level one participant:

Mass noun substitution from level one:

(20) Item: Vamos a tomar un café antes de ver la película.
 go-1PL-PRES to take-INF a-M-SG coffee-M-SG before of see-INF the-F-SG movie-F-SG
 'We are going to have a coffee before watching the movie'

Response: We are going to have coffee before watching the movie.

Condition 3b:

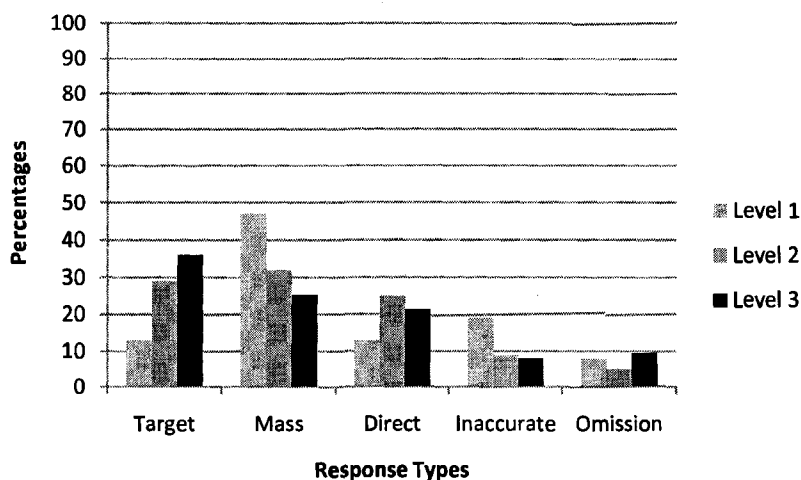


Figure 5.6 Translation task: condition 3b, non-equivalent flexible nouns with indefinite determiners.

Table 5.10 Translation task: condition 3b, non-equivalent flexible nouns (%).

	Target	Mass	Direct	Inaccurate	Omission	Total
Level 1	13	47	13	19	8	100
Level 2	29	32	25	9	5	100
Level 3	36	25.33	21.33	8	9.33	100

Condition 3b yielded the lowest percentages of target responses (table 5.10 and fig. 5.6).

This condition contained flexible nouns preceded by indefinite determiners that are

ungrammatical if translated directly into English (ie. *un queso/*a cheese*). A sentence was considered as a target response if the participant maintained the count phrase, which would require them to use a classifier together with a mass noun. The response was considered a mass noun substitution if the participant only used a mass noun and did not provide a classifier in order to maintain the count status of the phrase. The results showed that the percentage of target responses increased with each proficiency level (level 1=13%, level 2=29%, level 3=36%), while the mass noun substitutions decreased (level 1=47, level 2=32, level 3=25.33). A linear correlation test was also conducted to test the relationship between the proficiency level and the non-target responses. The results revealed that there was a significant correlation between the proficiency level and the mass noun responses, which means that as the level increased the number of mass noun conversion responses decreased (χ^2 (2, N=167) $p < 0.0005$). The level one participants also had the highest percentage of inaccurate responses (level 1=19%, level 2=9%, level 3=8%) but produced the lowest percentage of direct translations (level 1=13%, level 2=25%, level 3=21.33%). With regards to the actual productions, the non-target sentence constructions were similar across all three levels:

Mass noun substitution from all three levels:

(21) Item: Voy a traer un queso Brie a la fiesta.
 go-1SG-PRES to bring-INF a-M-SG cheese-M-SG Brie to the-F-SG party-F-SG
 'I'm going to bring a wheel of Brie cheese to the party'

Response: I'm going to bring Brie cheese to the party.

Mass noun substitution from all three levels:

(22) Item: Quiero un pan.
 want-1SG-PRES a-M-SG bread-M-SG
 'I want a roll/small baguette'

Response: I want bread.

Direct translation from all three levels:

(23) Item: Añade un ajo más a la sopa.
add-2SG-IMPV a-M-SG garlic-M-SG more to the-F-SG soup-F-SG
'Add another clove of garlic to the soup'

Response: Add one more garlic to the soup.

Direct translation from all three levels:

(24) Item: Dame un papel, por favor.
give-2SG-IMPV-me a-M-SG paper-M-SG please
'Give me a piece of paper, please'

Response: Give me a paper, please.

The chi-square test of independence showed that there was a significant difference between the types of responses for all three levels: level 1 (χ^2 (3, N=87) $p < 0.0005$), level 2 (χ^2 (3, N=71) $p < 0.0005$), level 3 (χ^2 (3, N=50) $p < 0.0005$).

Condition 4:

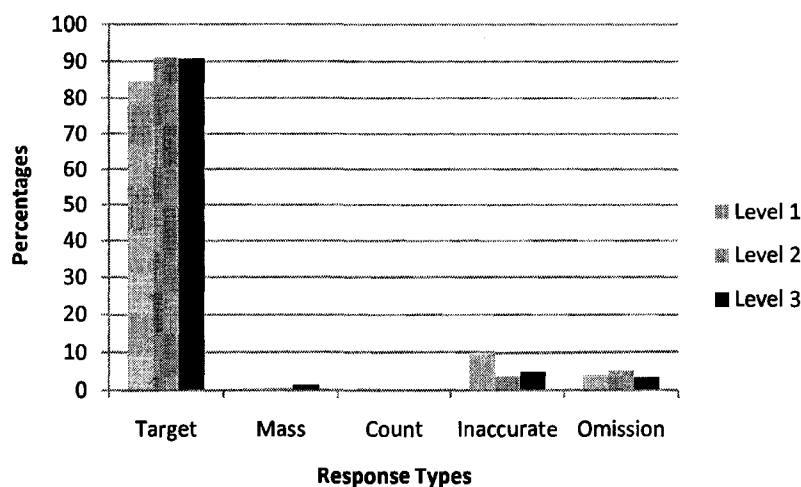


Figure 5.7 Translation task: condition 4, mass nouns with classifiers.

Table 5.11 Translation task: condition 4, mass nouns with classifiers (%).

	Target	Mass	Count	Inaccurate	Omission	Total
Level 1	85	0.5	0.5	10	4	100
Level 2	91	0.5	0	3.5	5	100
Level 3	90.67	1.33	0	4.67	3.33	100

Table 5.11 and fig. 5.7 show the results from the fourth condition: mass nouns with a classifier. The nouns used in this condition were the same flexible nouns used in the third condition with indefinite determiners. In condition four, however, they were used as mass nouns that were quantified with a classifier. Similar to the results from condition one, there is a very high percentage of target responses from all three levels (level 1=85%, level 2=91%, level 3=90.67%). At the same time, there is an overall low percentage of mass noun substitutions (level 1=0.5%, level 2=0.5%, level 3=1.33%) and only one count nouns substitution (level 1=0.5%, level 2=0%, level 3=0%). The chi-square test was not performed with the data from this condition because the number of non-target responses was too low to make any statistical observations.

A response was considered a mass or count substitution if the participant either used the mass noun without a classifier or converted the flexible mass noun into a count noun with an indefinite determiner respectively. The following are two examples of mass noun substitutions:

Mass noun substitution from level three:

(25) Item: Cristina ha comprado una loncha de jamón.
Cristina has-3SG-AUX bought-PP a-F-SG slice-F-SG of ham-M-SG
'Cristina has bought a slice of ham'

Response: Christina has bought some ham.

Mass noun substitution from level three:

(26) Item: Pon un trozo de manzana en la tarta.
put-2SG-IMPV a-M-SG piece-M-SG of apple-F-SG in the-F-SG pie-F-SG
'Put a piece of apple in the pie'

Response: Put some apple in the pie.

In sum, conditions one and four yielded the highest percentage of target responses, while condition 3b had the lowest percentage of target responses. Furthermore, conditions 2a, 2b, 3a, and 3c produced the greatest amount of variation. The following tables 5.12 – 5.15 were generated to show a more detailed breakdown and analysis of the results in conditions 2 and 3 according to each individual item.

Table 5.12 Translation task: condition 2a results per individual item for levels one to three (%).

Item	Target	Count	Inaccurate	Omission	Total
8. demasiada cerveza	60	1.82	27.27	10.91	100
21. demasiada gente	61.82	0	32.73	5.45	100
25. poco queso	80	0	18.18	1.82	100
37. mucho dinero	100	0	0	0	100
42. mucha nieve	94.55	0	5.45	0	100

Table 5.12 contains the results for each individual item in condition 2a, mass nouns with an indefinite quantifier, for all three language proficiency levels. The percentage was calculated out of the total number of responses for the individual item for all three proficiency levels combined. The three items with the highest percentage of target productions were *mucho dinero* (100%), *mucha nieve* (94.55%), and *poco queso* (80%). Only one item yielded a mass to count conversion, which was as follows:

Count noun substitution from level one:

(27) Item: Marco bebe demasiada cerveza.
Marco drink-3SG-PRES too much-F beer-F-SG
'Marco drinks too much beer'

Response: Marco drinks too many beers.

The remainder of the non-target responses were either inaccurate or omissions. The highest percentage of inaccurate responses was for item 21 *demasiada gente*.

Inaccurate response from level three:

(28) Item: Hay poco queso en el frigorífico.
there is-3SG-PRES little-M-SG cheese-M-SG in the-M-SG fridge-M-SG
'There is little cheese in the fridge'

Response: There is not a lot of cheese in the fridge.

Table 5.13 Translation task: condition 2b results per individual item for levels one to three (%).

Item	Target	Mass	Direct	Inaccurate	Omission	Total
2. demasiadas monedas	23.64	65.45	0	3.64	7.27	100
20. muchas prendas	60.00	10.91	0	7.27	21.82	100
24. muchas personas	94.55	0	0	5.45	0	100
34. tantos azucarillos	38.18	50.91	3.64	1.82	5.45	100
41. muchos libros	96.36	0	0	1.82	1.82	100

The results for each individual item in condition 2b, count nouns with indefinite quantifiers, are shown in table 5.13 for levels one to three combined. Normally an ungrammatical direct translation would not appear in this condition, considering that a direct translation of the items should result in the target response. As mentioned previously, however, there were two instances of *azucarillos* translated as **sugars* by level two participants. The same item also produced a high percentage of count to mass noun conversions (50.91%), which means the participants translated *azucarillos* as *sugar*. Similarly, *demasiadas monedas* also resulted in a

high percentage of count to mass noun conversions (65.45%), where the participants translated the item as *too much change* or *too much money*. The data also show that not all of the items yielded a high percentage of count to mass noun conversions: *muchas personas* did not have any conversions to the mass equivalent *many people*. Item 20 *muchas prendas* resulted in the highest percentage of omissions (21.82%) and also inaccurate responses (7.27%) out of all the items in condition 2b. The chi-square test confirmed a significant difference between the lexical items and the number of mass responses (χ^2 (4, N=220) $p < 0.0001$).

Table 5.14 Translation task: condition 3a results per individual item for levels one to three (%).

Item	Target	Mass	Inaccurate	Omission	Total
7. un café	85.45	12.73	0	1.82	100
10. una manzana	94.55	0	5.45	0	100
18. un pollo	85.45	5.45	3.64	5.45	100
26. un jamón	100	0	0	0	100
38. una cerveza	43.64	30.91	12.73	12.73	100

Table 5.14 contains the results for condition 3a, flexible nouns that can be preceded by an indefinite determiner in Spanish and in English, for levels one to three combined. Items 26 *un jamón* and 10 *una manzana* had the highest percentage of target response at 100% and 93.55% respectively, followed by items 7 *un café* and 18 *un pollo* both with 85.45%. Item 38 *una cerveza* had a significantly lower percentage of target responses than the other four items (43.64%). One argument could be that English speakers use *a beer* and *beer* interchangeably when referring to drinking the beverage, however the same argument should then apply to *a coffee* and *coffee*, since English speakers often say *have/drink coffee/a coffee* when referring to a cup of coffee. The data do not support this argument, because although *un café* had the second highest percentage of count to mass noun conversions (12.73%), the percentage was much lower than that of *una*

cerveza (30.91%). There was a significant difference between the lexical items and the number of both mass responses and direct responses (χ^2 (8, N=220) $p < 0.0001$).

Table 5.15 Translation task: condition 2b results per individual item for levels one to three (%).

Item	Target	Mass	Direct	Inaccurate	Omission	Total
3. un papel	38.18	14.55	41.82	3.64	1.82	100
14. un queso	16.36	54.55	23.64	1.82	3.64	100
32. una madera	23.64	3.64	1.82	43.64	27.27	100
35. un pan	12.73	85.45	0	0	1.82	100
44. un ajo	34.55	20	30.91	10.91	3.64	100

Condition 2b, flexible nouns that can be preceded by an indefinite determiner in Spanish but not in English, resulted in the most response variation (table 5.15) and the lowest percentages of target responses overall. Item 32 *una madera* had the highest percentage of inaccurate responses (43.64%) and omissions (27.27%). These results suggest that the participants did not possess the required vocabulary to comprehend the phrase *una madera suelta*. Items 14 *Un queso* and 35 *Un pan* yielded the lowest percentage of target responses (16.36% and 12.73% respectively) and the highest number of count to mass noun conversions (54.55% and 85.45% respectively). Unlike *un queso*, however, *un pan* did not have any direct translations, whereas some participants translated *un queso Brie entero* as **a whole Brie cheese* rather than *a whole/an entire wheel of Brie cheese*. The two items with the highest percentage of direct translations were 3 *un papel* and 41 *un ajo* (41.82% and 30.91% respectively). It could be argued that English speakers find *a paper* acceptable in English, even when referring to a piece of paper instead of a newspaper (*paper* is often used as a count noun to refer to a newspaper). If this is the case, then perhaps we need to reconsider the mass-count status and flexibility of the noun *paper* in English (ie. Bloom, 1990; Bosque, 1999). At the same time, however, the participants translated *un ajo*

más directly as *another garlic* or *one more garlic* (30.91%) even though there are no contextual circumstances in English where *garlic* can be preceded by an indefinite determiner. Similar to the results from conditions 2b and 3a, the chi-square test showed a significant difference between the lexical items and the number of mass nouns responses (χ^2 (4, N=220) $p < 0.0001$). These results suggest that nouns in English may not be as inflexible as has been suggested previously (see the discussion in chapter one of Gathercole, 1997).

5.4.2 Multiple Choice Task

The results in this section are presented in a similar manner to those presented from the translation task. Below there are tables and corresponding figures that display the percentage results per condition according to each language proficiency level. The tables with the raw data are available in appendix X. Apart from a few of the lexical item choices, the only difference between the conditions for the two tasks is that the translation task has both mass and count nouns with indefinite quantifiers but the multiple choice task is reduced to only mass nouns with indefinite quantifiers. Therefore, in this section, condition 2 does not have a part *a* and *b*. Condition 3, however, does still have both equivalent and non-equivalent flexible nouns, and so the condition is analyzed as a whole and also separately in two parts. At the end of the section, an analysis is presented of the individual task items in condition 3 in order to see which lexical items or contexts caused more response variation.

