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Is this an *ice house* or a *house of ice*? A study of the production, judgment and interpretation of English NN compounds in L1 Spanish L2 English adults.

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ABSTRACT

This dissertation investigates how English noun-noun (NN) compound properties such as directionality, productivity and semantic interpretation are used by two groups of L1 Spanish L2 English adults with different proficiency levels: B2 and C2. English NN compounds differ from Spanish ones in directionality and productivity. Therefore, B2 participants are predicted to show more problems when producing and judging compounds due to the influence of the L1 while C2 participants are expected to not have these difficulties. Moreover, the dissertation attempts to shed light on the semantic relations implied when interpreting novel NN compounds in order to establish a hierarchy that may account for any differences between both groups. The results show that both groups of participants have a high success rate when producing and judging NN compounds and that the role transfer plays is not crucial. The data also demonstrate that both groups favor the same semantic relations and in the same hierarchical order. The lack of important differences between the two proficiency groups suggests that in this area of grammar neither proficiency nor L1 influence affect the L2 grammar.

Keywords: Bilingualism, directionality, NN compounds, productivity, semantics, transfer.

RESUMEN

El objetivo de este estudio es investigar cómo los hablantes de L1 español L2 inglés con distintos niveles de competencia en la L2 (B2 y C2) hacen uso de las propiedades que caracterizan a los compuestos nominales (NN) en inglés: direccionalidad, productividad e interpretación semántica. Dichos compuestos se diferencian de los españoles en direccionalidad y productividad y, en este caso, la predicción es que el grupo de nivel B2 tenga más problemas al producir y juzgar los compuestos NN por la influencia de su L1, mientras que el grupo de nivel C2 no presentará esta dificultad. En lo que respecta a las relaciones semánticas, este estudio aborda cuáles son las que más se favorecen al interpretar compuestos NN noveles con objeto de establecer una jerarquía que muestre las diferencias entre los dos grupos de hablantes. Los resultados demuestran que ambos grupos tienen un índice de éxito alto al producir y juzgar estos compuestos, que la transferencia de la L1 es insignificante, y que además ambos grupos favorecen las mismas relaciones semánticas y en el mismo orden jerárquico. La falta de diferencias importantes entre los dos grupos sugiere que en esta área gramatical ni el nivel de competencia ni la influencia de la L1 juegan un papel en la gramática de la L2.

Palabras clave: Bilingüismo, compuestos NN, direccionalidad, productividad, semántica, transferencia.

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FOREWORD: CONTEXTUALIZATION OF THE DISSERTATION

The present undergraduate dissertation is the final formal requirement to complete the degree in English Studies at the University of Valladolid. It is related to contents in the A2 subject "Scientific description of the English Language" as in the official description of the English degree (Universidad de Valladolid 2009: 39).

More specifically, this dissertation is on Noun-Noun compounds (i.e. NN compounds). I have chosen this particular aspect of the English grammar because I think it is problematic for those who speak English as a second language (L2). This means that the analysis of NNs and of how Spanish speakers learning English produce, judge and interpret this type of structure could provide me with very useful information at least in three respects. First, as a non-native speaker, doing research on this specific area will help me master it; second, as a researcher, I will be familiar with the research procedure of analyzing previous works, deciding on my own research questions, designing my own test and codifying and interpreting the data I have elicited, all this with respect to this problematic area of grammar; and third, as a future English teacher, knowing where some grammar difficulties lie and how they could be overcome will make me aware of them and worth considering as part of my teaching methodology.

This dissertation has offered me the opportunity to undertake independent research on a specific grammar topic (i.e. NN compounds in English) and has enabled me both to explore this topic in more depth than in an assignment essay and to point to how the teaching of English as an L2 could be benefited from a grammatical analysis. Since research and teaching are the two most common professional activities related to the degree in English Studies, I have connected both in my dissertation as a possible way to guide my future professional career.

In this dissertation I have integrated and applied the main competences acquired in the different courses along the degree. More precisely, through the

elaboration of the present dissertation I have had to use the general and specific competences described below and which are also reflected in the official description of the English degree.

While working on NN compounds, I have initially carried out a bibliographical search using the resources available in the faculty library, both on-line and off-line, as well as internet resources such as articles, books and web sites. This has strengthened both general and specific competences like the following:

- Capacity to analyze and systematize conceptualization and abstraction.
- Ability to manage technological means and resources.
- Research skills: investigation techniques and documentation.
- Skills on managing information.
- Ability to identify, manage and synthesis bibliography.
- Ability to manage specific technological means and resources related to the main professional possibilities of the degree.

Although I have been working under the supervision of my tutor, I have been able to develop my own research work by eliciting new linguistic data whose analysis is presented in this dissertation. This way of working reflects general competences such as the following:

- Autonomous learning.
- Ethic, critic and constructive spirit.
- Ability to solve problems.

1. INTRODUCTION

The present study focuses on Noun-Noun compounds (i.e. NN compounds). More specifically, it is concerned with how L1 Spanish L2 English speakers, organized according to two distinct proficiency levels (i.e. B2 and C2), perceive and interpret the directionality, productivity, and semantics of English NN compounds.

English NN compounds differ from Spanish NN compounds in two main areas: their directionality and productivity. These syntactic properties have been widely discussed by scholars such as Bauer (1983), Matthews (1991), Piera (1995) and Snyder (2001) among others. Directionality covers the syntactic organization in terms of headedness: that is, which of the two nouns making up the compound is the head and in which position the head is placed. Productivity deals with the frequency of such constructions in the language. English NN compounds are right-headed (e.g. *bomb car* and *kitchen table*) and highly productive. In contrast, Spanish NN compounds are left-headed (e.g. *coche bomba*) and are not productive; instead of an NN compound, an alternative construction such as a Prepositional Phrase (i.e. PP) or a relative clause is preferred in Spanish (e.g. *mesa de cocina*). Therefore, the purpose of the present undergraduate dissertation is to account for how L1 SP L2 EN learners produce and interpret English NN compounds, given the different properties between English and Spanish NN compounds.

In addition to these two syntactic properties, the semantics of NN compounds have been a subject of discussion among scholars (Lees 1966, 1970; Downing 1977; Carstairs-McCarthy 2002, 2005; Krott et al. 2009; and Giegerich 2015 among others). The traditional approach of using thematic roles to classify the meaning relations between the modifier and the head in a compound (Lees 1966 and 1970) was proved to be inadequate and thus was replaced by the use of different verbs and prepositions that would render a more accurate and detailed interpretation of the meaning of NN compounds (Downing 1977). In other words, rather than using thematic terms like PATIENT or AGENT, verbs like HAVE or MADE OF were proposed. Following this interpretative approach, this dissertation also aims to establish the semantic

relations favored by L1 Spanish L2 English learners when interpreting novel NN compounds.

Considering these syntactic and semantic features of NN compounds (e.g. directionality and productivity, on the one hand, and the semantic relations between the two nouns in a compound, on the other), I formulated some research questions that I will answer by carrying out an empirical study. The data used for the analysis have been elicited based on three tasks that I have designed for this study: a production task, a force choice task (i.e. FCT), and an interpretation task.

This dissertation is organized into 7 sections (i.e. §) in addition to this introductory section. § 2 presents a revision of the linguistic theory concerning compounds: 2.1. provides a general overview of compounds and then narrows the subject to endocentric NN compounds, while 2.2. examines the defining properties of endocentric NN compounds that will be analyzed in the empirical part (i.e. directionality, productivity and semantics). § 3 presents a revision of previous empirical studies made in the context of endocentric NN compounding in English: 3.1. deals with monolingual L1 English acquisition, whereas 3.2. refers to L2 bilingual acquisition. § 4 is where the predictions and the research question to be tested are formulated. In § 5 the empirical study performed is described: 5.1. contains information about the participants; 5.2. provides details about the method and materials used for the tasks; and 5.3. displays the results obtained and an analysis of the data. § 6 covers the general discussion of the data in light of the initial predictions and research questions. Finally, § 7 offers a conclusion of the study. These sections are followed by a works cited section with the bibliographical references used to elaborate this analysis. The CD attached to this undergraduate dissertation includes both a document with the three tasks used for the study and the excel with the database designed to codify and analyze the data.

2. COMPOUNDS: THEORETICAL DESCRIPTION
2.1. A GENERAL OVERVIEW

A compound is a combination of two words that results into a new word. These two words function as a single unit both morpho-syntactically and semantically (Matthews 1991). Examples of compounds can be found in (1)[1]:

(1) a. *greenhouse*
b. *boyfriend*
c. *truckdriver*

In (1a) *greenhouse* is made out of an adjective *green* and a noun *house*, but, as a compound, it is syntactically labeled as a noun, and defined as 'a building with a roof and sides made of glass, used for growing plants that need warmth and protection' (Cambridge Dictionary Online 2016). (1b) *boyfriend* consists of two nouns, *boy* and *friend* and denotes 'a man or boy that a person is having a romantic or sexual relationship with', that is, the biological gender of the friend (Cambridge Dictionary Online 2016). Similarly, (1c), *truckdriver*, is also composed of two nouns, *truck* and *driver*, whose meaning is 'person who drives a truck as a means of earning a living' (The Free Dictionary 2016).