Condition 1a:

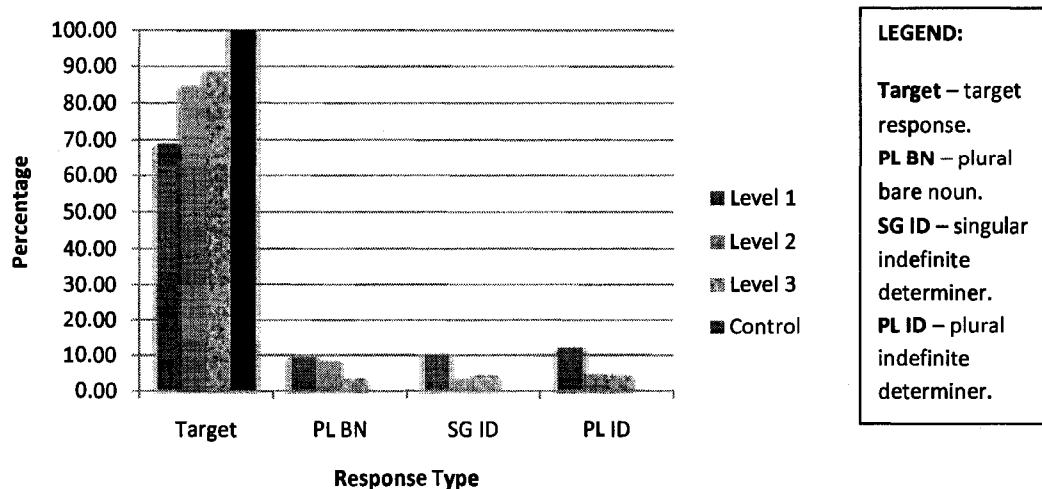


Figure 5.8 Multiple choice task: condition 1, bare mass nouns.

Table 5.16 Multiple choice task: condition 1 bare mass nouns (%).

	Target	PL BN	SG ID	PL ID	TOTAL
Level 1	68.75	9.38	10.00	11.88	100
Level 2	84.38	8.13	3.13	4.38	100
Level 3	88.33	3.33	4.17	4.17	100
Control	100	0	0	0	100

The results from condition 1, bare mass nouns, are presented in table 5.16 and fig. 5.8. For this condition, the percentage of target responses increased with each level, and the control group achieved a perfect score (level 1=68.75%, level 2=84.38%, level 3=88.33%, control =100%). It is interesting to note that, although the mass morpho-syntax used in this condition would be the same if translated into the L1, the results from the three levels did not match those from the control group. All three levels chose to use the mass nouns with count noun morpho-syntax for some of the items. Table 5.16 and fig. 5.8 illustrate that for levels one and three there was no difference between the percentage of the non-target options, whereas for level two there

was a higher percentage of plural bare mass nouns chosen than the single mass nouns with a singular indefinite determiner and the plural mass nouns with a plural indefinite determiner (PL BN =8.13%, SG ID =3.13%, PL ID = 4.38%). The chi-square test of the raw data, however, did not show a significant difference between the non-target responses for any of the proficiency levels. The test results confirm that for the non-target responses the participants do not tend to favour one type over another in this condition.

Condition 2:

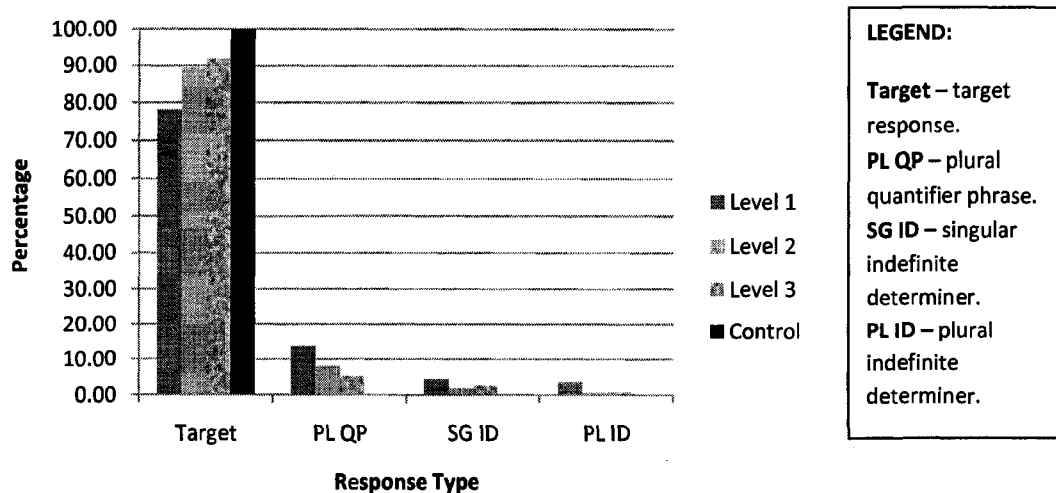


Figure 5.9 Multiple choice task: condition 2, mass nouns with indefinite quantifiers.

Table 5.17 Multiple choice task: condition 2, mass nouns with indefinite quantifiers (%).

	Target	PL QP	SG ID	PL ID	TOTAL
Level 1	78.13	13.75	4.38	3.75	100
Level 2	89.38	8.13	1.88	0.63	100
Level 3	91.67	5	2.5	0.83	100
Control	100	0	0	0	100

In table 5.17 and fig. 5.9 the results are shown for condition 2: mass nouns with an indefinite quantifier. Similar to condition 1, bare mass nouns, the control group elected all of the target responses, and the percentage of target responses increased with each language proficiency level. Overall, there was a higher percentage of target responses for condition 2 than for condition 1. This could be attributed to the difference in the types of response options. In condition 1 they could choose from a bare mass noun, a plural mass noun, a mass noun with an indefinite determiner, and a plural mass noun with a plural indefinite determiner. In condition 2, they could choose from a mass noun with an indefinite quantifier, a plural mass noun with a plural indefinite quantifier, a mass noun with an indefinite determiner, and a plural mass noun with an plural indefinite determiner. Given the different types of target phrases, it was not possible to have the same response options in each condition. What can be observed in table 5.17 and fig. 5.9 for the results from condition 2 is that for all three levels there was a higher percentage of plural indefinite quantifiers chosen over the other two response types (level 1=13.75%, level 2=8.13%, level 3=5%). A chi-square test of independence was used to test the significance of the different response types. There was no significant difference between the non-target responses.

Condition 3:

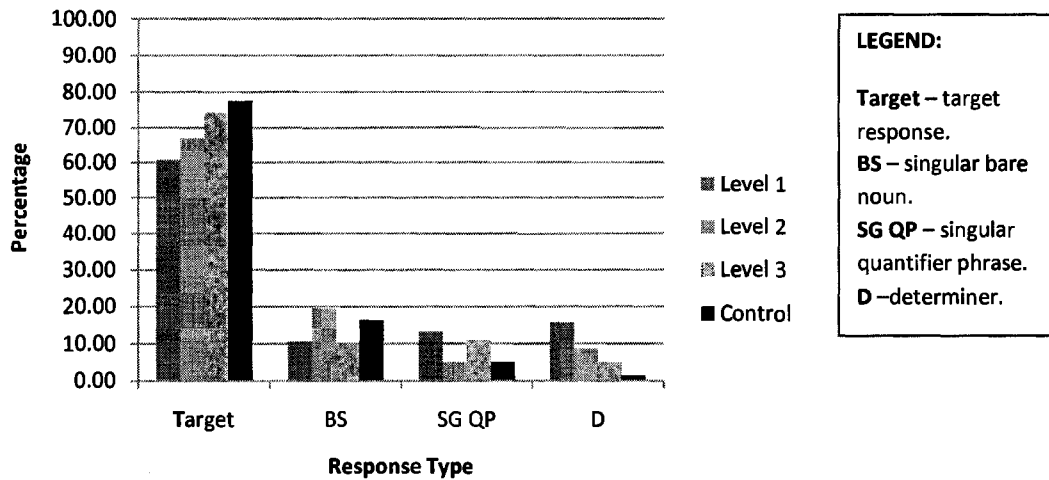


Figure 5.10 Multiple choice task: condition 3, flexible nouns with indefinite determiners.

Table 5.18 Multiple choice task: condition 3, flexible nouns with indefinite determiners (%).

	Target	BS	SG QP	D	TOTAL
Level 1	60.63	10.63	13.13	15.63	100
Level 2	66.88	19.38	5	8.75	100
Level 3	74.17	10	10.83	5	100
Control	77.5	16.25	5	1.25	100

The flexible nouns used in conditions 3 and 4 were nouns that could be used as mass nouns or converted into count nouns depending on the context and the accompanying syntax. Given this flexibility, it was challenging to create contexts and sentences that would eliminate ambiguity and require the target response. For this reason, apart from the variation in the participants' responses, there was also variation in the responses from the control group.

Table 5.18 and fig. 5.10 display the collapsed results for condition 3. The collapsed results show an increase in target responses per proficiency level (level 1=60.63%, level

2=66.88%, level 3=74.17%). The difference between the non-target response types proved to be significant (χ^2 (4, N=126) $p < 0.01$).

In order to look at the results in more detail, condition 3 (table 5.18 and fig. 5.10) was divided into two groups: condition 3a, equivalent flexible nouns (table 5.19 and fig. 5.11); and condition 3b, non-equivalent flexible nouns (table 5.20 and fig. 5.12).

Condition 3a:

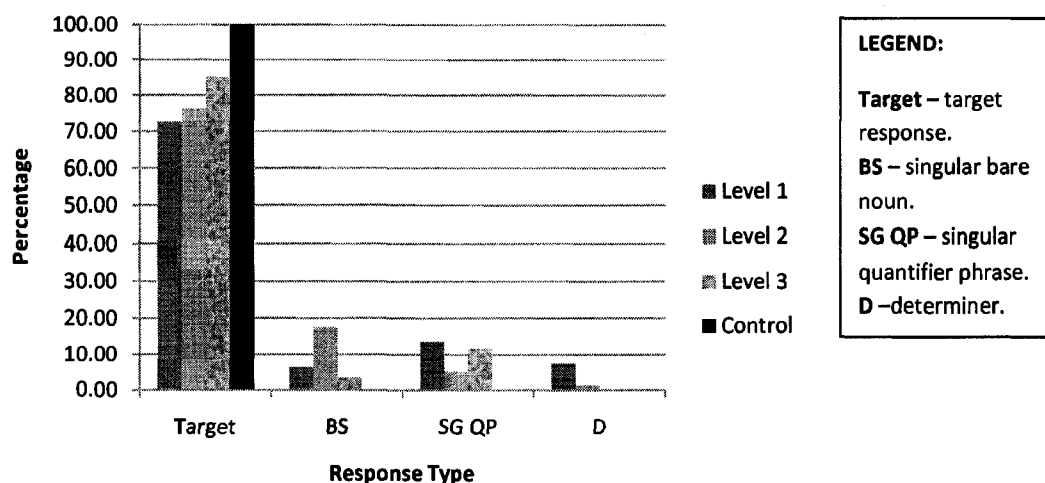


Figure 5.11 Multiple choice task: condition 3a, equivalent flexible nouns with indefinite determiners.

Table 5.19 Multiple choice task: condition 3a, equivalent flexible nouns with indefinite determiners (%).

	Target	BS	SG QP	D	TOTAL
Level 1	72.50	6.25	13.75	7.50	100
Level 2	76.25	17.5	5	1.25	100
Level 3	85	3.33	11.67	0	100
Control	100	0	0	0	100

The results for condition 3a, equivalent flexible nouns with an indefinite determiner, are shown in table 5.19 and fig. 5.11. The percentage of target responses increased with each

proficiency level, and the control group chose 100% of the target responses. The level 2 participants chose a higher percentage of singular bare nouns over the other options (BS =17.5%, SG QP=5%, D=1.25%), while the level 1 and level 3 participants chose a higher percentage of singular mass nouns with a quantifier and nouns preceded by a determiner (level 1 BS=6.25%, SG QP=13.75%, D=7.50; level 3 BS=3.33%, SG QP=11.67%, D=0%). The chi-square test confirmed that there was a significant difference between the non-target responses ($\chi^2 (6, N=112)$ $p < 0.01$).

Condition 3b:

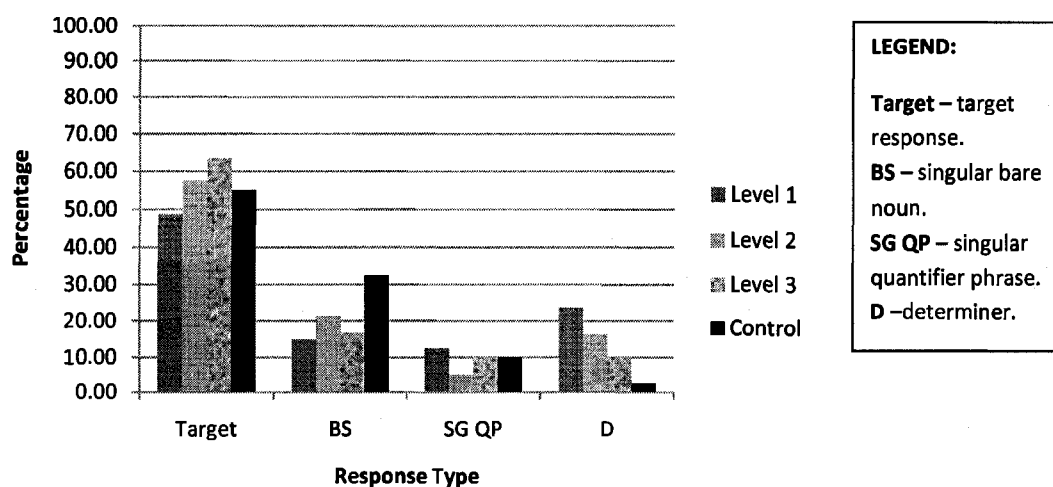


Figure 5.12 Multiple choice task: condition 3b, non-equivalent flexible nouns with indefinite determiners.

Table 5.20 Multiple choice task: condition 3b, non-equivalent flexible nouns with indefinite determiners (%).

	Target	BS	SG QP	D	TOTAL
Level 1	48.78	15.00	12.50	23.75	100
Level 2	57.5	21.25	5	16.25	100
Level 3	63.33	16.67	10	10	100
Control	55	32.5	10	2.5	100

Condition 3b yielded the most response variation out of all the conditions (table 5.20 and fig. 5.12). Considering that the control group only elected 55% of the target responses, a more detailed analysis of the individual item responses should be performed in the future in order to investigate which of the contexts and lexical items caused the most variation. It is interesting, however, that the control group had a lower percentage of target responses than both level two and three (control =55%, level 2=57.5%, level 3=63.33%). The control group also gave the highest percentage of singular bare noun responses out of all the groups (control =32.5%, level 1=15%, level 2=21.25%, level 3=16.67%). The results for the participant groups were similar to those from conditions 1, 2, and 3a in that the percentage of target responses increased with each proficiency level (level 1=48.78%, level 2=57.5%, level 3=63.33%). The chi-square test was run twice for this condition, once including the control group (at 55% target responses) and once without. The test that included the control group showed a significant difference between the response types (χ^2 (6, N=112) $p < 0.01$). However, when the control group was removed from the analysis, the results were no longer significant. In other words, when the test was ran to compare all 4 groups including the control group, there was a significant difference between the types of responses; however, once the control group was removed and only the 3 non-native groups were compared, then the results were no longer significant.

Condition 4

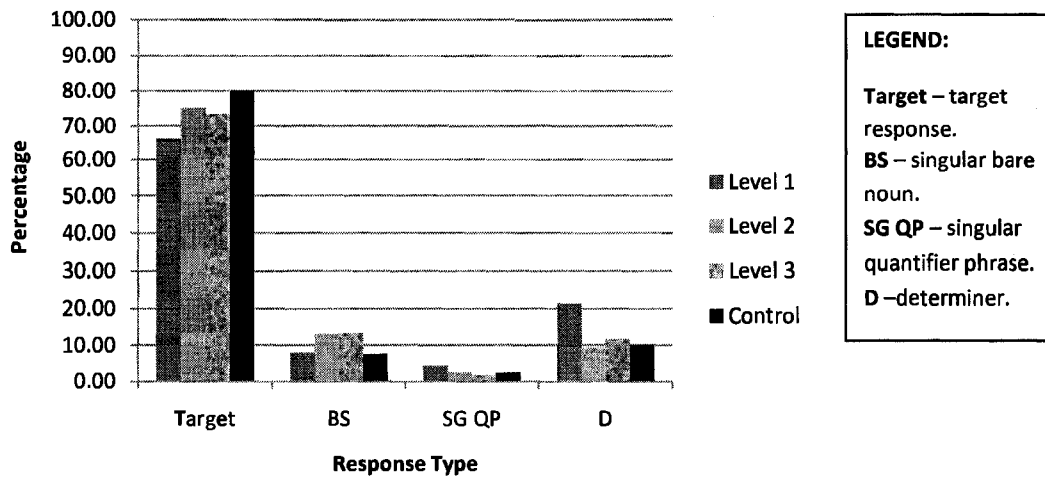


Figure 5.13 Multiple choice task: condition 4, mass nouns with classifiers

Table 5.21 Multiple choice task: condition 4 mass nouns with classifiers (%).

	Target	BS	SG QP	D	TOTAL
Level 1	66.25	8.13	4.38	21.25	100
Level 2	75	13.13	2.5	9.38	100
Level 3	73.33	13.33	1.67	11.67	100
Control	80	7.5	2.5	10	100

For condition 4 (table 5.21 and fig. 5.13), mass nouns with a classifier, the response choices were the same as with condition 3: a) mass noun with a classifier; b) bare mass noun; c) singular mass noun with an indefinite quantifier; d) noun preceded by a definite determiner. The percentage of responses did not increase with each level, but instead the level 2 participants had the highest percentage of target responses out of the three proficiency groups (level 1=66.25%, level 2=75%, level 3=73.33%). All language groups, including the control group, chose the singular mass nouns with an indefinite quantifier the least out of all the response options (level 1=4.38%, level 2=2.5%, level 3=1.67%, control =2.5%). The difference in the non-target

response types proved to be significant (χ^2 (4, N=126) $p < 0.05$). Overall, the percentages of responses from the three proficiency levels are similar to those from the control group, indicating the possibility that it was the presence of ambiguity in some of the contexts rather than the morpho-syntactic structure itself that resulted in non-target responses.

The following two tables 5.22 and 5.23 contain the percentage of responses per item for all three proficiency levels combined in conditions 3a and 3b. The percentage was calculated out of the total number of responses for the individual item for all three proficiency levels combined.

Table 5.22 Multiple choice task: condition 3a results per individual item for levels one to three (%).

Item	Target	Bare mass	Mass with indefinite quantifier	Definite article
14. un jamón	85.45	9.09	0	5.45
18. un pollo	92.73	3.64	3.64	0
31. una cerveza	72.73	7.27	14.55	5.45
38. un café	58.18	18.18	21.82	1.82

Table 5.22 shows the results for each individual item in condition 3a, flexible nouns that can be preceded by an indefinite determiner in Spanish (that are equivalent when translated into English). The results show that, with the exception of item 38. *un café*, these items had a higher percentage of target responses than the non-equivalent flexible nouns (shown below in table 5.23). Tables 5.22 and 5.33 also show that item 18. *un pollo* had the highest percentage of target responses overall (92.73%) and the lowest percentage of responses with a determiner (0%). A chi-square test of independence was used to test the relationship between the lexical item and the type of response. The test showed that there was a significant difference between the lexical item

and the response type, which means that not all lexical items yielded the same responses (χ^2 (9, N=220) $p<0.001$).

Table 5.23 Multiple choice task: condition 3b results per individual item for levels one to three (%).

Item	Target	Mass with		
		Bare mass	indefinite quantifier	Definite article
2. una madera	45.45	21.82	12.73	14.55
6. un queso	45.45	16.36	1.82	36.36
25. un pan	60	16.36	14.55	9.09
29. un ajo	72.73	10.91	7.27	9.09

Similar to the findings from condition 3a (table 5.22), the chi-square test showed a significant difference between the response types, which means the participants did not respond in the same way for each individual lexical item even though they belong to the same condition (χ^2 (9, N=220) $p<0.0001$). Not only does the condition affect response types, but so does the lexical item itself.

5.5 General Discussion

The present study presented and analyzed the findings from two tasks: a translation task and a multiple choice task. The participants were undergraduate students from the University of Ottawa and were divided into three language proficiency levels according to the hours of classroom instruction they had received prior to the testing. There were twenty level one (beginner) participants, twenty level two (intermediate) participants, and fifteen level three (advanced) participants. There was also a control group of ten native Spanish-speaking graduate students that participated in the multiple choice task.

The translation task consisted of four conditions and a set of distractors: bare mass noun phrases, nouns with an indefinite quantifier, flexible nouns with an indefinite determiner, and mass nouns with a classifier. The indefinite quantifier phrases and the indefinite determiner phrases were further broken down into subgroups for analysis: mass nouns with an indefinite quantifier, count nouns with an indefinite quantifier, equivalent flexible nouns with an indefinite determiner, and non-equivalent flexible nouns with an indefinite determiner. Recall that flexible nouns are nouns that can be used as a mass or count noun depending on the context and accompanying syntax. Flexible nouns that are non-equivalent means that in Spanish the nouns can be preceded by an indefinite determiner but in English they cannot.

The multiple choice task also consisted of four conditions and a set of distractors: bare mass nouns, nouns with an indefinite quantifier, flexible nouns with an indefinite determiner, and mass nouns with a classifier. With the multiple choice task, only the flexible nouns contained two subcategories: mass nouns with an indefinite determiner and count nouns with an indefinite determiner. For this task, only mass nouns were used in the condition with an indefinite quantifier.

In general, the study reached its first objective of contributing original experimental data to an area that had not been previously studied by researchers of Spanish language acquisition. To our knowledge, there have not been any studies that are concerned with the acquisition of the mass-count distinction in Spanish as an L2.

According to the initial predictions, it was hypothesized that conditions 1, 2, and 4 would have a high percentage of target responses, considering that there was no variation between the Spanish sentences and the target translation equivalents. The findings supported this prediction for conditions 1 (bare mass noun phrases) and 4 (mass nouns with a classifier), but not for the

second condition (nouns with an indefinite quantifier). When broken down into two sub-conditions, it could be seen that there was a higher percentage of target responses for the mass noun with indefinite quantifier than with the count nouns. The count noun items were originally chosen for the task because in Spanish (and when translated into English) they have mass noun lexical equivalents (ie. *coins/change*). The participants tended to translate the count nouns as their mass equivalents, despite the presence of count morphosyntax in the Spanish sentence. At the same time, in condition 2a, the participants did not use count noun equivalents instead of the given mass noun in the item when one was possible (ie. *money/bills or coins, people/person*). In hindsight, it would have been interesting to use sets of mass and count noun equivalents in this condition, in order to test further whether or not English learners of Spanish prefer to translate mass nouns as their count noun equivalents or vice versa. What can be said from the current findings is that, in general, the participants preferred the mass noun equivalent over the count noun given in the item. There was only one instance of a mass noun being converted into a count noun, where the participant translated *demasiada cerveza* as *too many beers* instead of the target *too much beer*.

The most response variation occurred with condition three, flexible nouns with an indefinite quantifier. As mentioned above, in order to examine the results in more detail, this condition was divided into two subgroups according to the possible English translations (acceptable or not acceptable direct translations). The findings for condition 3a showed that there was a high percentage of target responses that also increased with each proficiency level. In contrast, the percentage of target responses for condition 3b was under 40% for all three levels. The participants tended to either translate the item as a mass noun or use a non-target direct translation. The two items that were most often converted to mass nouns were *un queso* and *un*

pan. One explanation for these results could be that the participants did not have the lexical entry for the count forms of these nouns in their mental lexicon, and therefore only recognized the nouns as their default mass counterparts *queso* and *pan*. At the same time, it could be argued that the participants preferred to write less and instead just omit the indefinite determiner instead of writing a classifier phrase. If this were true, then, the findings should have been similar for all of the flexible nouns that required a classifier in English. Items *un ajo* and *un papel*, however, had significantly higher percentages of non-target direct translations than count to mass conversions. It is possible that, since *a paper* is often used in English to refer to a newspaper, or as a term to refer to an essay, it may be acceptable to some native speakers of English as an equivalent of *a piece of paper*. *Un ajo*, however, does not offer a similar plausible explanation. There are no contexts that would allow **a garlic* to be acceptable. In sum, the items in this condition had both similar and varied results. On one hand, the items had the lowest percentage of target responses overall, while on the other hand, the percentage of each type of non-target response varied with each item. That is to say, some of the items had higher percentages of count to mass noun conversions, while others had more non-target direct translations. Therefore, not only were the results affected by the condition, but they were also affected by the count noun itself.

The findings from the multiple choice task were similar to those from the translation task for the items containing bare mass noun phrases (condition 1) and those containing mass nouns with indefinite quantifiers (condition 2). There was a high percentage of target responses and the amount increased with each proficiency level. It should be noted, however, that although the mass noun phrase structures in these two conditions are equivalent in the L1, the participants did not choose the target option 100%. This suggests that even though the non-target responses are considered ungrammatical in both the L2 and the L1, the participants chose the mass nouns with

count morpho-syntax (ie. *unas leches/ *a milks, demasiadas gentes/*too many peoples*). These findings raise the question: if these responses are not acceptable in either the L1 or the L2, then why are the learners producing them? One possible reason could be that since the participants were presented with four response options, one of them being the target mass noun with the remaining three being mass nouns with count morpho-syntax, the participants could have been unsure of whether or not all of the choices were acceptable in the L2. If that is the case, then are the learners not relying on the lexical and conceptual representations present from the L1, but instead are perhaps guessing. Another possibility is that the participants are overgeneralizing the flexibility of nouns in Spanish. *Leche* may be pluralized or preceded with an indefinite quantifier in Spanish in certain contexts (such as with idioms using the word *leche* or when using restaurant talk), but not in the context provided in the task itself. The participants may also be overextending the pluralization of indefinite quantifiers (they may be pluralized when used with plural count nouns, for example).

The results from the third condition showed the greatest amount of variation. Similarly to the translation task, this condition was comprised of equivalent and non-equivalent flexible nouns. For the equivalent nouns, there was a high percentage of target responses that increased with each proficiency level. For the non-equivalent nouns, the percentage of target responses was much lower from all levels, even though the response options were the same for both types of flexible nouns. Although these results were similar to those from the translation task, it should be noted that for the non-equivalent flexible nouns, the control group chose the target option just over half of the time (for conditions 1, 2, and 3a they chose the target response 100%). Thus, the multiple choice task results for this condition showed that the flexible noun preceded by an

indefinite determiner were not always the preferred choice, even for the control group of native Spanish speakers.

For the final condition, mass nouns with a classifier, the results from the participants were similar to those from the control group. The percentage of target responses ranged between 62.5 and 80%. The nouns used in this condition were the same flexible nouns used in condition 3, except they were preceded by classifier. The non-target options were also the same as those used in condition 3. It is possible that the flexible nouns themselves or the types of response options could have been contributing factors, causing variation even amongst the responses from the native Spanish speakers.

In sum, for both tasks the level one participants produced the lowest percentage of target responses out of the three proficiency levels¹⁰. For the translation task, the percentage of target responses increased with each proficiency level for all conditions except for 2a, mass nouns with an indefinite quantifier, where the level 2 participants produced a higher percentage of target responses than the level three participants. The results for conditions 3a, equivalent flexible nouns with indefinite quantifiers, and 4, mass nouns preceded by a classifier, were very similar for the level two and three participants. Overall, conditions 1, 2a, 3a, and 4 yielded the highest percentage of target responses, while condition 3b, non-equivalent flexible nouns with an indefinite quantifier, proved to be the most problematic, causing the lowest percentage of target responses out of all the conditions. For condition 3b as well as condition 2b there was a significantly higher production of mass-noun conversions than the other non-target response types.

¹⁰ This shows that increased exposure to the language helps in the acquisition of the mass and count morpho-syntax, even though the distinction and the flexibility of nouns is not explicitly taught in the Spanish classroom.

The participants performed in a similar manner for the multiple choice task. The percentage of target responses increased with each proficiency level for every condition except 4, mass nouns preceded by a classifier, where the target productions for level three were slightly less than for level two. The analysis of the non-target responses per condition and level showed a significant difference only for conditions 3a, 3b, and 4. The same flexible nouns were used for both conditions 3 and 4, which could be one explanation for the similar findings. Conditions 3 and 4 also had the same response options.

5.6 Conclusions

Considering the results from both tasks, the findings suggest that the participants tend to produce fewer target responses for phrases with flexible nouns in Spanish. This could be attributed to the difference between the distributional privileges in English and Spanish. There could also be a negative transfer effect for the non-equivalent mass nouns in Spanish. If the participants had never learned that some nouns that are mass in English could be type-shifted to count in Spanish, then they would not be familiar with the grammaticality of the count syntax. Future studies might benefit from a post-task self-assessment questionnaire, which would ask the participants to judge their familiarity with the vocabulary and the phrasal syntax. It would also be interesting to explore the number of native English speakers who find nouns like *paper* acceptable with an indefinite determiner. Further studies should also aim to construct tasks that result in 100% target responses from the control group for all conditions, either by adjusting the context or providing more specific vocabulary pictures.