As we can infer from the examples in (1), most compounds are made of free roots, that is, the two root words that make up the compound can also be found on their own (i.e. *boy*, *friend*, *truck*, or *driver*). However, there are also some compounds formed by two or more bound roots, which, contrary to free ones, need to be attached to another root to occur grammatically. However, as argued by Carstairs-McCarthy (2002), "in the light of the English language's preference for free roots, they [bound roots] are not nearly so common as ordinary compounds" (21). These bound roots are typically words coming from Greek or Latin and denote technical or scientific terms like those in (2):

[1] Although the lexicalization of compounds is connected to spelling (i.e. lexicalized compounds are often spelt as one word), there is no agreement among grammarians and the same compound can be spelt as one word, as two independent words or as two words linked by a hyphen: *health care* is spelt as two independent words in the Cambridge English Dictionary (2016) whereas it appears as a single word (e.g. *healthcare*) in the Oxford English Dictionary (2016).

(2) a. *lexicography*
b. *microfilm*

Bauer (1983: 213) and Carstairs-McCarthy (2002: 21) refer to this type of bound root compounds as "combining forms". A special case of bound roots is illustrated in (3):

(3) a. *cranberry*
b. *huckleberry*
c. *blueberry*
d. *strawberry*

In (3a), *cran-* needs to be attached to the morpheme *berry*. It is interesting, though, to mention that *cran-* as well as *huckle-* (in *huckleberry* in (3b)) do not exist as separate items and cannot be found in any other words. Similarly, *straw-* as an isolated word has nothing to do with the meaning *strawberry* (3d). In addition, in (3c), although *blue-* is indeed a free root, it does not really add meaning to *-berry* because blueberries are actually blackish. These are the so-called cranberry morphemes: "a morpheme that occurs only in one word or phrase" (Carstairs-McCarthy 2002: 142).

The examples in (1) to (3) above show that there are, in fact, different kinds of compounds depending on issues such as the form of the word roots they are made of. So, for instance, as in (1) above and (4) below, compounds could be noun-noun (NN) compounds (1b), deverbal compounds (verb+noun; (1c) and (4a)), adjectival compounds (noun+adjective; (4b)) and verbal compounds (particle+verb; (4c)):

(4) a. *scarescrow* (VN)
b. *navy blue* (NA)
c. *overflow* (PV)

In the present undergraduate dissertation, I will focus on NN compounds as it is the most productive compounding process in English. NN compounds are those made of two nouns, as it can be observed again in (5):

(5) a. *table cloth*
b. *pencil case*
c. *snow seat* (Krott et al. 2009: 27)

These compounds, as section 2.1. below shows, are often referred to as endocentric compounds given that there is a hierarchical relation between the two nouns that make up the compound: the noun to the right is the head of the compound and determines the syntactic category the compound belongs to and the noun to the left is the modifier. That is, the lexical category of an A-B compound is determined by the lexical category of B and not by that of A. This is what is called the Right Hand Head Rule (RHHR) as proposed by Williams (1987) quoted in Hoeksema (1992). The RHHR can be seen at work when building new NN compounds like the one in (5c) and when comparing them to related compounds such as *baby sit* (Huddleston and Pullum 2005: 283). Regardless of the meaning we attribute to these words, what is clear is that *snow seat* in (5c) is a noun while *baby sit* is a verb.

As already suggested by Bloomfield (1933: 235), compounds are classified into endocentric and exocentric. The former constitute the focus of the present work and are those comprised of a modifying element and a head. What is more, usually, the relation between the two elements in endocentric compounds is that of hyponymy, as portrayed in (6):

(6) a. *computer screen* = 'a kind of screen, that of computers'
b. *compúter screen* /kəm'pju:tər ˌskri:n/

As already mentioned in the previous section, it is important to notice that the head in an English compound is the right hand element (*screen* in (6)), even though, in terms of phonological articulation, it is not the head that is stressed but the modifier (*computer*), as represented in (6b). This word order between the two nouns in an NN compound correlates with the typical English word order in determiner phrases: adjectives and even nouns pre-modify the lexical head of the phrase, that is, the noun in a Determiner Phrase (DP), as in (7):

(7) a. $[_{DP}\,[_{AP}\,\textit{white}]\,\textit{cloud}]$
b. $[_{DP}\,[_{DP}\,\textit{office}]\,\textit{hour}]$

Nevertheless, the RHHR applies only in the case of endocentric compounds. Some compounds do not have an internal head and so they lack a hyponymy relation. These types of compounds are called exocentric. Exocentric compounds fail the hyponymy test. This means that the lexical category of an A-B compound is neither A nor B, but C somehow associated with both A and B (Bauer 2008). This is illustrated in (8):

(8) *pickpocket*

In (8) the RHHR does not apply as no hierarchical relation is established between the two words that make up the compound; otherwise, *pickpocket* would be a noun instead of a verb and it will refer to a type of pocket.

All this classification of compounds is not particular of English, but can be applied to other languages such as Spanish, which is also involved in this dissertation. For instance, this can be seen in the examples in (9):

(9) a. *hombre-murciélago* = man bat = 'batman'
b. *bocamuelle* = mouth spring = 'tender mouthed'

(9a) is an endocentric compound because its head is the noun *hombre* and its modifier is the noun to its right *murciélago*. This illustrates, as it has already been argued, that the RHHR is not universal but language specific and so compounds in some languages, like Spanish, are not right-headed but left-headed. This will be further discussed in the next section (§ 2.2.) when talking about the directionality of compounds. As to (9b), it is made of two nouns *boca* and *muelle* but neither of them is the head, as it is an adjective, so, therefore, (9b) illustrates an exocentric compound.

Once the focus of the present work is established, section 2.2. below presents a closer look into the grammatical features of endocentric NN compounds.

2.2. THE DEFINING FEATURES OF ENDOCENTRIC NN COMPOUNDS

As suggested in § 2.1. several classifications of NN compounds have been proposed and these can generally be broken into two main blocks: syntactic and semantic classifications. Although an initial methodological distinction is often made between these two blocks, we will see below that they are connected; that is, that a combination of both syntactic and semantic features is in fact necessary to present a grammatical classification of NN compounds.

A significant syntactic property of NN compounds is productivity. As accounted for by many scholars (Downing 1977, Snyder 2001, Nicoladis 2002, Carstairs-McCarthy 2002 and 2005, Krott et al. 2009 and Nakov 2013 among others), compounding is one of the most productive morphological processes in English. Not every single coined compound is lexicalized as many are created *ad hoc*.

Snyder (2001) argues that productive NN compounding is a parametric property of English that is associated to the production of complex predicates like the *put*-locative one in (10):

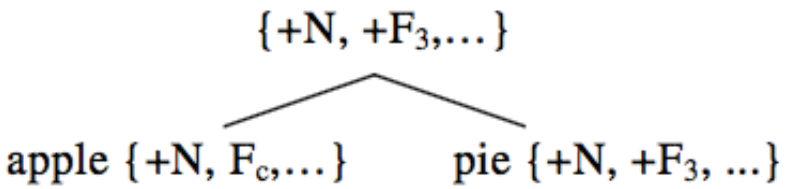
(10) Peter put his hand on the moon.

According to Snyder (2001: 328) "English complex predicates involve certain morphological compounding at an abstract level" and, therefore, the acquisition of complex predicates correlates with the acquisition of compounds. As a result, Snyder proposes the compounding parameter according to which "the grammar [disallows*, allows] the formation of endocentric compounds during the syntactic derivation. [*unmarked value]" (2001: 328). In other words, endocentric compounds in English are productive because they are the result of underlying syntactic operations. This does not apply cross-linguistically, though, as suggested in the compounding parameter: i.e. Romance languages have no complex predicates and thus no productive NN compounding. Regarding this, we could classify languages as [+compounding] or [-compounding], Germanic languages being [+compounding] and Romance languages [-compounding]. In

other words, English compounding is very productive as it exhibits the [+compounding] feature, whereas endocentric NN compounding in Spanish is unproductive revealing the [-compounding] feature.

A second aspect regarding the syntax of compounds has to do with directionality and structure. As suggested by Piera (1995), taking into account that the source of a compound is a noun plus its grammatical and semantic features, we can apply X' theory to the analysis of compounds. This account proves that it is not the features of the left-hand element in a compound that have to project, but those features of the right-hand element. That is, the compound adopts the features of the head. This is related to the "standard adjunction structure" (Piera 1995: 3) which also highlights that compounds behave like syntactic phrases as they can have different layers. Example (11) has been taken from Piera (1995: 3) to illustrate this:

(11)



The tree in (11) shows that the compound *apple pie* has the features [+N] [+F_3]. These are the features that the compound takes from *pie*. Therefore, this indicates that it is the right hand element that projects as its features are available for the entire compound.