CONCLUSIONS

This dissertation examined the primary acquisition of the mass-count distinction in Spanish and English and the non-primary acquisition of the Spanish distinction by native English-speaking adults. In this area of research, three main problems were investigated. First, we looked at the relationship between the syntax and the semantics of the mass-count distinction, and specifically how they differ for Spanish and English. Second, we examined the learnability problem in the domain of first language acquisition. It was argued that children are born with constraints and biases that help reduce the number of possible hypotheses when learning the meanings of novel words. The universality of these innate constraints and biases was then called into question. Third, we investigated the role of the first language in the acquisition of the mass-count distinction in Spanish.

In order to compare the syntactic and semantic views of the distinction in Spanish and English, we focused on the theories and research put forth by Gathercole (1997), Bosque (1999), Borer (2005), Wierzbicka (1985), Bloom (1990, 1992, 1994, 1999), and Barner and Snedeker (2005), among others. Based on this comparison, we argued that both English and Spanish have a linguistic mass-count distinction, contrary to Gathercole's claims. We do agree, however, that the nominal systems have differences and that the Spanish nominal system is more flexible than the English system. The linguistic mass-count distinction present in both languages is specifically relevant when determining that they have the same option of the telicity parameter. Namely, in both Spanish and English telicity is compositional in that the nature of the DP and the mass-count distinction contributes to determining whether the predicate is telic or atelic.

We also argued that there is a relationship between syntax and semantics that is tied to the mass-count distinction. In general, nouns are unspecified with respect to quantity values, but can be specified when used with determiners and classifiers. A mass noun is unspecified for quantity and tends to denote uncountable non-individuated entities, whereas a noun used with count syntax, such as an indefinite determiner or a numeral, refers to countable individual entities that have a specific quantity value. Both English and Spanish have flexible nouns that may be type-shifted between mass and count, depending on the phrase structure in which the noun is embedded, although Spanish appears to have a more flexible system than English.

In order to examine the acquisition of the mass-count distinction we presented two studies: the first concerned the primary acquisition of the distinction in both Spanish and English, and the second consisted of experimental tasks that aimed to investigate the non-primary acquisition of the distinction in Spanish. The L1 study addressed the learnability problem, specifically concerning the universality of language constraints and biases in early language learning. It has been hypothesized in L1 research that children tend to assign novel labels to objects on the basis of shape and to substances on the basis of material. Bloom (1992, 1994) also argued that a mapping takes place, which involves a mapping from objects to the cognitive notion of individual and from substances to the notion of non-individual. The question arose, however, of whether or not these biases and mappings are universal, or if early language acquisition is affected by language specifics. Our L1 study aimed to answer this question. We hypothesized that the children would miscategorize the object mass nouns on the basis of shape, and thus produce the object mass nouns with count syntax. If the shape and material biases were universal, then the results would be similar across languages. We found that the results were not similar for three groups of children. The English data did yield the same findings as Bloom's

(1990) study: the monolingual English children produced more non-adult usages with object mass nouns than with substance mass nouns. The Spanish results showed no significant difference between the object and substance mass nouns. When we further divided the object mass nouns into more detailed categories, the results were also different. The English results were not significant, whereas the Spanish children produced significantly more non-adult usages with superordinates and dual object nouns. It is possible that the differences in results could be due to the differences in the nominal systems, and therefore we concluded that the acquisition of the mass-count distinction may be affected by specific characteristics of a given language. In order to test this further, it would be necessary to conduct an experimental study so we may control for more variables and elicit specific relevant productions. By using experimental data instead of spontaneous speech data, we may be able to have a greater number of participants, have more data, control for age and word frequency, and control for content and word productions.

Considering the results from the L1 study, and the differences between the English and Spanish nominal systems, the next step in our research was to examine the acquisition of the mass-count distinction in Spanish by English-speaking adults. Non-primary acquisition differs from primary acquisition in that the L1 learners are starting from a 'clean slate'. They are born with no prior influences from other languages, and are assisted by a language mechanism. Although the presence of an innate language acquisition device or UG that is present in L1 acquisition is debatable, what is agreed upon is that the L2 learner is influenced by the L1, either positively or negatively. Thus, the objective of our second study was to test whether or not the participants would be affected positively or negatively by the mass-count distinction in their L1. Specifically, we hypothesized that the participants would have a high percentage of target

responses when given what would be considered equivalents in their native language, but they would produce a lower percentage of target responses with sentences that contained flexible nouns and especially flexible nouns that were not considered flexible in the L1. Our findings supported these hypotheses. It was also interesting to find that not only did the condition affect the results, but so did the lexical item itself. The results also showed that the production of target responses increased overall with an increase in proficiency level, even though the mass-count distinction is usually not explicitly taught in the classroom in the institution where our participants were recruited. Further research is required, however, in order to confirm these initial findings.

In the future, we would like to test the acquisition of the mass-count distinction in Spanish and the effects of the L1 with other languages such as French. A comparison could be made between the English speaking participants and the French participants. Further studies could include a comparison of L1 English speakers with bilingual English – French speakers learning Spanish as an L3, in order to observe the different effects of positive and negative transfer on acquisition. Another possible variable could be to include learners in a natural context, such as adults studying in Spain or immigrant workers living in any Hispanic country. Finally, we would like to explore further the relationship between the telic/atelic value of predicates and the mass-count nature of the DP.

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APPENDIX I

Chapter Three: List of Errors

Language	Child	Category	Example
Mono-English	Ross	superordinate	you want a money?
		dual object	that's pants.
		discrete object	I want to eat raisins in a paper.
	Shem	substance	I wanna juice.
		substance	there and a apple juice there.
		substance	and a apple juice.
		dual object	put away a pants.
		dual object	and this scissors.
		aggregate	I want some juice and a rice.
		aggregate	I want some juice and a rice.
		aggregate	I want juice in a rice and juice in my cup.
		aggregate	I go in my backyard go in a grass and uh hurts.
		superordinate	we go in a store and buy a food the mans thankyou.
		flexible	eating a cake in the bathtub.
		flexible	he's eating a cake in the bathtub.
		discrete object	I wantuh put it back with another paper.
		discrete object	I want a paper.
		discrete object	a paper on the playdough?
		discrete object	get out a paper.
		discrete object	and a paper too.
		discrete object	I wanta cut a paper to write.
		discrete object	and make it the crunch a paper.
		discrete object	and make the punch a paper.
	Adam	substance	drink a milk?
		substance	I need one milk too.
		substance	oh he wants the three dozen milk.
		substance	three dozen milk and three dozen eggs.
		substance	two and one half milk.
		substance	yeah like another water.
		discrete object	do you want me serve dem serve you another meat?
		discrete object	dose are cheese?
		discrete object	dis is a paper. Tell you when the paper cut.
		discrete object	dese are toast
		superordinate	dese are moneys.
		superordinate	I got your tea two moneys
		superordinate	dat a mail.
		dual object	is dis scissors?
	Eve	substance	another milk.
		discrete object	a bread with some butter on it.
		discrete object	a paper.
		discrete object	where my other paper?
		discrete object	that a new paper.
	discrete object	eating a bacon	
	discrete object	sit down oh drop a celery	
	dual object	that my scissors	
Nethanial	substance	er de dis is a milk	
	substance	two waters.	
	substance	where's the other water?	

		superordinate	<i>with a sand, but it makes one dirty.</i> no es un dinero.
			<i>it isn't a money.</i>
Bi-English	Leo	substance	I want a apple juice.
Bi-Spanish	Manuela	flexible	un papel. (Mother: quieres papel que vas a hacer dibujar?) <i>a paper. (Mother: do you want paper, because you're going to draw?)</i>

APPENDIX II

Chapter Five: Certificate of Ethics Approval



Université d'Ottawa University of Ottawa

Service de subventions de recherche et d'éthologie Research Grants and Ethics Services

January 4, 2008

Juana Liceras
Department of Modern Languages
University of Ottawa
70 Laurier Avenue, Room 146
Ottawa, ON K1N 6N5

Diana Carter

Object: The Primary and Non Primary Acquisition of the Lexicon: A Cross-Linguistic Study of the Mass-Count Distinction in English and Spanish (File # 09-07-20)

Dear Professor Liceras and Ms. Carter,

You will find enclosed the Social Sciences and Humanities Research Ethics Committee ethical clearance for the abovementioned study.

During the course of the study, any modifications to the protocol or forms may not be initiated without prior written approval from the REB. You must also promptly notify the REB of any adverse events that may occur.

This certificate of ethical clearance is valid until January 4, 2009. Please submit an annual status report to the Protocol Officer in January 2009 to either close the file or request a renewal of ethics approval. This document can be found at:
http://www.rges.uottawa.ca/ethics/application_dwn.asp.

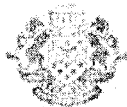
A copy of this approval will be sent to research services, if necessary.

If you have any questions, you may contact the undersigned at the number (613) 562-5800 ext. 1783.

Sincerely yours.

Leslie-Anne Barber
Protocol Officer for Ethics in Research
For Peter Beyer, Chair of the Social Sciences and Humanities REB

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Université d'Ottawa University of Ottawa

Service de subventions de recherche et d'éthologie Research Grants and Ethics Services

HEALTH SCIENCES AND SCIENCE RESEARCH ETHICS BOARD

CERTIFICATE OF ETHICAL APPROVAL

This is to certify that the University of Ottawa Social Sciences and Humanities Research Ethics Committee has examined the application for ethical approval of the research project entitled **The Primary and Non Primary Acquisition of the Lexicon: A Cross-Linguistic Study of the Mass-Count Distinction in English and Spanish (File # 09-07-20)** submitted by Diana Carter and supervised by Juana Liceras from the Department of Modern Languages of the University of Ottawa. The Board found that this research project met appropriate ethical standards as outlined in the Tri-Council Policy Statement and in the Procedures of the University of Ottawa Research Ethics Boards, and accordingly gave it a Category 1a (approval). This certification is valid one year from the date indicated below.

Leslie-Anne Barber
Protocol Officer for Ethics in Research
For Peter Beyer, Chair of the Social
Sciences and Humanities REB

January 4, 2008
Date

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550, rue Cumberland Ottawa (Ontario) K1N 6N5 Canada 550 Cumberland Street
Ottawa, Ontario K1N 6N5 Canada

(613) 562-5841 • Téléc./Fax (613) 562-5338
<http://www.uottawa.ca/services/research/rgs/index.html>

APPENDIX III

Chapter Five: Background Questionnaire

1. Your name: _____
2. Gender: _____
3. Age: _____
4. Your main/native language _____
5. Your mother's main language: _____
6. Your father's main language: _____
7. Language(s) spoken at home:
Main: _____
Secondary: _____
8. Language(s) spoken during the first five years of your life:

9. Language(s) studied at:
 - Primary school: _____
 - Secondary (high) school: _____
 - University: _____
 - Other institutions: _____
10. Language(s) you use:
 - At home: _____
 - At school: _____
 - With your friends/relatives: _____
 - At work: _____

- When you dream: _____
11. Other language(s) you can:
 - Speak: _____
 - Read: _____
 - Write: _____
 - Dream: _____
 12. What language do you feel most comfortable with at this time?

 13. Contact with Spanish (not in Ottawa):
 - Approximate hours/week: _____
 - Context (e.g. friends, family, clubs...): _____

Previous contact:

 - Have you ever lived in Spanish speaking environment?
YES [] NO []

If yes:

 - When? _____
 - For how long? _____

APPENDIX IV

Chapter Five: Information Letter and Consent Form

Information letter and consent form

Student investigator:
Diana Carter
Graduate student
Department of Modern Languages
University of Ottawa

Thesis supervisor:
Dr. Juana Licerias
Professor
Department of Modern Language and Literatures
University of Ottawa
(613) 562-5800 ext. 3742
jliceras@uottawa.ca

Invitation: You are invited to participate in a doctoral thesis research study conducted by Diana Carter and supervised by Prof. Juana Licerias.

Purpose of the Study: We wish to learn how native speakers of English with various proficiency levels in Spanish as a second language (L2) learn new vocabulary. We will compare the L2 Spanish learning process with the learning process of childhood learning of Spanish as a first language. We will use statistical analysis to help identify kinds of difficulties that L2 Spanish learners might have learning new vocabulary.

Participation: You do not have to participate and you can decline this invitation at any point. Your decision to participate or not participate will not affect your evaluation in your Spanish program and you may list your participation as a volunteer activity on your C.V. You will also receive a certificate of participation. You will be asked to complete two tasks: a translation task and a multiple choice task. The tasks will take under an hour to complete. This study does not involve risk or deception, and there are no possible harms associated with the study.

Confidentiality: The information that you share will remain strictly confidential and will be used solely for the purposes of this research. The only people who will have access to the research data are myself and Professor Licerias. Results will be published in pooled (aggregate) format, which means that the answers will be discussed collectively and not be released individually.

Anonymity: You do not have to give us your real name (use a nickname if you wish) unless you request a certificate of participation. In any case your questionnaire will be given a number to guarantee anonymity. Your name will not appear on any documentation or publications.

Conservation of data: The surveys will be kept in a locked filing cabinet in the office of Prof. Licerias at the University of Ottawa for a period of 5 years, at which time they will be destroyed.

Information about the Study Results: The results of this study will be available to you if you are interested. If you wish to receive additional instruction about question formation in Spanish, you may choose either or both of these two options: 1) receive a detailed handout with examples of typical errors, explanations and suggestions for further practice; 2) a personal appointment with the researcher. By participating in the study and the follow-up options, you will have an opportunity to practice and improve your Spanish, and have a better understanding of Spanish grammar and vocabulary.

If you need any additional information feel free to contact the researcher or her supervisor.

If you have any questions with regards to the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 159, Ottawa, ON K1N 6N5, tel.: (613) 562-5841 or ethics@uottawa.ca.

Thank you for your time and consideration. **Please keep this page for your records.**

Doctoral Thesis Research Study

Student investigator:
Diana Carter
Graduate student
Department of Modern Languages
University of Ottawa

Thesis supervisor:
Dr. Juana Licerias
Professor
Department of Modern Language and Literatures
University of Ottawa
(613) 562-5800 ext. 3742
jliceras@uottawa.ca

Please keep this copy for your records.

I have reviewed the letter of information and I wish to participate:
I can withdraw at any time.

Name of
Participant: _____
(first name, last name)

Signature: _____ Date: _____

I wish to be informed of the results of this project. _____ (please put a check mark)

I would like to receive additional instruction through (check as many as you want):

(check here) _____ 1) receive a detailed handout with examples of typical errors, explanations and suggestions for further practice;

(check here) _____ 2) a personal appointment with the researcher.

Please include an email address (preferred) and/or a phone number, if you put a check mark in any of the above.

Email address: _____ (please write legibly)

Tel. number: _____

Doctoral Thesis Research Study

Student investigator:

Diana Carter
Graduate student
Department of Modern Languages
University of Ottawa

Thesis supervisor:

Dr. Juana Licerias
Professor
Department of Modern Language and Literatures
University of Ottawa
(613) 562-5800 ext. 3742
jliceras@uottawa.ca

Please return this page to the researcher if you wish to participate.

I have reviewed the letter of information and I wish to participate:
I can withdraw at any time.

Name of
Participant: _____
(first name, last name)

Signature: _____ Date: _____

I wish to be informed of the results of this project. _____ (please put a check mark)

I would like to receive additional instruction through (check as many as you want):

(check here) _____ 1) receive a detailed handout with examples of typical errors, explanations and suggestions for further practice;

(check here) _____ 2) a personal appointment with the researcher.

Please include an email address (preferred) and/or a phone number, if you put a check mark in any of the above.

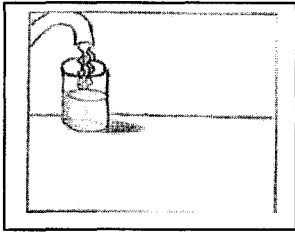
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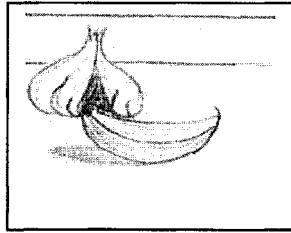
APPENDIX V

Chapter Five: Vocabulary Sheets

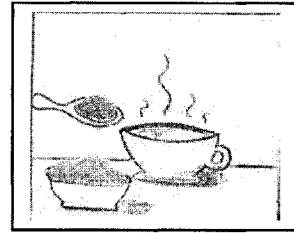
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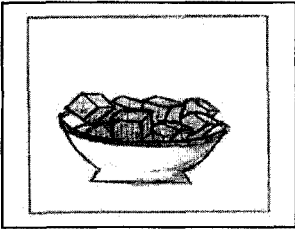
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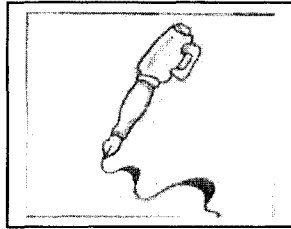
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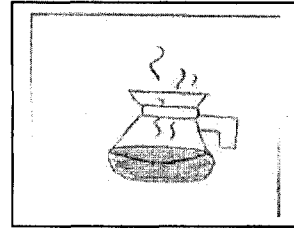
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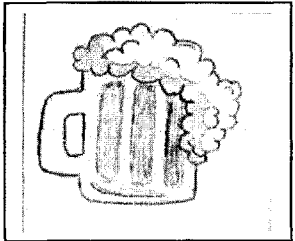
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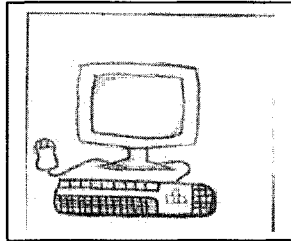
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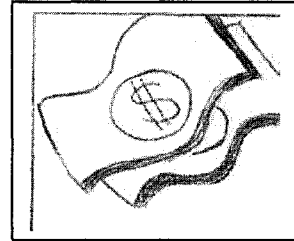
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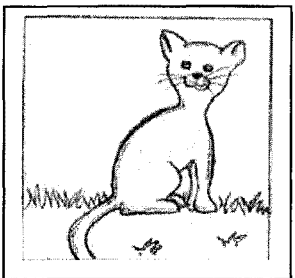
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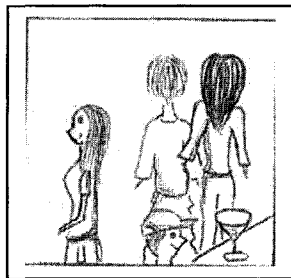
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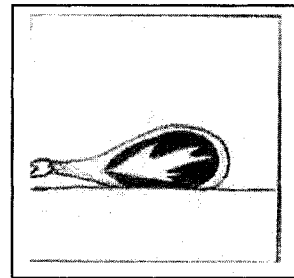
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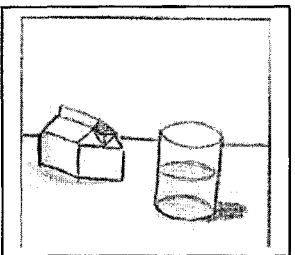
GATO



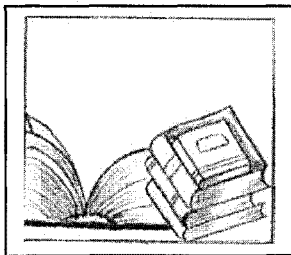
GENTE



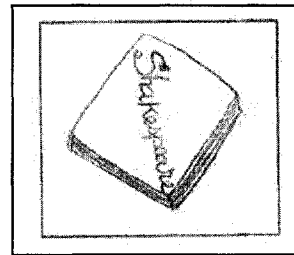
JAMÓN



LECHE

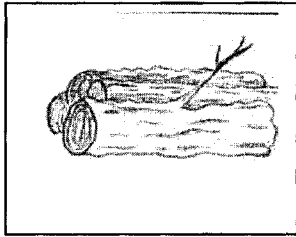


LIBROS

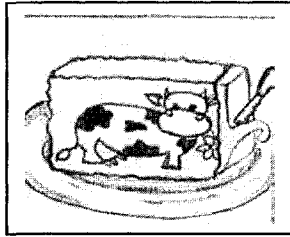


LITERATURA

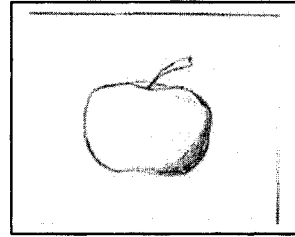
VOCABULARIO



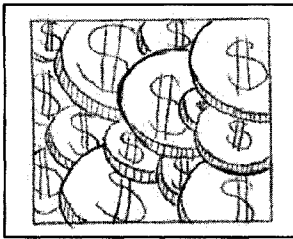
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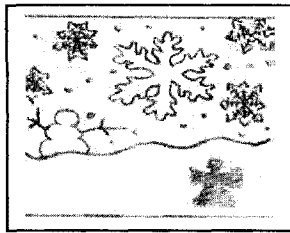
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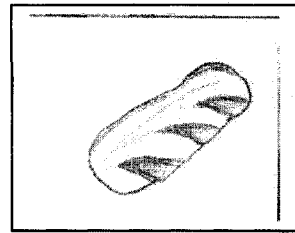
MANZANA



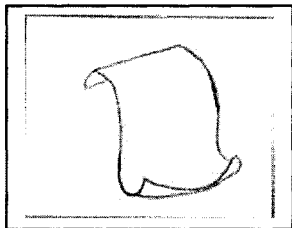
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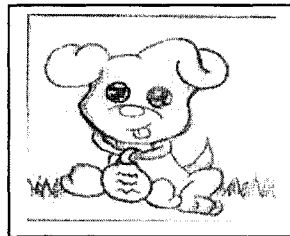
NIEVE



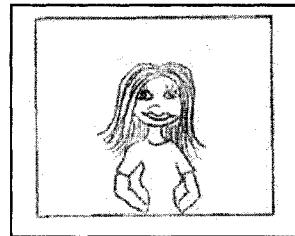
PAN



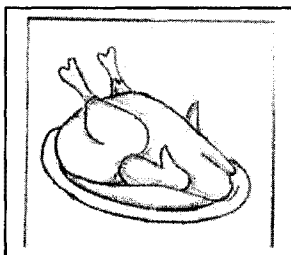
PAPEL



PERRO



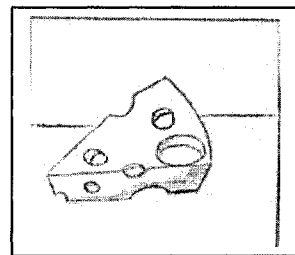
PERSONA



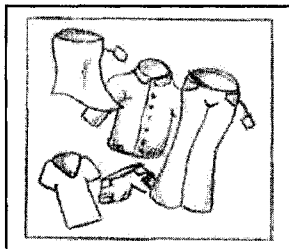
POLLO



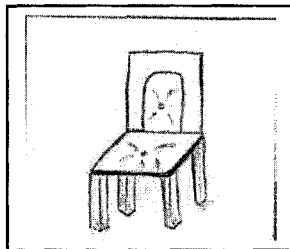
PRENDA



QUESO



ROPA



SILLA

APPENDIX VI

Chapter Five: Translation Task Sentence List for Each Condition

BARE MASS NOUN PHRASE

1. Me gusta comer tostadas con mantequilla.
2. Normalmente los niños beben leche por la mañana.
3. Hoy vamos a comprar ropa nueva.
4. ¿Tomas azúcar con el café?
5. En la universidad puedes estudiar literatura.
6. Necesito papel para la impresora.
7. Este plato no necesita ajo.
8. En Canadá se construyen muchas casas con madera.
9. Esta tarde compraré pan.
10. ¿Prefieres pollo o pescado con el arroz?

MASS NOUN WITH INDEFINITE QUANTIFIER

1. En el invierno siempre hay mucha nieve.
2. Has ganado mucho dinero en la lotería.
3. Hay demasiada gente en el bar.
4. Marco bebe demasiada cerveza.
5. Hay poco queso en el frigorífico.

COUNT NOUN WITH INDEFINITE QUANTIFIER

1. Tengo demasiadas monedas en mi cartera.
2. Gucci va a diseñar muchas prendas para la boda de Cristina Aguilera.
3. Hay muchas personas en la clase.
4. No hay muchos libros en la estantería.
5. No pongas tantos azucarillos en el café.

MASS NOUN WITH INDEFINITE ARTICLE

1. Dame un papel, por favor.
2. Añade un ajo más en la sopa.
3. Camarero, me pone una cerveza por favor.
4. Vamos a tomar un café antes de ver la película.
5. Hay una madera suelta en el piso del salón.
6. Le regalaron un jamón para las fiestas.
7. Voy a traer un queso Brie entero a la fiesta.
8. Quiero un pan.
9. El médico nos sugiere que comamos una manzana al día.
10. Pablo va a comprar un pollo a su hijo.

MASS NOUN WITH CLASSIFIER PHRASE

1. Dame una hoja de papel, por favor.
2. Pon dos dientes de ajo en la sartén.
3. Hay dos botellas de cerveza en el frigorífico.
4. Mi esposa se toma una taza de café cada mañana.
5. Para construir una mesita, necesitas cinco pedazos de madera.
6. Cristina ha comprado un pedazo de jamón.
7. Ponme una loncha de queso en el bocadillo.
8. Voy a la panadería a comprar una barra de pan.
9. Pon un trozo de manzana en la tarta.
10. Para la cena, voy a preparar pechugas de pollo.

COUNT DISTRACTORS

1. El perro de Paula no nos deja dormir.
2. A Susana le encantan los gatos.
3. ¿Me prestas tu bolígrafo, por favor?
4. En el laboratorio hay diez computadoras.
5. En la clase faltan tres sillas para los estudiantes.

APPENDIX VII

Chapter Five: Translation Task

Nombre y apellidos / Name and surname / Nom et prénom: _____

Lengua materna / Mother tongue / Langue maternelle: _____

INSTRUCCIONES / INSTRUCTIONS:

Por favor, traduzca a su lengua materna las siguientes frases. Puede utilizar las hojas de vocabulario y los dibujos. No se deben usar diccionarios ni libros de gramática. Tampoco se deben revisar las respuestas para hacer cambios una vez que se ha completado cada una.

Please translate the following sentences in your mother tongue. You may refer to the picture-vocabulary sheets provided to you. You are not supposed to use a dictionary or text book. Please do not go back to change any previous answers.

S'il vous plait, traduisez à votre langue maternelle les phrases suivantes. Vous pouvez consulter les feuilles de vocabulaire et les illustrations fournies. L'utilisation des dictionnaires et de livres de grammaire n'est pas autorisée. De plus, vous ne devez pas réviser vos réponses une fois qu'elles ont été complétées.

Ejemplo: A) Mario no puede encontrar su llavero. Mario can't find his keychain. / Mario ne peut pas trouver son porte-clefs.

B) Laura va a dejar de fumar. Laura is going to give up smoking. / Laura va arrêter de fumer.

1. Me gusta comer tostadas con mantequilla.

2. Tengo demasiadas monedas en mi cartera.

3. Dame un papel, por favor.

4. Pon dos dientes (*cloves/gousses*) de ajo en la sartén.

5. El perro de Paula no nos deja dormir.

6. Normalmente los niños beben leche por la mañana.

7. Vamos a tomar un café antes de ver la película.

8. Marco bebe demasiada cerveza.

_____.

9. A Susana le encantan los gatos.

_____.

10. El médico nos sugiere que comamos una manzana al día.

_____.

11. Voy a la panadería a comprar una barra de pan.

_____.

12. Cristina ha comprado un pedazo (*piece/morceau*) de jamón.

_____.

13. En la clase faltan tres sillas para los estudiantes.

_____.

14. Voy a traer un queso Brie entero a la fiesta.

_____.

15. Para la cena, voy a preparar pechugas (*breasts/blancs*) de pollo.

_____.

16. Hoy vamos a comprar ropa nueva.

_____.

17. ¿Tomas azúcar con el café?

_____.

18. Pablo va a comprar un pollo a su hijo.

_____.

19. Pon un trozo (*piece/morceau*) de manzana en la tarta.

_____.

20. Gucci va a diseñar muchas prendas para la boda de Cristina Aguilera.

_____.

21. Hay demasiada gente en el bar.

_____.

22. En la universidad puedes estudiar literatura.

_____.

23. Necesito papel para la impresora.

_____.

24. Hay muchas personas en la clase.

25. Hay poco queso en el frigorífico.

26. Le regalaron un jamón para las fiestas.

27. Ponme una loncha (*slice/tronche*) de queso en el bocadillo.

28. Este plato no necesita ajo.

29. En Canadá se construyen muchas casas con madera.

30. Esta tarde compraré pan.

31. En el laboratorio hay diez computadoras.

32. Hay una madera suelta en el piso del salón.

33. Mi esposa se toma una taza de café cada mañana.

34. No pongas tantos azucarillos en el café.

35. Quiero un pan.

36. Hay dos botellas de cerveza en el frigorífico.

37. Has ganado mucho dinero en la lotería.

38. Camarero, me pone una cerveza por favor.

39. Para construir una mesita, necesitas cinco pedazos de madera.

40. ¿Prefieres pollo o pescado con el arroz?

41. No hay muchos libros en la estantería.

42. En el invierno siempre hay mucha nieve.

43. ¿Me prestas tu bolígrafo, por favor?