Directionality has to do with Piera's (1995: 5-6) double bracket restriction (DBR) according to which "a double bracket at the edge of a word blocks adjunction of a word" iff (i.e. if and only if) the head of the compound has a double bracket to the left. In other words, all compounds in English comply with the DBR as the head has a single bracket to its left, as seen in (12):

(12) a. [$_{DP}$ *engine* [$_{DP}$ *oil*]]
b. [$_{DP}$ *finger* [$_{DP}$ *tip*]]

In (12), the double bracket appears to the right of the noun head (*oil* in (12a) and *tip* in (12b)) but, since adjunction of subsequent modifiers to the compound is done to the left, this is not a problem, as no double bracket appears to the left of the compound. In addition, this correlates with recursiveness in English: as the head of the compound has only one bracket to the left, we can compound a compound further, as in (13):

(13) a. [$_{DP}$ *car* [$_{DP}$ *engine* [$_{DP}$ *oil*]]]
b. [$_{DP}$ *chocolate* [$_{DP}$ *finger* [$_{DP}$ *tip*]]]

In (13a), *engine oil* has one bracket to its left, and so more elements can be added: e.g. *car*. In this case the recently added element is incorporated to form a second compound. Likewise, in (13b) the head *finger tip* has a double bracket to its right, but a single bracket to its left which enables adjunction of another noun, *chocolate*, to create a different compound. In fact, as Piera (1995) argues, "the addition of any simple items in English will only increase the depth of embedding of the compound head, not the number of brackets at the leftmost edge of the compound" (6). All this indicates that compounds in English can be extended leftwards.

In addition to the directionality of English NN compounds, Piera (1995) considered Spanish NN compounds. He acknowledged that English and Spanish NN compounds differ in two essential ways: English compounds are right-headed, whereas Spanish are left-headed; and English compounds are recursive, while Spanish ones are not. He argues that Spanish nouns have the structure illustrated in (14):

(14) [[X]$_{d}$ Y]$_{I}$ (Piera 1995: 5)

Piera (1995) changes this structure, in which *d* means derivation and *i* inflection (i.e. X is the head, and Y the modifier), to introduce what he calls "word marker" (WM) (1995: 4) used to mark inflection. Thus, a noun like *manzana*, and a compound like *manzana tarta* (i.e. an apple which is a pie) are represented as in (15a,b) (Piera 1995: 5):

(15) a. [[Manzan] WM] WM=a
b. [[Manzan] WM] [[Tart] WM] WM=a
c. *[postre [[manzan]a] [[tart]a]]

(15a) provides a typical representation of a noun in Spanish: that is, the head is *manzan(a)* while the WM indicates the inflection of the head, which is why it has a double bracket to its left. As it is seen in example (15b), Spanish nouns have a double bracket to their left which makes adjunction of a modifier to the left impossible, as the ungrammaticality of (15c) shows; in other words, the DBR ensures binary combinations as only one word (i.e. *tarta* in (15b)) can be added to the right of the head of the compound (i.e. *manzana* in (15b)). Therefore, the WM proposal marks the head directionality in Spanish and this WM also predicts lack of recursiveness.

An alternative structural analysis to the one proposed by Piera (1995) derives from a transformational approach like the one adopted by Lees (1960, 1966, 1970), Levi (1973, 1974, 1975) and Matthews (1991). As Matthews explains, "in the transformational model, sentences or other forms with similar meanings are related formally by rules which derive one structure from another" (1991: 86-87). Taking this into account, Lees, for instance, considers that compounds derive from deep syntactic structures like subject-predicate or subject-object. However, he does not provide any explanation for the grammatical relations that he establishes and also, as Downing (1977) criticizes, he proposes a number of transformation rules that delete any underlying structure. He later tries to give a different account introducing a more semantic description. He analyzes compounds using thematic roles (e.g. AGENT, PATIENT, INSTRUMENT, THEME etc.) and "generalized verbs" underlying the structure of compounds (Lees 1970: 128). What Lees meant with the term "generalized verbs" was "the minimal set of semantic features which characterize all variants in the sets: *impel, propel, energize, activate, power, drive, actuate* etc., or *cause, engender, produce, yield*..." (1970: 128). That is, according to his analysis, the unmarked structure of a compound looks like that in (16):

(16) *steam engine* ➔ instrument_{N1} energizes_{V} patient_{N2}

In (16), *steam* is assigned the role of INSTRUMENT because it is the means through which the event of energizing is effected. *Engine* is materially affected by this event and thus given the role of PATIENT. The verb *energize* underlies the surface structure of the compound because, to establish a semantic relation between *steam* and *engine,* an event verb with two arguments is needed. In spite of his effort, his proposed semantic underlying structures do not differ much from his work in 1960.

Levi (1973, 1974, 1975) proposes that compounds are derived from reduced relative clauses and complement structures due to deletion of the predicate or nominalization. Regarding the deletion of predicates of relative clauses, they are deleted because of their semantic primitiveness and she enumerates the number of predicates to seven and later to twelve (Levi 1978) which are very similar to Lees' generalized verbs: e.g. *cause*, *have*, *be*, *use*, *for*, *in* etc. In the case of nominalization, "the underlying predicate survives overtly in the head noun, with the modifier deriving from either the subject or object of the underlying S [sentence]" (Levi 1974: 404). However, both criteria she proposes overlap as a compound resulting from predicate deletion can also fit in the nominalization process, such as that in (17):

(17) *battle fatigue* ➔ fatigue that is caused by the battle = CAUSE
[[battle]$_{\text{Subject}}$ [causes fatigue]$_{\text{Verb Phrase}}$]$_{\text{Sentence}}$

In addition, she maintains that only subjects or objects can become the first member of a compound and does not admit that others such as instrumentals or locatives can also be. Therefore, she tries to limit ambiguity but there is indeed vagueness in the underlying predicates she proposes. These syntactic analyses already anticipate that there is an intersection between the syntax and semantics of compounds because in fact their semantics will result from the syntactic structure we assign to the compound.

Even though it seems clear that compounds can be derived from sentences, Downing (1977) argues that compounds do not actually come from

them because of the distinct functions each one has. Overall, sentences can serve truth conditions, whereas compounds refer and do not assert. Furthermore, establishing the meaning of a compound with a paraphrase does not mean that the compound has to be derived from an underlying structure. In addition to this, as suggested by Giegerich (2015) who follows a lexicalist model, as nominalizations are not derived transformationally due to the amount of semantic content included in the nouns, the same is applied to compounds. He claims that "while sentences are uttered and then forgotten, words have a more permanent existence. Words are coined and then often retained […]" (Giegerich 2015: 99).

Regarding the semantics of compounds, we need to note that most compounds do not have a compositional meaning. Several possible approaches have been made regarding the semantics of compounds. We can think of syntagmatic sense relations as constraining combinability between expressions in the syntax, and as compounds are said to be the result of syntactic structures, we can apply theta roles to the interpretation of compounds. This is what Lees (1970) does and is illustrated in example (16). A similar approach is the one adopted by Warren (1978) quoted in Nakov (2013: 20) where Warren included relations such as CAUSALITY (case, effect and purpose), PARTICIPANT (agent, beneficiary, instrument and possessor), QUALITY (container, continent, material), SPATIAL (source, goal, locative) and TEMPORALITY. According to this analysis example (18) should be interpreted as follows:

(18) *bird sanctuary* = locative and therefore SPATIAL

Another possible classification is Vanderwende's (1994) also quoted in Nakov (2013: 20). Vanderwende's proposal focuses on wh- questions and their corresponding semantic arguments depending on the syntactic function they would play in a potential sentence. Some of these questions are *what*/*who* (subject: AGENT, THEME, INSTRUMENT), *what*/*whom* (object: PATIENT, THEME), *how* (INSTRUMENT), *what does it cause* (CAUSE), *what causes it* (caused-by), *where* (location: SOURCE, GOAL, LOCATIVE) and so on.

Following this approach, we could interpret example (18), repeated here as (19), as it is shown below:

(19) *bird sanctuary* = location, answers the question *where?*

A similar analysis is the one proposed by Krott et al. (2009). In their study, they try to demonstrate that it is the frequency between head and modifier as well as the familiarity with the elements of a compound that influences the interpretation of compounds. They examine the semantic relations between modifiers and heads in sets of compounds, and so they divide compounds into modifier families and head families. The former is made of all compounds containing a particular noun as modifier, as shown in (20a), and the latter consists of the set of compounds whose head is the same noun, as illustrated in (20b). The combination of modifier and head families builds fixed patterns that are used to interpret novel NN compounds.

(20) a. apple X (*apple tree*, *apple juice*, *apple bag*, etc.)
b. X juice (*berry juice*, *fruit juice*, *apple juice*, etc.)

Head families provide subcategorization of the head whereas modifier families provide how the head is modified and the semantic role there is between both elements. To illustrate this, example (21) is shown below:

(21) a. *apple box*: 1. type of box
2. box $_{\text{LOCATIVE}}$ FOR apples $_{\text{THEME}}$
b. *chocolate box*: 1. type of box
2. box $_{\text{PATIENT}}$ MADE OF chocolate $_{\text{THEME}}$

The semantic analysis proposed by Krott et al. (2009), as illustrated in (21), reveals that the semantic analysis of compounds, in fact, goes beyond the characterization of semantic roles such as locative, patient or theme. In particular, the relationship between the noun head in (21a) and (21b) and their corresponding noun modifiers is semantically different (i.e. FOR versus MADE OF) in spite of both having noun modifiers with the same semantic role (i.e. THEME).

An alternative analysis on compounding is offered by Downing (1977) who focuses on the functional status of the compounding process. Before carrying out her study, Downing assumes that (a) "[a]ny adequate theoretical model for nominal compounding should be able to account for the generation of all the semantic or syntactic generation classes of existing nominal compound" (1977: 816); (b) the semantic content of a compound should be paraphrasable by a sentence; (c) the underlying syntactic and semantic structures of compounds are finite and can be identified by looking at lexicalized compounds; and (d) compounding is productive.

In her study, she tries to discover the conditions of compounding looking at novel compounds and evaluating "the nature and relative frequency of the semantic relationships underlying attested but non-lexicalized compounds" (Downing 1977: 817). The results prove that there are indeed interpretative constraints as there must be a clear relation between modifier and head but these two elements must not co-occur. That is, the two elements in the compound have to be closely related, and they must not be contradictory or tautological but have separate and exclusive functions. This can be seen in (22):

(22) a. *#vegetable desk*
b. *#table desk*

(22a) shows a lack of association between *vegetable* and *desk*. A *desk* is not MADE OF vegetables, exclusively FOR vegetables, or look LIKE vegetables. Thus, it is semantically odd. As to (22b), its semantic anomaly resides in the fact that the two elements denote similar entities; in fact, *desk* is a hyponym of *table*. Therefore, there is co-occurrence.

In addition, she finds that there is an infinite set of compounding relations but these can be narrowed to a limited set of categories. What is more, she observes that "a small set of relationships is generally favored; and the appropriateness of a given relationship is also dependent on its permanence, its predictability in context, and on the semantic class of the head noun" (1977: 836). In other words, she proposes that although compounds should not have a completely predictable relation between their parts, interpretability has to be

guaranteed taking the meaning from the elements in the compound or from the context. Besides, contrary to sentences, compounds are denotative entities as they serve to associate a concept to a particular sense. What is more, the more denotative a compound is, the wider interpretations it will have.

If we follow these analyses presented above we can conclude that a small set of semantic relations could be proposed and these include BE, HAVE, CAUSE, MAKE, IN, FOR, ABOUT among others. These categories range from ten to twenty and encompass the semantic relations found in most endocentric compounds. A list of these categories, taken from Krott et al. (2009: 28), is presented in (23). The list below is a very complete sample, but similar lists with slight variations can also be found:

(23)

Modifier–Head relation	examples
ABOUT (B is about A)	fairy story, alphabet song, science museum
BE (B is an A)	Barbie doll, baby bear, toy car
CAUSE1 (A causes B)	sunburn, heartbeat, motion sickness
CAUSE2 (B causes A)	light bulb
DURING (B happens during A)	daylight, winter sports, April fool
FOR (B is for A)	postbox, picnic table, baby blanket
FROM (B comes from/is derived from A)	seafood, olive oil, lemon juice
HAS (B has A)	cheese burger, apple tree, fruitcake
LIKE (B is like A)	jellyfish, banana boat, goldfish
LOCATED (B is located at A)	back door, farm animal, seabird
MADE OF (B is made of A)	cardboard box, chocolate bar, snowball
MAKES1 (A makes B)	honeybee, bubble gum
MAKES2 (B makes A)	rabbit-hole, birdnest, chicken egg
OBJECTIVE NOMINALIZATION (A is object of verb B)	haircut, shopkeeper, lawn mover
OPAQUE (A, B and/or whole is opaque)	butterfly, bonfire, ferris wheel
PART (B is part of A)	apple peel, chicken leg, eyelash
SUBJECTIVE NOMINALIZATION (A is subject of verb B)	snakebite, bee sting
USE (B uses A)	pillow-fight, windmill, water pistol
OTHER	weekend, boatman, beauty-spot

On the one hand, the semantic classification of compounds using these categories indicates that the semantic interpretation of compounds goes beyond semantic roles. In addition, it considers the specific semantic and interpretative relations that could be established between the two nouns that make up a compound. Apart from the internal relations between the two nouns of the

compound, it also considers the external relations: e.g. those between the compound itself and the linguistic context where it appears. These features can be applied when analyzing an NN compound as in example (24):

(24) a. *paper stone*
b. A: look! I have taken some sheets of paper and I have made a stone.
B: that is a **paper stone**.

Stone has the role PATIENT and *paper* the role INSTRUMENT, but these fall short as the meaning they give is not enough to explain the meaning between the two nouns of a compound. Without being provided with a context, the best way to characterize this relationship is through the categories such as the ones presented in (23). According to them, this compound could mean 'stone MADE OF paper'. There could even be a more far-fetched interpretation: stone LOCATED in the paper. What is more, if a context is provided to (24a), the appropriate relation will be determined and clarified, as shown in (24b). This brief context is enough to know that the compound in (24a) has the relationship MADE OF. In other words, it allows a more accurate classification and solves potential semantic ambiguity.

On the other hand, some semantic categories overlap. Especially those comprised of polysemous prepositions such as WITH or OF may be problematic. This can be illustrated as in example (25):

(25) a. *fist fight*
b. *president car*
c. *computer screen*

(25a) can be analyzed as 'fight WITH fists'. However, a more accurate analysis can be carried out applying the category USE: 'fight USING fists'. It is possible to interpret (25b) and (25c) with the relation OF: 'the car OF the president' and 'the screen OF the computer' respectively. However, if we compare (25b) and (25c), it can be deduced that they do not have the same relation even though they are codified with OF: (25b) shows a relationship of belonging (BELONG) such as 'the car BELONGS TO the president'. (25c), though, indicates a

partitive relation (PART): e.g. ‘the screen that is PART OF a computer’. A possible solution is to add these alternative categories and try to avoid prepositions: i.e. the more lexical content an item has the more accurate the interpretation it provides. However, it has to be taken into account that scholars have tended to reduce the number of categories used. However, we have to be aware of the difficulties due to ambiguity and explain why, for example, (25b) has been codified with a different category from (25c) if they could have the same relation (i.e. that of OF). This will be an essential part of the analytical task in the present study.

In the semantic analysis of compounds, the differences between a novel compound (26b) and a lexicalized one (26a) need to be taken into account and, in particular, the semantic interpretative differences between them:

(26) a. *iron man*
b. *coffee water* (Krott et al. 2009: 27)

(26a) has a very straightforward and single interpretation: ‘man MADE OF iron’. This is because it has been lexicalized and, therefore, is consistent with a predetermined reading. That is, lexicalized compounds involve one form-one meaning couplings. On the contrary, the same does not apply to (26b). Here it is not so clear what the semantic relation is between modifier and head. It could be ‘water FOR coffee’, ‘water LIKE coffee’ or ‘water TO MAKE coffee’. This highlights that there are several possible interpretations as novel compounds are typically non-generic but deictic, and thus underlying structures could be extended infinitely as it seems we can be as imaginative as we want. In this case, the specific interpretation of a novel compound is directly linked to the context in which it appears. As Carstairs-McCarthy (2002) argues, “arriving at the precise meanings of these compounds depends on our knowledge of the world […] rather than on purely linguistic knowledge” (62). What Carstairs-McCarthy (2002) suggests is that, in addition to linguistic proficiency, it is crucial to know the world around us to be able to provide the most suitable semantic relation between the two members of a compound: e.g. looking at example (26b), if we do not know that water is used to make coffee or that coffee is brownish,

relations like ‘water TO MAKE coffee’ or ‘water LIKE coffee’ respectively will not be possible. This does not mean, though, that novel compounds cannot become lexicalized items. Following Downing (1977), a lexicalization cline of compounds can be proposed, as illustrated in (27):

(27) deictic compound (created *ad hoc*) ➔ generic compound➔ permanent compound ➔ lexicalized item

This means that, in the analysis of (NN) compounds, a clarification needs to be made as to where in the time line in (27) a specific compound is. This will help tease apart important differences between NN compounds and, in the end, also help in the linguistic analysis of compounds, as we will see below.

3. NN COMPOUNDS: PREVIOUS EMPIRICAL WORKS

In this section, previous empirical studies that have been made in the context of endocentric NN compounding in English will be discussed. Therefore, the acquisition of NN compounds in L1 English speakers (both adults and children) will be considered. Nevertheless, as my target group is Spanish speakers (L1) learning English as a second language (L2), L2 bilingual acquisition both in the case of L2 English-L1 Spanish and L2 Spanish-L1 English speakers will also be dealt with. Research work done on closely related languages such as French will also be mentioned as French works similarly to Spanish. Some of the studies referred to below differ from the present one, but they provide noteworthy aspects for the present research, as it will be shown in the subsequent sections. Thus, first, a discussion on monolingual acquisition is presented, and afterwards that on bilingual acquisition.