44. Añade un ajo más en la sopa.

45. Dame una hoja de papel, por favor.

APPENDIX VIII

Chapter Five: Multiple Choice Task before Randomization

Nombre y apellidos / Name and surname / Nom et prénom: _____

INSTRUCCIONES / INSTRUCTIONS:

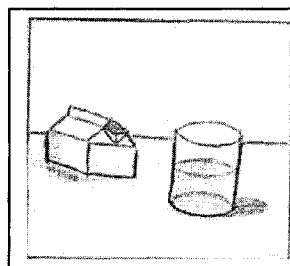
Por favor, lea las frases y elija la opción más adecuada para llenar el espacio en blanco. No se deben usar diccionarios ni libros de gramática. Tampoco se deben revisar las respuestas para hacer cambios una vez que se ha completado cada una.

Please read the sentences and choose the most appropriate option to fill in the blank. You are not supposed to use a dictionary or text book. Please do not go back to change any previous answers.

Veillez lire les phrases et remplir les espaces avec l'option la plus appropriée. L'utilisation des dictionnaires et de livres de grammaire n'est pas autorisée. De plus, vous ne devez pas réviser vos réponses une fois qu'elles ont été complétées.

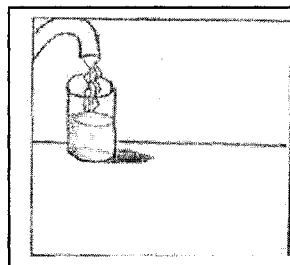
1. María tiene mucha sed porque está comiendo galletas.
A María le gusta beber _____ cuando come galletas.

- a. leche
- b. leches
- c. una leche
- d. unas leches



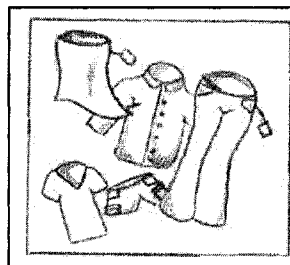
2. Paco y Pablo están en un restaurante y ninguno de los dos bebe alcohol. El camarero les pregunta qué quieren tomar.
Paco y Pablo quieren tomar _____.

- a. agua
- b. aguas
- c. una agua
- d. unas aguas



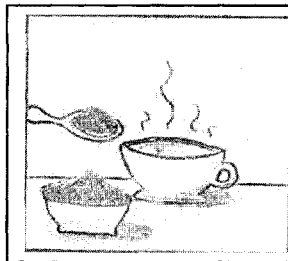
3. Después de terminar el año escolar voy a trabajar en una empresa.
Necesito comprarme _____.

- a. ropa
- b. ropas
- c. una ropa
- d. unas ropas



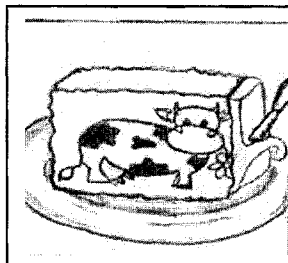
4. Susana va a la casa de Cristina para tomar algo y charlar.
Cristina le pregunta a Susana si quiere _____ con el té.

- a. azúcar
- b. azúcares
- c. un azúcar
- d. unos azúcares



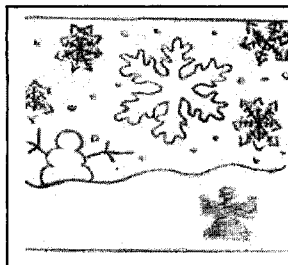
5. Vamos a comer la pasta con salsa picante.
¿Quieres un poco de pan con _____?

- a. mantequilla
- b. mantequillas
- c. una mantequilla
- d. unas mantequillas



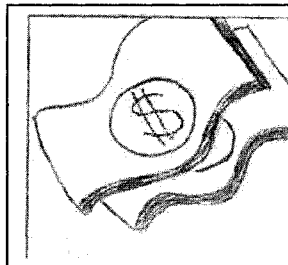
6. En Ottawa, hace mucho frío en diciembre.
Siempre hay _____ para fin de año.

- a. nieve
- b. nieves
- c. una nieve
- d. unas nieves



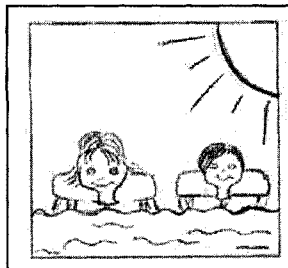
7. Esta tarde vamos a ir de compras.
Necesitamos sacar _____ del banco.

- a. dinero
- b. dineros
- c. un dinero
- d. unos dineros



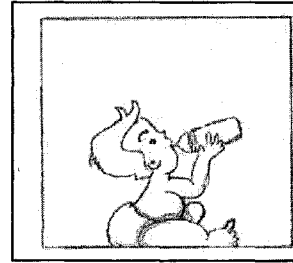
8. Es importante llevar chaleco salvavidas en la canoa.
A veces hay _____ que no sabe nadar.

- a. gente
- b. gentes
- c. una gente
- d. unas gentes



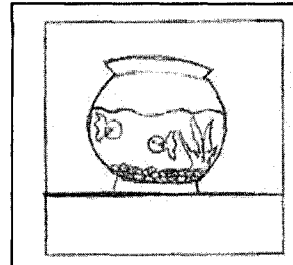
9. Los bebés comen y beben muchas veces al día.
Normalmente los bebés beben _____.

- a. mucha leche
- b. muchas leches
- c. una leche
- d. unas leches



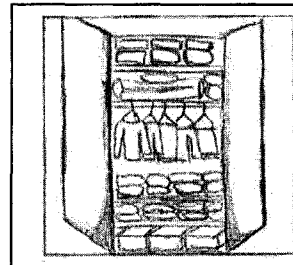
10. Necesito cuidar mejor de mis peces.
Hay _____ en la pecera y debo llenarlo.

- a. poca agua
- b. pocas aguas
- c. una agua
- d. unas aguas



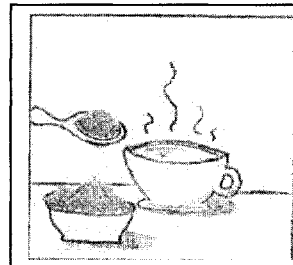
11. No puedo cerrar la puerta del armario.
Creo que he puesto _____ adentro.

- a. demasiada ropa
- b. demasiadas ropas
- c. una ropa
- d. unas ropas



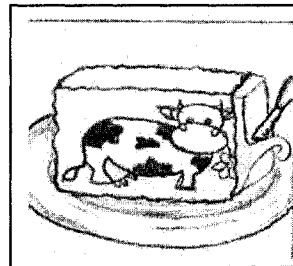
12. Mi abuela prepara café expreso a menudo.
Cuando lo tomo, siempre necesito echar _____.

- a. mucho azúcar
- b. muchos azúcares
- c. un azúcar
- d. unos azúcares



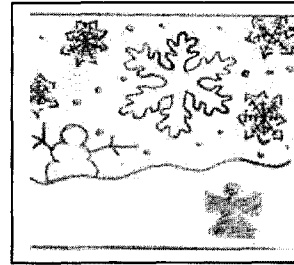
13. No quedan cereales ni pan para el desayuno.
Quiero preparar crepes pero hay _____.

- a. poca mantequilla
- b. pocas mantequillas
- c. una mantequilla
- d. unas mantequillas



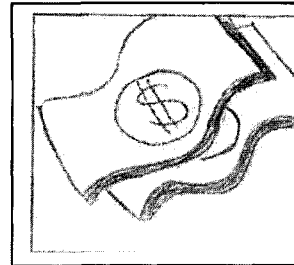
14. Últimamente ha habido muchos accidentes en la autopista.
Es difícil conducir cuando hay _____.

- a. mucha nieve
- b. muchas nieves
- c. una nieve
- d. unas nieves



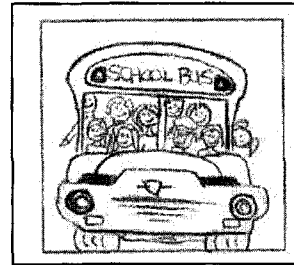
15. Mañana es el cumpleaños de mi madre.
Quiero comprarle un regalo, pero tengo _____.

- a. poco dinero
- b. pocos dineros
- c. un dinero
- d. unos dineros



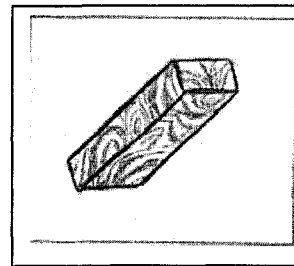
16. No me gusta ir al centro de la ciudad por la tarde.
Siempre hay _____ en el autobús.

- a. demasiada gente
- b. demasiadas gentes
- c. una gente
- d. unas gentes



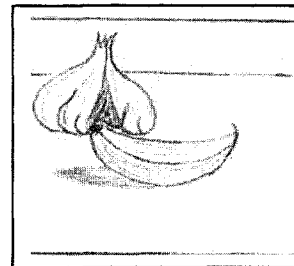
17. Estamos construyendo una mesita.
Para terminarla, sólo necesitamos _____.

- a. una madera
- b. madera
- c. mucha madera
- d. la madera



18. Hoy quiero comer pasta. Para preparar la salsa de tomate
voy a añadir _____ más.

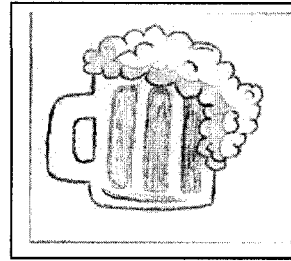
- a. un ajo
- b. ajo
- c. mucho ajo
- d. el ajo



19. Hace mucho calor y tengo sed.

Me tomaría _____.

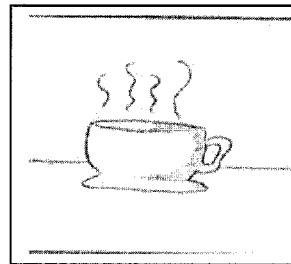
- a. una cerveza
- b. cerveza
- c. mucha cerveza
- d. la cerveza



20. Siempre tengo sueño por las mañanas.

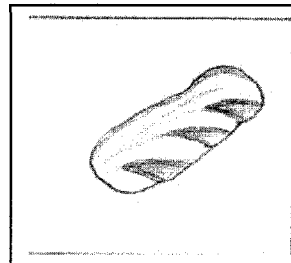
Necesito tomarme _____ antes de ir a trabajar.

- a. un café
- b. café
- c. mucho café
- d. el café



21. La pastelería del pueblo es muy barata. Puedes comprar una docena de pastelitos y _____ por dos euros.

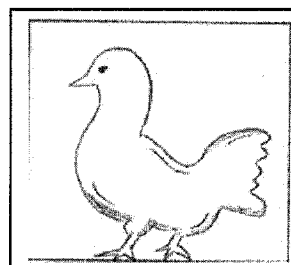
- a. un pan
- b. pan
- c. mucho pan
- d. el pan



22. Andrés vive en una granja y tiene varios animales ahí.

Tiene tres cerdos y _____.

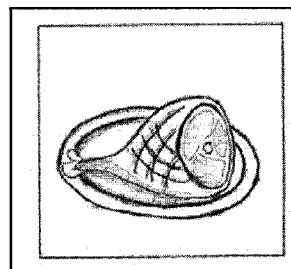
- a. un pollo
- b. pollo
- c. mucho pollo
- d. el pollo



23. Voy a la casa de mi abuela para cenar.

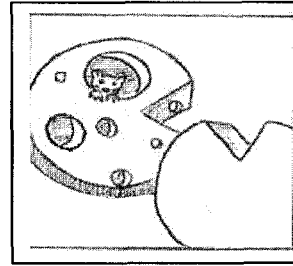
Ella está cocinando _____ delicioso.

- a. un jamón
- b. jamón
- c. mucho jamón
- d. el jamón



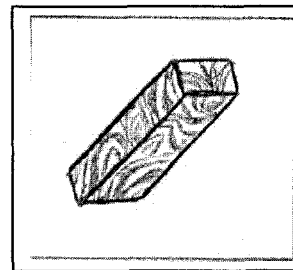
24. A mi mamá le encanta el queso bueno.
Voy a regalarle _____ Roquefort.

- a. un queso
- b. queso
- c. mucho queso
- d. el queso



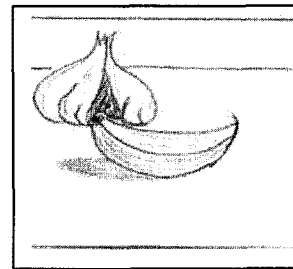
25. Necesito reparar el armario porque está roto.
¿Me pasas _____?

- a. un pedazo de madera
- b. madera
- c. mucha madera
- d. la madera



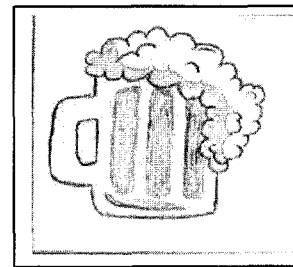
26. Eduardo está preparando la sopa para el almuerzo.
Necesita añadir _____ más a la olla.

- a. un diente de ajo
- b. ajo
- c. mucho ajo
- d. el ajo



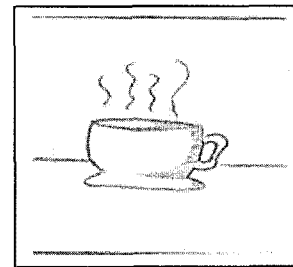
27. Paco y Enrique van a la discoteca juntos.
Enrique pide un vaso de vino y Paco _____.

- a. una jarra de cerveza
- b. cerveza
- c. mucha cerveza
- d. la cerveza



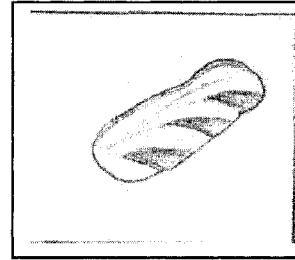
28. Hoy quiero salir a desayunar fuera en vez de comer en casa.
Voy a pedir _____ y una napolitana.

- a. una taza de café
- b. café
- c. mucho café
- d. el café



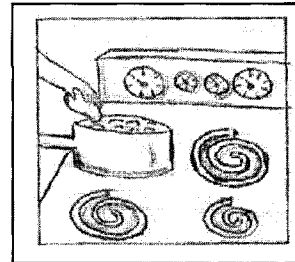
29. Esta mañana he ido al mercado a comprar para el almuerzo.
Me he comprado una lechuga, tres tomates y _____.

- a. una barra de pan
- b. pan
- c. mucho pan
- d. el pan



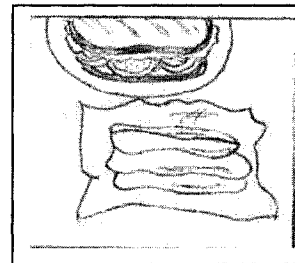
30. Estoy a dieta este mes. Así que para la cena sólo voy a hervir _____.