3.1. MONOLINGUAL ACQUISITION

Snyder (1995) proposes the compounding parameter that divides languages into [+ affixal] or [- affixal]: that is, if the language is [+affixal], categories function as affixes and so they can be linked to other categories. This

highlights that English, and Germanic languages in general, have productive compounding as they are [+affixal]. What is more, as it has already been presented (§ 2.2.), Snyder (2001) establishes that compounding is a parametric property of English that correlates with the production of complex predicates. In fact, although these two structures (i.e. complex predicates and compounds) have different grammatical properties, they are semantically and syntactically related. In order to prove this, he carries out two types of analyses: one based on a cross-linguistic comparison and one based on acquisition data. The cross-linguistic comparison will be dealt with first. After that, his analysis based on acquisition data will be presented. The results of the cross-linguistic survey are presented below in table 1:

Table 1. Results of a cross-linguistic survey (Snyder 2001: 329).

	RESULTATIVES	PRODUCTIVE N-N COMPOUNDING
American Sign Language	yes	yes
Austroasiatic (Khmer)	yes	yes
Finno-Ugric (Hungarian)	yes	yes
Germanic (English, German)	yes	yes
Japanese-Korean (Japanese, Korean)	yes	yes
Sino-Tibetan (Mandarin)	yes	yes
Tai (Thai)	yes	yes
Basque	no	yes
Afroasiatic (Egyptian Arabic, Hebrew)	no	no (?)
Austronesian (Javanese)	no	no
Bantu (Lingala)	no	no
Romance (French, Spanish)	no	no
Slavic (Russian, Serbo-Croatian)	no	no

Snyder's (2001) cross-linguistic survey in table 1 underlines two relevant findings. First of all, it detects that productive NN compounding is connected to complex predicates (e.g. resultatives). In other words, productive NN compounding is only available in those languages where resultatives are possible. Secondly, he ratifies that Romance languages are [-compounding], as opposed to English, because both complex predicates and NN compounds are unavailable and unproductive.

In addition to his survey, Snyder (2001) analyzes monolingual children acquiring English to demonstrate that productive novel NN compounds and complex predicates are acquired at the same age. It had already been shown that in order for compounds and complex predicates to be produced, the child's

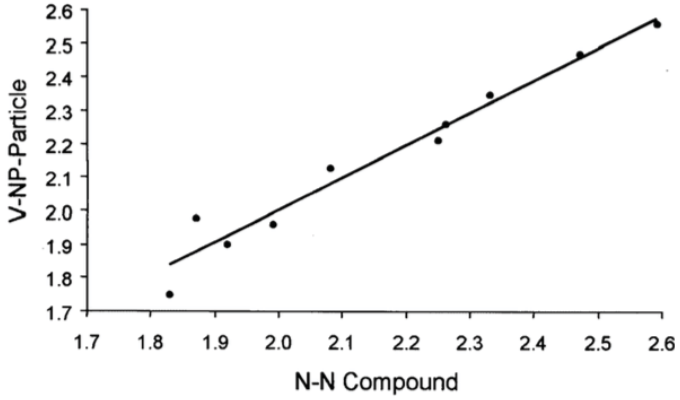
Mean Length of Utterance (MLU) has to be equal or exceed 2.5 words. In his study, as exemplified in (28), and together with novel compounds (28c), he also takes into account some control measures including adjective+noun constructions (28a) and lexical NN compounds (28b), given the parallelism that exists among these three constructions:

(28) a. *big cat* (A + N)
b. *keyboard* (lexical NN)
c. *snake hair* (novel NN)

The examples in (28) all show how a noun head (i.e. *cat*, *board* and *hair*) is premodified rendering the three different types of constructions at stake: adjective+noun combinations, lexicalized NN compounds and, the target structure, novel NN compounds.

According to the spontaneous data of the participants studied, taken from the CHILDES database (MacWhinney 2000), the ages of first use of novel NN compounds range from 1.83 to 2.59. This anticipates how early (i.e. around the age of 2) these constructions are acquired in English and other [+affixal] languages. The correlation between the acquisition of NN compounds and complex predicates (in this case verb-particle constructions such as *pick up*) is illustrated in graph 1:

Graph 1. First NN compound versus first verb-particle combination (ages in years) *(Snyder 2001: 332).*



Graph 1 shows that there is no significant difference between the ages of acquisition of novel compounds and the ages of acquisition of phrasal verbs. What is more, the first novel compound does not occur importantly earlier than this type of complex predicate. Furthermore, this correlation can be also applied to the rest of complex predicate constructions (i.e. causatives, *put*-locatives, *to*-locatives and double object datives) based on the fact that "the best-fitting line indicated in Figure 1 [graph 1] is very nearly an identity function" (Snyder 2001: 332). In other words, graph 1 accounts for an association between NN compounds and all complex predicates as there is almost no variation in the ages of acquisition of these constructions: i.e. they are parallel. All this remained the same once the control measures were eliminated, but double object datives constitute an exception to the generality that compounding holds together with complex predicates because double object constructions (at least in English) may not be dependent on compounding and also because these constructions, may require, in addition to compounding, another element later acquired by children. The latter hypothesis seems plausible as most of the children investigated produced NN compounding notably earlier than their first double object dative.

The fact that there is a relation between complex predicates and NN compounds also means that child acquisition of syntax is related to the acquisition of lexical morphology, namely it may coincide with word learning. However, as Snyder (2001) proposes, there is a restriction to this approach of word learning due to a semantic constrain: two distinct syntactic expressions denote an event-argument iff (i.e. if and only if) they are equivalent to an endocentric compound in their semantic interpretation. Therefore, taking Snyder's (2001) findings about the productivity of compounds, researchers started to investigate what triggered the acquisition of endocentric NN compounds in bilingual children and adults when one of their languages exhibit the [-affixal] feature (i.e. Spanish or French) and the other language the [+affixal] feature (i.e. English).

Given the syntactic properties attributed to compounds, as discussed before, it is necessary to account for the semantic interpretation of compounds.

Krott et al. (2009) test L1 English children and adults to elucidate on what they relied when interpreting novel compounds without being provided a context. They predicted that compounds would be interpreted by analogy with other similar compounds, and that the most frequent semantic relations in the lexicon would be favored. The semantic relations in a compound are established by the combination of modifier families (20a) and head families (20b), as previously discussed (§ 2.2.). Thus, an example like (29) could be interpreted in the following two ways:

(29) *table leg*: a. head family: table leg, chair leg, cat leg, etc.
b. modifier family: table leg, table piece, table top, etc.

In example (29), the interpretation provided by the head family (29a) is a sign of subcategorization of the head: in other words, it indicates hyponymy because if a *chair leg* and a *cat leg* are types of legs, so is a *table leg*. Modifier families (29b) focus on the different semantic relations that can be established between the head and the same modifier: e.g. *table leg* is codified with the semantic relation PART OF, just like *table piece* and *table top* all of which involve that the N head is part of a table.

Krott et al.'s (2009) study demonstrates that being aware of already existing combinations of either a modifier or a head is significant when interpreting compounds. Their analysis "reveals that children and adults draw on similar but different knowledge when interpreting novel noun–noun compounds" (Krott et al. 2009: 15). They both rely on familiarity with similar compounds, but there is a difference. Adults focus on analogous modifiers (29b), while children on analogous heads (29a). The former is due to the larger vocabulary of adults which allows them to choose from several available relationships established by the modifiers. On the contrary, the latter lean on heads because they provide a subcategorization as stated above when discussing (29): a better interpretation is attributable to the knowledge of more subcategories of the head.

In the parental report, parents assured that children would classify many of the relations as FOR. This can be illustrated in table 2:

Table 2. Family members of egg bag on parental checklist (Krott et al 2009: 11).

egg _____	_____ bag
egg carton*	sandwich bag*
egg timer*	lunch bag*
eggbeater*	shopping bag*
eggcup*	sports bag*
egg white	shoe bag*
egg yolk	handbag*
eggshell	punching bag*
egg noodles	saddlebag
egg salad	teabag
	canvas bag
	cloth bag
	sandbag
	ice bag

* Indicates the same relation as the dominant relation of the target compound *egg bag* (FOR) according to our compound database.

Table 2 exhibits the modifier family of *egg* and the head family of *bag* which combined result in *egg bag*, codified by adults as 'bag FOR eggs'. Table 2 displays several possible combinations in which *egg* is the modifier and *bag* the head. The asterisk (*) marks the compounds whose relation is codified as FOR in the parental report. Approximately, half of the compounds with *egg* (4/9) and *bag* (7/13) are listed using this relation. This coincided with the frequency of modifier head relations found in the spontaneous data from the CHILDES database. Therefore, experimenters predict that children will not have problems interpreting FOR relations.