- a. una pechuga de pollo
- b. pollo
- c. mucho pollo
- d. el pollo



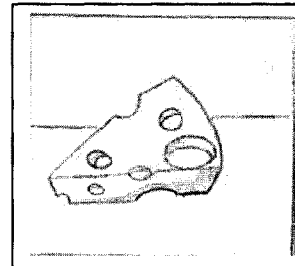
31. María está en un bar de tapas con sus amigas y le pide al camarero un pincho de tortilla y _____.

- a. un plato de jamón
- b. jamón
- c. mucho jamón
- d. el jamón



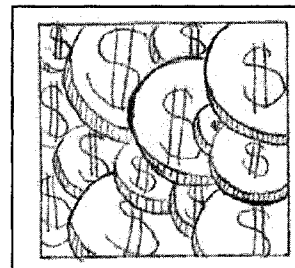
32. Quiero comer un sándwich a mediodía. Voy a poner una hoja de lechuga, dos rodajas de tomate y _____.

- a. un trozo de queso
- b. queso
- c. mucho queso
- d. el queso



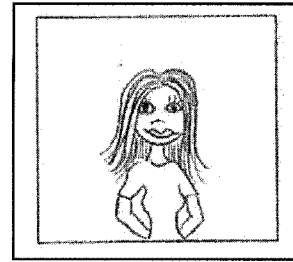
33. La cartera de Jaime pesa muchísimo.
Cuando la abre, ve que necesita quitar algunas de _____.

- a. las monedas
- b. la moneda
- c. moneda
- d. monedas



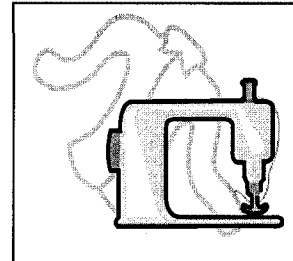
34. La universidad está buscando a alguien que pueda dar clases de español. Le darán el trabajo a _____ más preparada.

- a. la persona
- b. las personas
- c. persona
- d. personas



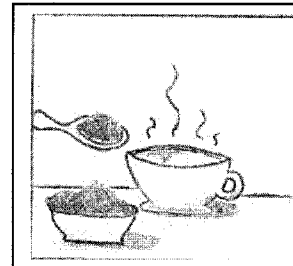
35. Bailo en un espectáculo de danza este fin de semana.
_____ que mi madre me ha diseñado son bonitas.

- a. las prendas
- b. la prenda
- c. prenda
- d. prendas



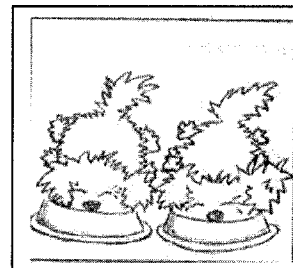
36. Vamos al bar Noche y Día a tomar un café con leche.
_____ del bar vienen en un paquete blanco y negro.

- a. los azucarillos
- b. el azucarillo
- c. azucarillo
- d. azucarillos



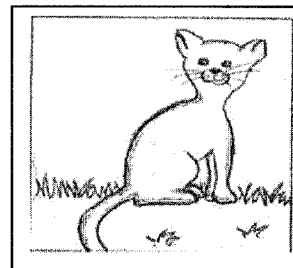
37. A muchos animales les gusta jugar en la nieve.
_____ esquimales viven al aire libre en Nunavut.

- a. los perros
- b. el perro
- c. perro
- d. perros



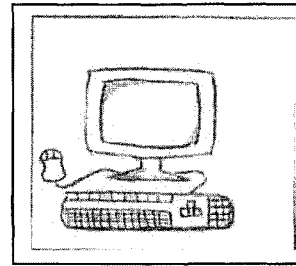
38. Ana es supersticiosa.
Ella cree que ver _____ negro es un símbolo de mala suerte.

- a. un gato
- b. los gatos
- c. gato
- d. gatos



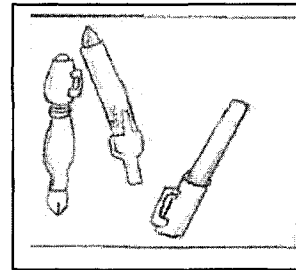
39. No puedo jugar a videojuegos en casa.
_____ que tengo es muy vieja y no tiene mucho RAM.

- a. la computadora
- b. las computadoras
- c. computadora
- d. computadoras



40. La profesora quiere corregir las redacciones en casa. Por eso
ha dejado todos _____ rojos encima de su escritorio.

- a. los bolígrafos
- b. el bolígrafo
- c. bolígrafo
- d. bolígrafos



APPENDIX IX

Chapter Five: Multiple Choice Task

Nombre y apellidos / Name and surname / Nom et prénom: _____

INSTRUCCIONES / INSTRUCTIONS:

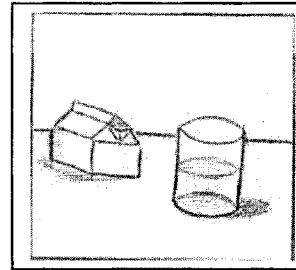
Por favor, lea las frases y elija la opción más adecuada para llenar el espacio en blanco. No se deben usar diccionarios ni libros de gramática. Tampoco se deben revisar las respuestas para hacer cambios una vez que se ha completado cada una.

Please read the sentences and choose the most appropriate option to fill in the blank. You are not supposed to use a dictionary or text book. Please do not go back to change any previous answers.

Veuillez lire les phrases et remplir les espaces avec l'option la plus appropriée. L'utilisation des dictionnaires et de livres de grammaire n'est pas autorisée. De plus, vous ne devez pas réviser vos réponses une fois qu'elles ont été complétées.

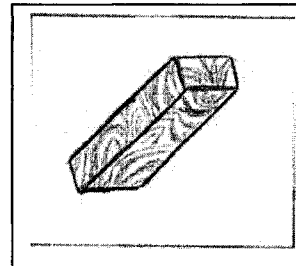
1. María tiene mucha sed porque está comiendo galletas.
A María le gusta beber _____ cuando come galletas.

- a. leche
- b. una leche
- c. unas leches
- d. leches



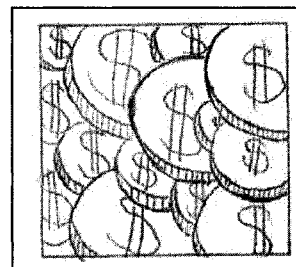
2. Estamos construyendo una mesita.
Para terminarla, sólo necesitamos _____.

- a. madera
- b. la madera
- c. mucha madera
- d. una madera



3. La cartera de Jaime pesa muchísimo.
Cuando la abre, ve que necesita quitar algunas de _____.

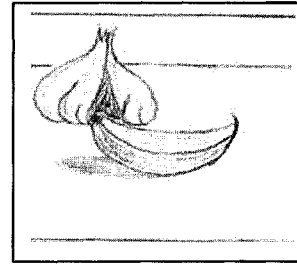
- a. moneda
- b. las monedas
- c. la moneda
- d. monedas



4. Eduardo está preparando la sopa para el almuerzo.

Necesita añadir _____ más a la olla.

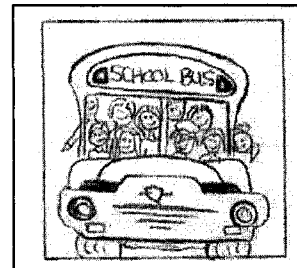
- a. el ajo
- b. ajo
- c. un diente de ajo
- d. mucho ajo



5. No me gusta ir al centro de la ciudad por la tarde.

Siempre hay _____ en el autobús.

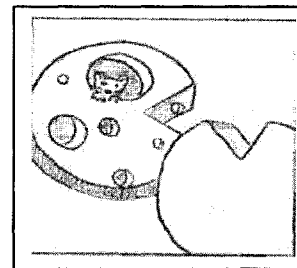
- a. demasiadas gentes
- b. unas gentes
- c. una gente
- d. demasiada gente



6. A mi mamá le encanta el queso bueno.

Voy a regalarle _____ Roquefort.

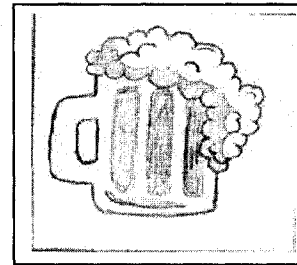
- a. un queso
- b. mucho queso
- c. el queso
- d. queso



7. Paco y Enrique van a la discoteca juntos.

Enrique pide un vaso de vino y Paco _____.

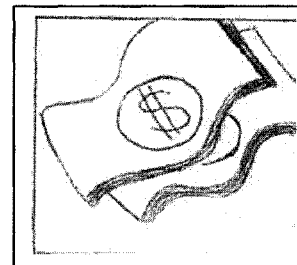
- a. la cerveza
- b. cerveza
- c. una jarra de cerveza
- d. mucha cerveza



8. Mañana es el cumpleaños de mi madre.

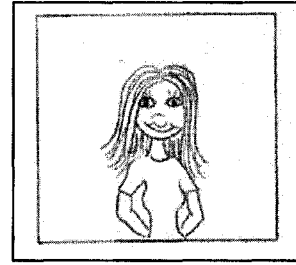
Quiero comprarle un regalo, pero tengo _____.

- a. un dinero
- b. poco dinero
- c. pocos dineros
- d. unos dineros



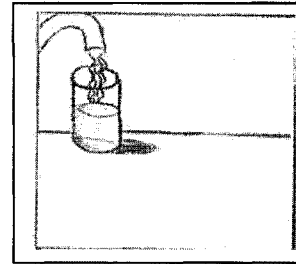
9. La universidad está buscando a alguien que pueda dar clases de español. Le darán el trabajo a _____ más preparada.

- a. personas
- b. la persona
- c. las personas
- d. persona



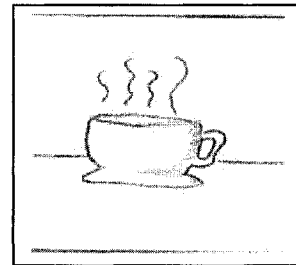
10. Paco y Pablo están en un restaurante y ninguno de los dos bebe alcohol. El camarero les pregunta qué quieren tomar. Paco y Pablo quieren tomar _____.

- a. una agua
- b. aguas
- c. agua
- d. unas aguas



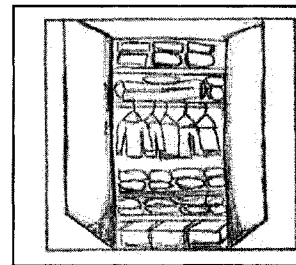
11. Hoy quiero salir a desayunar fuera en vez de comer en casa. Voy a pedir _____ y una napolitana.

- a. café
- b. mucho café
- c. el café
- d. una taza de café



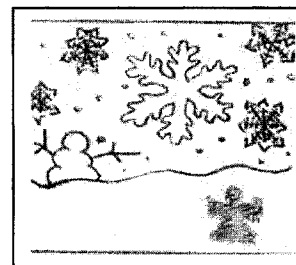
12. No puedo cerrar la puerta del armario. Creo que he puesto _____ adentro.

- a. demasiada ropa
- b. unas ropas
- c. una ropa
- d. demasiadas ropas



13. En Ottawa, hace mucho frío en diciembre. Siempre hay _____ para fin de año.

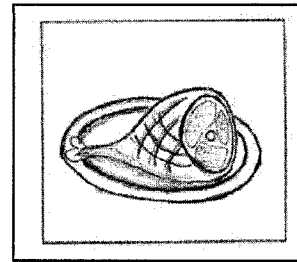
- a. una nieve
- b. nieves
- c. nieve
- d. unas nieves



14. Voy a la casa de mi abuela para cenar.

Ella está cocinando _____ delicioso.

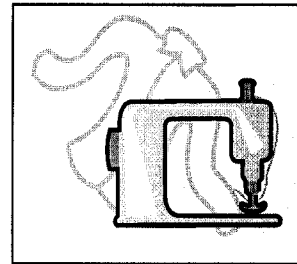
- a. el jamón
- b. un jamón
- c. jamón
- d. mucho jamón



15. Bailo en un espectáculo de danza este fin de semana.

_____ que mi madre me ha diseñado son bonitas.

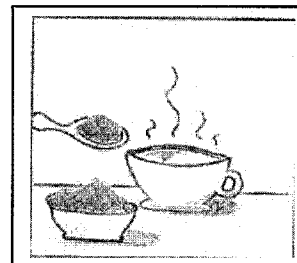
- a. las prendas
- b. prendas
- c. prenda
- d. la prenda



16. Mi abuela prepara café expreso a menudo.

Cuando lo tomo, siempre necesito echar _____.

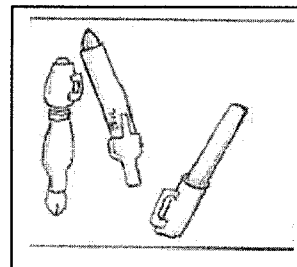
- a. muchos azúcares
- b. un azúcar
- c. unos azúcares
- d. mucho azúcar



17. La profesora quiere corregir las redacciones en casa. Por eso

ha dejado todos _____ rojos encima de su escritorio.

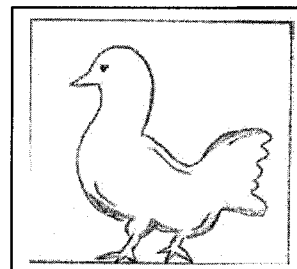
- a. los bolígrafos
- b. bolígrafo
- c. el bolígrafo
- d. bolígrafos



18. Andrés vive en una granja y tiene varios animales ahí.

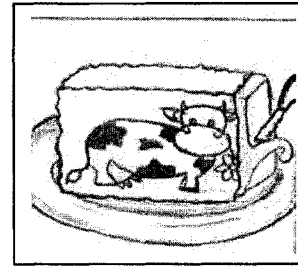
Tiene tres cerdos y _____.

- a. pollo
- b. un pollo
- c. el pollo
- d. mucho pollo



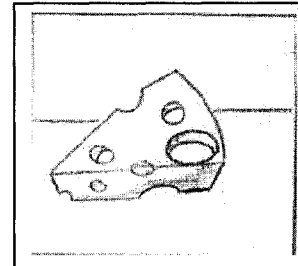
19. Vamos a comer la pasta con salsa picante.
¿Quieres un poco de pan con _____?

- a. unas mantequillas
- b. mantequillas
- c. una mantequilla
- d. mantequilla



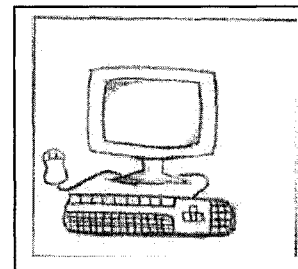
20. Quiero comer un sándwich a mediodía. Voy a poner una hoja de lechuga, dos rodajas de tomate y _____.