However, the preferred semantic relations for children are found to be HAS and LOCATED which they overuse because they are conceptually easier, while they underused FOR due to its semantic complexity linked to polysemy; as stated in section 2.2., some prepositions are problematic when used to interpret compounds due to their polysemous meanings. Results are shown in table 3:

Table 3. Distribution of semantic relations in both adults and children in CHILDES compounds and experimental stimuli (Krott et al. 2009: 14).

Relation	CHILDES (%)	Stimuli		Success rate with dominant relation (%)		Usage if non-dominant relation (%)	
		#	%	Children	Adults	Children	Adults
FOR	40·6	16	53·3	40·9	70·1	4·2	8·3
LOCATED	7·6	1	3·3	59·1	100·0	14·6	0·7
MADE OF	6·6	6	20·0	18·9	65·7	2·7	5·7
PART	5·0	1	3·3	45·5	77·8	0·0	0·1
HAS	4·4	4	13·3	59·1	54·9	17·1	7·7
BE	3·8	1	3·3	31·8	94·3	5·9	0·5
USE	1·9	0	0·0	n/a	n/a	0·9	1·0
LIKE	1·1	0	0·0	n/a	n/a	1·2	4·2
DURING	0·9	1	3·3	63·6	94·4	0·2	0
OTHERS	28·0	0	0·0	n/a	n/a	0·5	8·0

Table 3 presents an analysis of the frequency of modifier-head relations in the spontaneous data taken from CHILDES and the experimental stimuli, as well as the success rate with the dominant relations, and the usage of non-dominant relations. As can be seen, most compounds in the experiment are supposed to be classified as FOR (53,3%), but children do not even classify half of the compounds as FOR (40,9%). On the contrary, the results evidence that they have no problems with relations such as HAS, LOCATED or DURING. In addition, it is significant to observe the column 'usage of non-dominant relation' which indicates that, when a compound is classified with a different relation to the dominant one, children tend to use HAS (17,1%) and LOCATED (14,6%) rather than any other relation. It is important to note that FOR is one of those ambiguous categories which is problematic because of polysemy, such as OF and WITH (§ 2.2.). This, on the contrary, has a marginal effect in adults who perform well with various types of relations.

Many of these aspects put forward by Krott et al. (2009) will be taken into account to investigate whether L1 Spanish-L2 English learners show substantial differences regarding the interpretation of compounds. That is, whether the preferred options in child L1 data correlate with those in lower-proficient adult L2 data, given their simplified semantics, as will be shown in section 5. In addition, it will be especially useful in the design of the interpretation task, as will be shown in section 5 too.

3.2 PREVIOUS WORKS ON L2 BILINGUAL ACQUISITION

English and Spanish NN compounds differ in head directionality, recursiveness and productivity, as we have discussed above (§ 2.2.). As a recapitulation, these differences can be illustrated in example 30 below:

(30) a. $\text{laser}_{\text{N-modifier}}$ $\text{gun}_{\text{N-head}}$
b. $\text{pistola}_{\text{N-head}}$ $\text{laser}_{\text{N-modifier}}$
c. laser gun lamp
d. *lámpara pistola laser

Spanish NN compounds (30b) are left headed and English ones are right headed (30a). Furthermore, Spanish NN compounds are binary which is why (30d) is ungrammatical. In contrast, English NN compounds are recursive and can have more than two nouns embedded as in (30c). Productivity is another important factor because, as evidenced by Snyder (2001), Romance languages are [-affixal] and, therefore, NN compounds are not productive, whereas Germanic are [+affixal] and have productive NN compounds. These cross-linguistic differences in directionality and productivity between English and Spanish may lead Spanish native speakers to rely on their L1 properties to create compounds in English or they may transfer frequent constructions from their L1 into their L2.

In respect of L2 bilingual acquisition, the difference in the directionality of compounds is what leads Liceras and Díaz (2000) to initially hypothesize that the WM suggested by Piera (1995) triggered the acquisition of NN compounds in L2 Spanish and "that head directionality (adjunction to the left) will be linked to the presence versus absence of this WM" (Liceras and Díaz 2000: 4). Thus, NN compounds produced by L2 Spanish learners will be left-headed due to the presence of inflectional markers, as shown in (33):

(33) a. **NIÑO**s hormiga
b. **NIÑA** hormiga

In Spanish, it is only the head that carries number marking (*niños* in 33a) and gender marking (*niño* in 33a and *niña* 33b) while the modifier remains invariant.

In addition, they establish a relation between Snyder's (1995) compounding parameter and the subset principle. The latter postulates that learners will begin with the more conservative subset of grammar and shift to a larger grammar on the basis of positive evidence. Since English is both [+affixal] and [-affixal] (that is, productive compounding is available but not compulsory), it constitutes the superset part of the parameter. However, Spanish represents the subset option of the parameter being [-affixal] and thus marked. As a result, they predict that compounding would be difficult for L2 Spanish learners from an L1 English background as it is the marked option that these speakers will have to learn and that transfer from the superset to subset grammar (i.e. from English into Spanish) will lead to differences in head directionality. The results Liceras and Díaz (2000) obtained are shown in table 4:

Table 4. Spanish grammatical and ungrammatical responses (Liceras and Díaz 2000: 6-7).

	Beginner	Intermediate	Advanced
Spanish NN	33%	35%	48%
Spanish N-PP	3%	5%	5%
TOTAL	36%	40%	53%
Non-Spanish NN	44%	27%	21%
N-P-N	10%	2%	0%
Non-Spanish gender	15%	24%	12%
TOTAL	69%	53%	33%

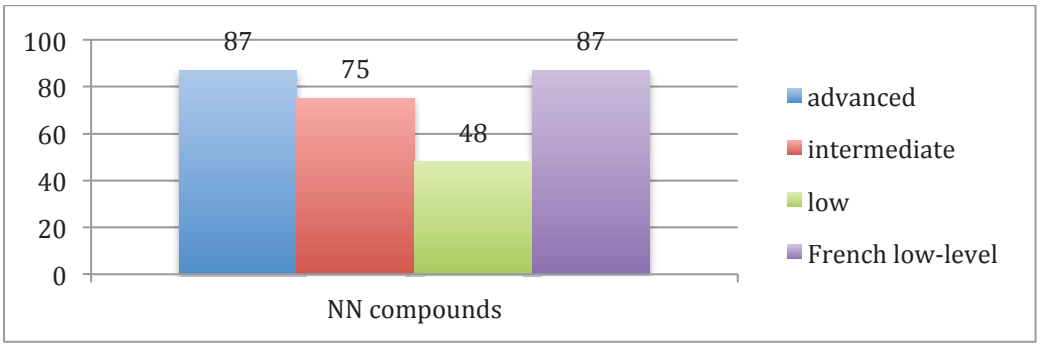
The data in table 4 show that the production of Spanish-like NN compounds increases with proficiency in Spanish. What is more, it can be observed that the participants tested by Liceras and Díaz (2000) opt for NN compounds in Spanish because the production of N-PP such as "*cara de perro*" has a remarkably lower incidence. Non-Spanish-like choices are displayed in the second part of the table. First of all, even though there are few non-Spanish NN

compounds (e.g. *policía gato* instead of *gato policía*) due to transfer from English directionality, these choices, although they decrease, do not disappear as the participants' proficiency in Spanish increases. Furthermore, the N-PP strategy (namely, "*perro de cara*"), which is favored by beginners, underlines that directionality is problematic for beginners. In terms of gender, the percentages of non-Spanish-like gender (e.g. *niño hormigo*) are relatively notable especially for beginners and intermediates. This can be taken as an indication of the fact that WMs do not lead to NN compound acquisition.

Therefore, in spite of their initial hypothesis, the results demonstrate that the presence of a WM does not trigger acquisition at early stages. It is in fact directionality that leads to the acquisition of NN compounds in Spanish. Therefore, Liceras and Díaz (2000) propose that the acquisition of compounds is due to a "processing trigger (head directionality)" rather than to a "representational trigger (WM)" (2). What is more, the increase in the production of Spanish compounds correlates with the disappearance of Spanish prepositional phrases (which are the productive alternative constructions to compounds in Spanish). As to the subset principle, there is no clear evidence that Spanish is the marked option as the participants produce a substantial amount of NN compounds.

Similar to Liceras and Díaz (2000), Slabakova (2002) also linked Snyder's compounding parameter with the subset principle. However, it is not only the subset principle that she takes into account, but also transfer. As she works with L1 English-L2 Spanish and with L1 French-L2 Spanish, she predicts that transfer from English ([+affixal]) will lead to a higher acceptance of NN compounds and complex predicates in Spanish, whereas transfer from French will show greater accuracy in rejecting them (i.e. French is [-affixal] and [-compounding] like Spanish). The results obtained are shown in graph 2:

Graph 2. Rejection of ungrammatical NN compounds by English Speakers and French low-level learners (Slabakova 2002:524).