- a. mucho queso
- b. el queso
- c. un trozo de queso
- d. queso



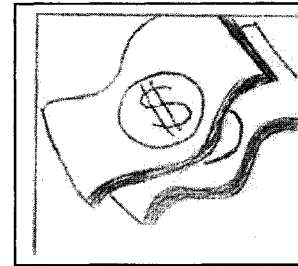
21. No puedo jugar a videojuegos en casa.
_____ que tengo es muy vieja y no tiene mucho RAM.

- a. computadoras
- b. la computadora
- c. computadora
- d. las computadoras



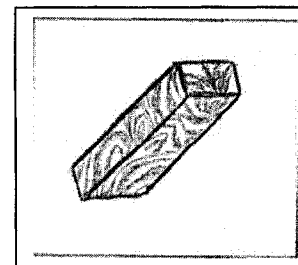
22. Esta tarde vamos a ir de compras.
Necesitamos sacar _____ del banco.

- a. un dinero
- b. dineros
- c. dinero
- d. unos dineros



23. Necesito reparar el armario porqué está roto.
¿Me pasas _____?

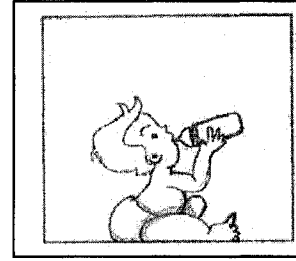
- a. un pedazo de madera
- b. la madera
- c. madera
- d. mucha madera



24. Los bebés comen y beben muchas veces al día.

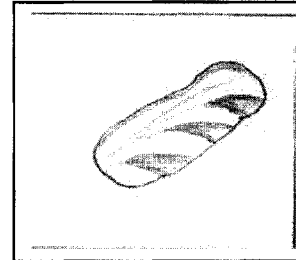
Normalmente los bebés beben _____.

- a. muchas leches
- b. una leche
- c. unas leches
- d. mucha leche



25. La pastelería del pueblo es muy barata. Puedes comprar una docena de pastelitos y _____ por dos euros.

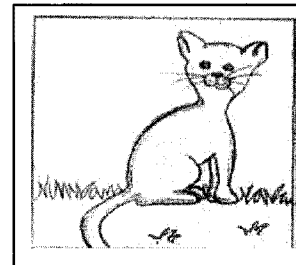
- a. mucho pan
- b. pan
- c. el pan
- d. un pan



26. Ana es supersticiosa.

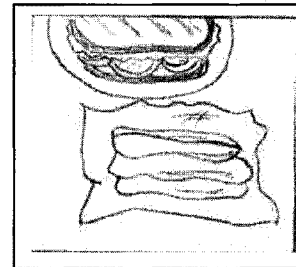
Ella cree que ver _____ negro es un símbolo de mala suerte.

- a. un gato
- b. gatos
- c. gato
- d. los gatos



27. María está en un bar de tapas con sus amigas y le pide al camarero un pincho de tortilla y _____.

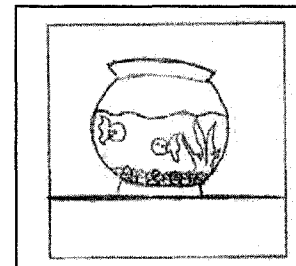
- a. jamón
- b. mucho jamón
- c. un plato de jamón
- d. el jamón



28. Necesito cuidar mejor de mis peces.

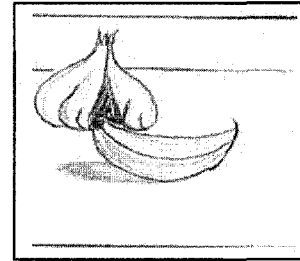
Hay _____ en la pecera y debo llenarla.

- a. unas aguas
- b. poca agua
- c. pocas aguas
- d. una agua



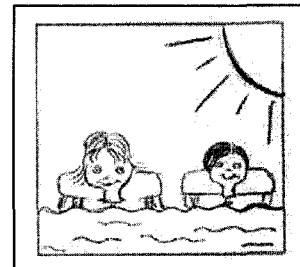
29. Hoy quiero comer pasta. Para preparar la salsa de tomate voy a añadir _____ más .

- a. ajo
- b. el ajo
- c. un ajo
- d. mucho ajo



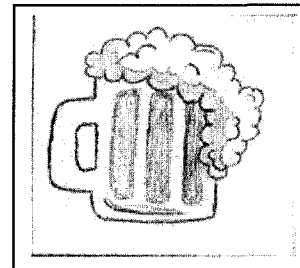
30. Es importante llevar chaleco salvavidas en la canoa.
A veces hay _____ que no sabe nadar.

- a. unas gentes
- b. una gente
- c. gentes
- d. gente



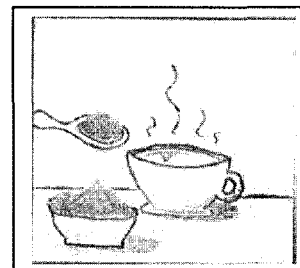
31. Hace mucho calor y tengo sed. Me tomaría _____.

- a. mucha cerveza
- b. una cerveza
- c. la cerveza
- d. cerveza



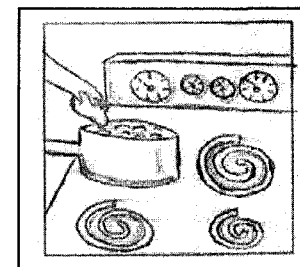
32. Susana va a la casa de Cristina para tomar algo y charlar.
Cristina le pregunta a Susana si quiere _____ con el té.

- a. azúcar
- b. azúcares
- c. un azúcar
- d. unos azúcares



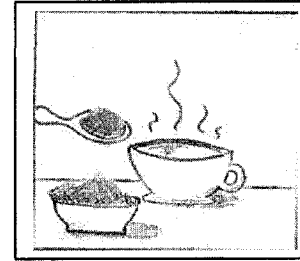
33. Estoy a dieta este mes. Así que para la cena sólo voy a hervir _____.

- a. el pollo
- b. una pechuga de pollo
- c. pollo
- d. mucho pollo



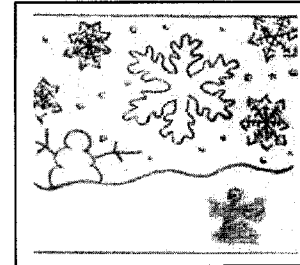
34. Vamos al bar Noche y Día a tomar un café con leche.
_____ del bar vienen en un paquete blanco y negro.

- a. los azucarillos
- b. azucarillo
- c. azucarillos
- d. el azucarillo



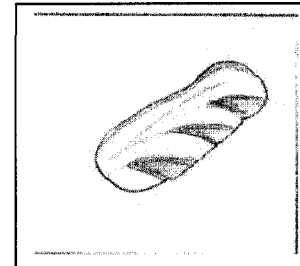
35. Últimamente ha habido muchos accidentes en la autopista.
Es difícil conducir cuando hay _____.

- a. muchas nieves
- b. unas nieves
- c. una nieve
- d. mucha nieve



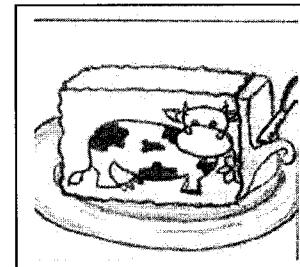
36. Esta mañana he ido al mercado a comprar para el almuerzo.
Me he comprado una lechuga, tres tomates y _____.

- a. mucho pan
- b. pan
- c. una barra de pan
- d. el pan



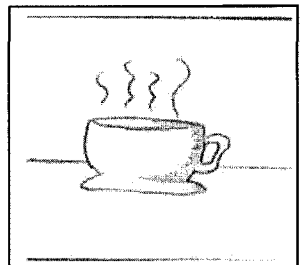
37. No quedan cereales ni pan para el desayuno.
Quiero preparar crepes pero hay _____.

- a. poca mantequilla
- b. una mantequilla
- c. unas mantequillas
- d. pocas mantequillas



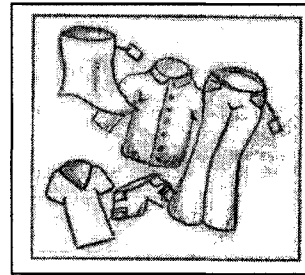
38. Siempre tengo sueño por las mañanas.
Necesito tomarme _____ antes de ir a trabajar.

- a. mucho café
- b. café
- c. un café
- d. el café



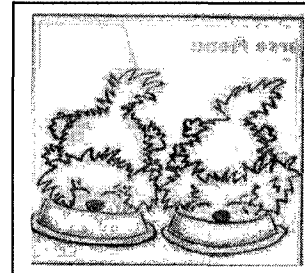
39. Después de terminar el año escolar voy a trabajar en una empresa.
Necesito comprarme _____.

- a. unas ropas
- b. ropa
- c. ropas
- d. una ropa



40. A muchos animales les gusta jugar en la nieve.
_____ esquimales viven al aire libre en Nunavut.

- a. el perro
- b. perros
- c. perro
- d. los perros



APPENDIX X
Chapter Five: Raw Data Tables

TRANSLATION TASK RAW DATA

Table 5.6b Translation task: condition 1, bare mass nouns.

	Target	Count	Inaccurate	Omission	Total
Level 1	182	3	12.0	0	200.0
Level 2	184	6	7	3	200
Level 3	143	2	3	2	150

Table 5.7b Translation task: condition 2a, mass nouns with indefinite quantifiers.

	Target	Count	Inaccurate	Omission	Total
Level 1	67	1	25	7	100
Level 2	88	0	10	7	100
Level 3	63	0	11	1	75

Table 5.8b Translation task: condition 2b, count nouns with indefinite quantifiers.

	Target	Mass	Direct	Inaccurate	Omission	Total
Level 1	56	32	0	4	8	100
Level 2	63	21	1	7	8	100
Level 3	53	17	1	0	4	75

Table 5.9b Translation task: condition 3a, equivalent flexible nouns with indefinite determiners.

	Target	Mass	Inaccurate	Omission	Total
Level 1	74	15	6	5	100
Level 2	86	8	3	3	100
Level 3	65	4	3	3	75

Table 5.10b Translation task: condition 3b, non-equivalent flexible nouns with indefinite determiners.

	Target	Mass	Direct	Inaccurate	Omission	Total
Level 1	13	47	13	19	8	100
Level 2	29	32	25	9	5	100
Level 3	27	19	16	6	7	75

Table 5.11b Translation task: condition 4, mass nouns with a classifier.

	Target	Mass	Count	Inaccurate	Omission	Total
Level 1	169	1	2.0	20.0	8	200
Level 2	182	1	0	7	10	200
Level 3	136	2	0	7	5	150

TRANSLATION TASK RAW DATA

Table 5.12b Condition 2a results per individual item for all three levels.

Item N	Target	Count	Inaccurate	Omission	Total
8	33	1.00	15.00	6.00	55.00
21	34.00	0	18.00	3.00	55.00
25	44	0	10.00	1.00	55.00
37	55	0	0	0	55.00
42	52.00	0	3.00	0	55.00

Table 5.13b Condition 2b results per individual item for all three levels.

Item N	Target	Mass	Direct	Inaccurate	Omission	Total
2	13.00	36.00	0	2.00	4.00	55.00
20	33.00	6.00	0	4.00	12.00	55.00
24	52.00	0	0	3.00	0	55.00
34	21.00	28.00	2.00	1.00	3.00	55.00
41	53.00	0	0	1.00	1.00	55.00

Table 5.14b Condition 3a results per individual item for all three levels.

Item N	Target	Mass	Inaccurate	Omission	Total
7	47.00	7.00	0	1.00	55.00
10	52.00	0	3.00	0	55.00
18	47.00	3.00	2.00	3.00	55.00
38	55	0	0	0	55.00
26	24.00	17.00	7.00	7.00	55.00

Table 5.15b Condition 3b results per individual item for all three levels.

Item N	Target	Mass	Direct	Inaccurate	Omission	Total
3	21.00	8.00	23.00	2.00	1.00	55.00
14	9.00	30.00	13.00	1.00	2.00	55.00
32	13.00	2.00	1.00	24.00	15.00	55.00
35	7.00	47.00	0	0	1.00	55.00
44	19.00	11	17.00	6.00	2.00	55.00

MULTIPLE CHOICE TASK RAW DATA

Table 5.16b Multiple choice task: condition 1, bare mass nouns.

	Target	PL BN	SG ID	PL ID	TOTAL
Level 1	110	15	16	19	160
Level 2	135	13	5	7	160
Level 3	106	4	5	5	120
Control	80	0	0	0	80

Table 5.17b Multiple choice task: condition 2, mass nouns with indefinite quantifiers.

	Target	PL QP	SG ID	PL ID	TOTAL
Level 1	125	22.00	7.00	6	160
Level 2	143	13	3	1	160
Level 3	110	6	3	1	120
Control	80	0	0	0	80

Table 5.18b Multiple choice task: condition 3, flexible nouns with indefinite determiners.

	Target	BS	SG QP	D	TOTAL
Level 1	97	17.00	21.00	25	160
Level 2	107	31	8	14	160
Level 3	89	12	13	6	120
Control	62	13	4	1	80

Table 5.19b Multiple choice task: condition 3a, equivalent flexible nouns with indefinite determiners.

	Target	BS	SG QP	D	TOTAL
Level 1	58	5.00	11.00	6	80
Level 2	61	14	4	1	80
Level 3	51	2	7	0	60
Control	40	0	0	0	40

Table 5.20b Multiple choice task: condition 3b, non-equivalent flexible nouns with indefinite determiners.

	Target	BS	SG QP	D	TOTAL
Level 1	39	12.00	10.00	19	80
Level 2	46	17	4	13	80
Level 3	38	10	6	6	60
Control	22	13	1	1	37

MULTIPLE CHOICE TASK RAW DATA

Table 5.21b Multiple choice task: condition 4, mass nouns with classifiers.

	Target	BS	SG QP	D	TOTAL
Level 1	106	13.00	7.00	34	160
Level 2	120	21	4	15	160
Level 3	88	16	2	14	120
Control	64	6	2	8	80

Table 5.22b Multiple choice task: condition 3a results per individual item for levels one to three.

Item	Target	Bare mass	Mass with indefinite quantifier	Definite article	Total
14. un jamón	47.00	5.00	0	3.00	55.00
18. un pollo	51.00	2.00	2.00	0	55.00
31. una cerveza	40.00	4.00	8.00	3.00	55.00
38. un café	32.00	10.00	12.00	1.00	55.00

Table 5.23b Multiple choice task: condition 3b results per individual item for levels one to three.

Item	Target	Bare mass	Mass with indefinite quantifier	Definite article	Total
2. una madera	25.00	15.00	7.00	8.00	55.00
6. un queso	25.00	9.00	1.00	20.00	55.00
25. un pan	33	9.00	8.00	5.00	55.00
29. un ajo	40.00	6.00	4.00	5.00	55.00