Graph 2 shows that transfer has a connection with linguistic competence and proficiency. That is, even though low-proficient L1 English-L2 Spanish learners have problems judging the ungrammaticality of NN compounds in Spanish (only 48% of correctness), higher-proficient L1 English-L2 Spanish speakers perform better (75% for intermediate and 87% for advanced) which "indicates that delearning these constructions is possible, quite successfully for N-N compounds […]" (Slabakova 2002: 526). In other words, learners transfer the grammar of their L1 into the L2, even though advanced learners tend to avoid this. This is also evident in the case of L1 French speakers who, even if they have a low level of L2 Spanish, they perform as high as the more proficient L1 English speakers (87%). In other words, as predicted by Slabakova (2002), the influence of L1 French (also a [-affixal] language like Spanish) results in a great accuracy when rejecting ungrammatical constructions in Spanish. In the end, Slabakova (2002) concludes that transfer plays a very important part in L2 acquisition, but the subset principle "does not seem to be operative in L2 acquisition" (527). Conversely, it seems evident that L1 Spanish-L2 English speakers will not have problems learning the superset relation found in English (the [+affixal] language) even if their L1 (i.e. Spanish) does not conform with that option as it is [-affixal].

Furthermore, she points out an interesting fact: the prospective significance of negative evidence (e.g. metalinguistic explanations or error corrections) could be behind the low error rate. This means that explicit knowledge or discussion in the classroom that NN compounds are unavailable in

Spanish, as opposed to English, leads to a higher accuracy in rejecting or avoiding these constructions in their L2 Spanish.

Following Liceras and Díaz (2000), Fernández Fuertes et al. (2008) focus on a group of English-Spanish 2L1 bilingual children (taken from CHILDES) and a group of L1 Spanish early learners of English as an L2. Their aim is to investigate whether the morpho-syntactic markers of English (i.e. directionality and agreement) play a role in the early acquisition of English, and, if so, what this role is. In addition, as Spanish and English select distinct options from the compounding parameter, they want to prove if the parameter could be redefined in the L2, which in adults seems not to be possible. Their hypotheses are concerned with (a) productivity: compounding is unproductive in Spanish so alternative constructions will be produced; and (b) directionality: L1 bilinguals are not expected to have problems, whereas early L2 English learners will have problems when producing or identifying English compounds. Although they also focus on agreement, only properties (a) and (b) will be reviewed here as they are the ones linked to the present investigation. Examples for hypotheses (a) and (b) are displayed in (34) and (35) respectively:

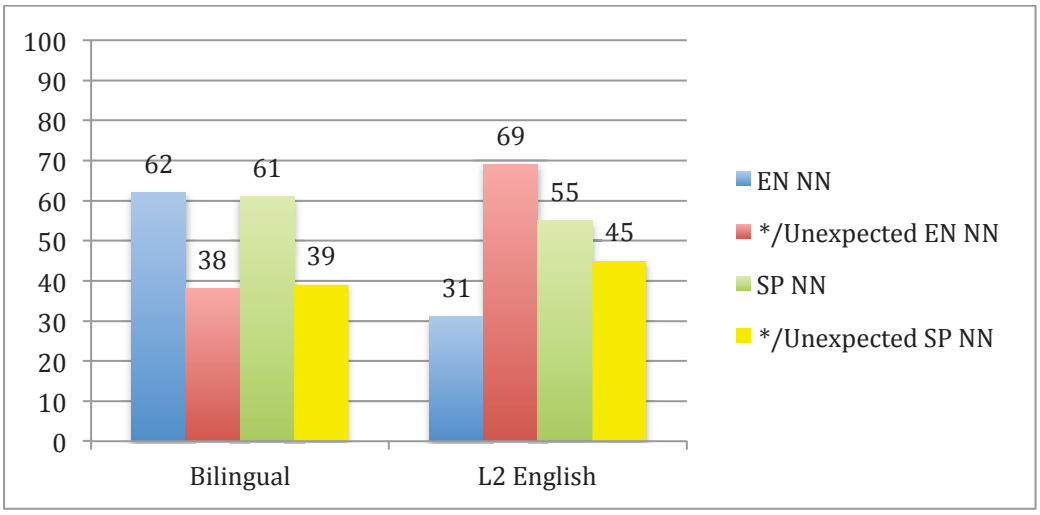
(34)	a.	*stone table*	NN
	b.	*table of stone*	N-PP
	c.	**mesa piedra*	NN
	d.	*mesa de piedra*	N-PP
(35)	a.	*police dog*	NN
	b.	**policía perro*	NN reversed
	c.	*perro policía*	NN
	d.	**dog police*	NN reversed

The amount of NN compounds is much higher in English than in Spanish. That is, though English allows constructions like (34a) and (34b), there is a preference for NN compounds. Nevertheless, since this is unproductive and in some cases ungrammatical in Spanish (34c), alternative constructions such as PPs, as illustrated in (34d), are produced. In addition, directionality in English is different from Spanish (§ 2.2. and § 3.2.), which is why (35b) is ungrammatical in Spanish; English has modifier + head order, as in (35a), whereas Spanish has head + modifier order (35c). English-Spanish L1 bilinguals are expected to be

aware of this difference, while L1 Spanish learning English might not be in the case of English. That is, L2 learners could transfer Spanish word order into English and consider (35d) as correct.

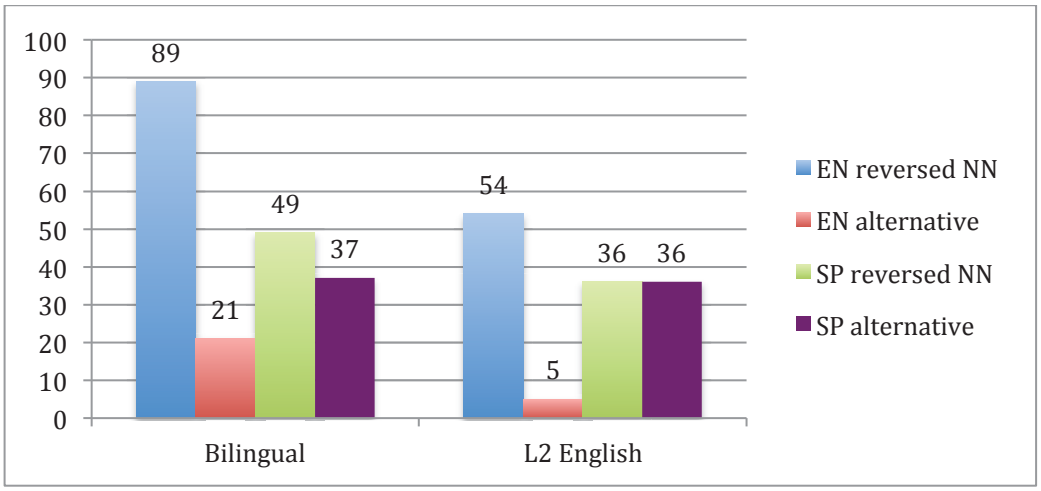
Data were elicited via a picture production task which was conducted both in English and in Spanish. A summary of the data is shown in graphs 3 and 4 below:

Graph 3. NN compound production by L1 bilinguals and L2 English learners (Fernández Fuertes et al. 2008).



Graph 3 offers a classification of the different answers provided by both participant groups, the L1 bilinguals and the L2 English learners. Bilinguals produce the same amount of well formed NN compounds in English and in Spanish, but they also produce a significant percentage of non-English and non-Spanish-like compounds: 38% and 39% respectively. In contrast, L2 English learners display a great amount of NN compounds in Spanish (55%) but not in English (31%). What is striking of this group, though, is the high number of English compounds that are not well formed (69%).

Graph 4. Reversed NN compounds and alternative construction production by L1 bilinguals and L2 English learners (Fernández Fuertes et al. 2008).



Graph 4 exhibits the most significant ungrammatical constructions (i.e. reversed compounds) or unexpected constructions (i.e. alternative constructions) that are used by both groups. In other words, it provides a breakdown of the red and yellow columns in graph 3: */Unexpected EN NN and */Unexpected SP NN respectively. Fernández Fuertes et al. (2008) classify unexpected constructions as either other NN compounds or alternative constructions; thus, directionality problems are included within the former label. As it can be observed, most of the unexpected and ungrammatical compounds produced by the groups analyzed involve directionality problems both in English and Spanish which is particularly remarkable in the group of bilinguals. That is, 89% of the unexpected constructions produced are reversed NN compounds in English and 49% are reversed NN compounds in Spanish. The other group (L2 English) has directionality problems primarily in English (54%). That is, they produce many compounds but most of them are reversed, and thus ungrammatical. What is also worth mentioning is the proportion of alternative constructions produced in Spanish as opposed to English alternative constructions: 37% in bilinguals and 36% in L2 learners. The great majority of these alternative constructions are PPs.

Overall, the results obtained evidence that both L1 bilinguals and interestingly L2 English children tend to prefer NN compounds in English, and

in Spanish alternative constructions are produced with a higher frequency (especially PPs). That is, "the production of L2 children favors the most common structure in each language" (Fernández Fuertes et al. 2008: 15. my translation). However, as evidenced also by Liceras and Díaz (2000), directionality is problematic. In this case, both groups have difficulties: bilinguals have problems in both languages, and L1 Spanish children mainly in their L2. In case of Spanish, this can be due to a lack of productivity and, thus, the exposure to a reduced input in the case of these constructions.

Although the participants in the present study differ from the ones in these previous works in that it is addressed to L1 Spanish adults learning L2 English, these results are essential to note the elements to be considered when hypothesizing and discussing the results obtained. That is, they highlight the controversial issues that the present study focuses on: directionality, productivity, transfer, and interpretation. The research questions are presented in the following section with a focus on these cardinal issues.

4. PREDICTIONS AND RESEARCH QUESTION

The objective of the present study is to characterize the production and interpretation of NN compounds in the case of L2 English learners whose L1 is Spanish. In order to do so, experimental data have been elicited with a view to discussing the following predictions and answer the corresponding research questions. These have been divided into three parts in the light of the previous works described above (§ 2 and § 3): directionality and transfer, productivity and transfer, and semantic interpretation. The three formulations below are articulated in terms of two different proficiency levels: intermediate and advanced, B2 and C2 respectively according to the Common European Framework of Reference for Languages (CEFR).

1. *Directionality and transfer*. As English and Spanish compounds differ in terms of headness (i.e. English is right-headed while Spanish is left-headed), difficulties in production or judgment of English NN compounds could be linked to different proficiency levels. On the one hand, intermediate L2 English

(B2) are expected to have problems choosing and producing the correct directionality for English NN compounds. That is, they will prefer the compound whose head is on the left (e.g. *table stone* instead of *stone table*) or an alternative construction (e.g. *table of stone*). If this were so, transfer would play a significant role as participants would rely on their L1 to pick out or produce sentences in the L2. However, a difference can be predicted between production and judgment: L1 Spanish-L2 English may perform better at judging than at producing. This will illustrate a contrast between internal knowledge where participants have to build up a structure (i.e. in a production task) and external knowledge of language where they have to interpret an already built-up structure (i.e. in a grammaticality judgment task or in a force choice task). On the other hand, high proficient L2 English (C2) participants are expected not to have problems when selecting or producing the correct structure because they understand the underlying relations within a compound and tend to avoid transfer, as shown by Slabakova (2002).

2. *Productivity and transfer*. Given that NN compounds are productive in English, but unproductive in Spanish, B2 learners are also supposed to show a lower number of responses involving a compound. The expected answer will be an alternative construction, especially a PP or a relative clause (e.g. *car that is a banana* instead of *banana car*). Again, transfer will be involved if this is to happen. Furthermore, as anticipated in hypothesis 1, a difference can be predicted between production and judgment: L1 Spanish-L2 English may perform better at judging than at producing. This will illustrate a contrast between internal knowledge where participants have to build up a structure (i.e. in a production task) and external knowledge of language where they have to interpret an already built-up structure (i.e. in a grammaticality judgment task or in a force choice task). Conversely, C2 participants should not present problems here, producing a higher rate of well-formed NN compounds and adequately judging well-formed and ill-formed compounds.

3. *Semantic interpretation*. As opposed to the formulations in 1 and 2 above were the target was directionality and productivity when producing or choosing NN compounds, a more semantic approach will be conducted by

means of an interpretation task to determine the semantic relations implied when interpreting a compound. As B2 learners have a lower proficiency than C2 learners, the former may use conceptually easier relations such as HAVE and LOCATED, as defended by Krott et al. (2009) for L1 speakers. Nevertheless, C2 learners are expected to show a wider range of semantic relations. In addition, the participants' choices will reveal the semantic relations that are favored and whether there is a particular preference for some relations. In addition to this, participants are expected to cling to modifier families, as they may provide participants with analogous interpretations based on similar compounds (e.g. if *stone table* is classified as MADE OF, *stone house* can also be labeled as MADE OF). Besides, and linking semantic interpretation to directionality, if the directionality attributed to the English compounds is reversed, this might lead to a misinterpretation of the compound, too.

The formulations above rely on a difference between the two proficiency groups and how this difference is expected to affect both directionality and productivity as well as semantic relations. However, if B2 L2 English perform well or no different from C2 learners, will this mean that L1 Spanish L2 English speakers are perfectly aware of the differences between NN compounds in the two languages regardless of their proficiency level and, therefore, will not rely on transfer from Spanish?

In order to provide an answer to this research question and a characterization of the L2 English data on the bases of the three formulations above, the following empirical study based on data has been designed.

5. EMPIRICAL STUDY

This section deals with the empirical study designed in order to answer the research questions formulated in the previous section (§ 4). The empirical study is divided into 3 different sub-sections. First, details about the participants chosen to perform the tasks are presented (§ 5.1.). Then, the method followed and materials used for the tasks in question are outlined (§ 5.2.). Finally, the data will be presented, classified and analyzed (§ 5.3.).

5.1 PARTICIPANTS

Sixteen L1 Spanish L2 English speaking adults participated in the experiment. They were not divided considering their age, but their proficiency in L2 English. In this case, the proficiency levels covered by this experiment were B2 and C2 according to the CEFR. Twelve of these participants had an English language certificate: FCE Cambridge ESOL (B2) and CPE Cambridge ESOL (C2). However, since four more participants were needed and no one else was found to have any of these certificates or similar ones, a quick placement test (Quick Placement Test 2001) was passed among a large number of L1 Spanish L2 English speakers to determine the proficiency of the rest of the participants required to complete the task. Thus, four more participants were selected through this process.

5.2 METHOD AND MATERIALS

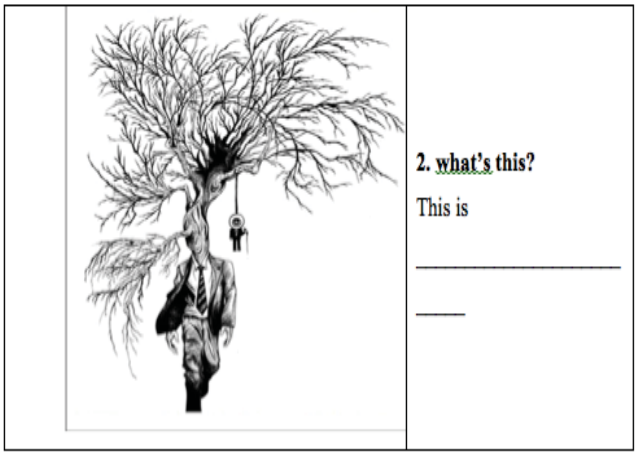
The test was sent via email or facebook to the participants as most of them lived in different areas. They had to dowload the attached file and answer in the test sheet itself. The directions for carrying out the tasks were written on the test document (that is, in the task headings) and on the respective emails or facebook messages. If prior to the starting of the test, participants had any doubts, these were solved in a manner that would not affect their subsequent answers. No time limit was given, although it was suggested that participants could do it in thirty minutes.

Participants were given an off-line test consisting of three tasks: a production task, a forced choice task (i.e. FCT) and an interpretation task. The first two tasks target NN compounds' syntactic properties (i.e. directionality and productivity), while the third task targets NN compounds' semantic properties.

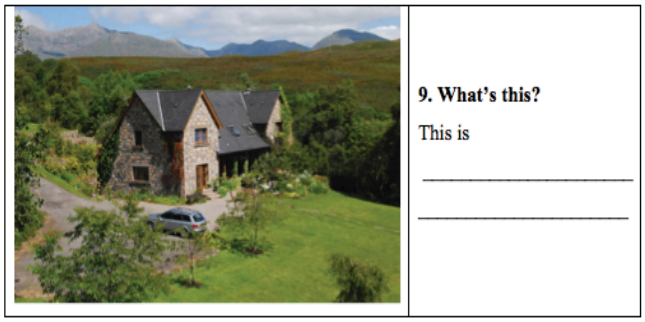
The production task was made of 12 questions in which participants were told to look at the pictures given and write the name of the object represented in the picture. An example was provided as an aid. Half of the pictures used were NN compounds both in English and in Spanish, while the other half were NNs

only in English while in Spanish they were N + PP structures. This contrast can be seen in examples (36) and (37) below:

(36)



(37)

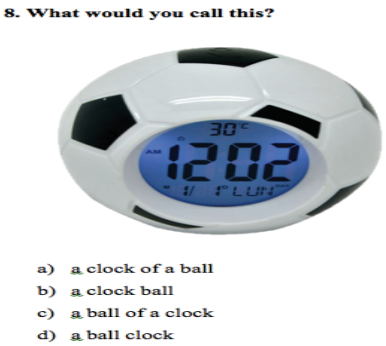


(36) is an example of an NN compound in the two languages being analyzed: *tree man* in English, and *hombre árbol* in Spanish. Thus, the expected answer would be an NN compound or a reversed NN compound if Spanish word order was obeyed. In contrast, (37) is expressed using an NN compound only in English: *country house*. In Spanish, though, this is typically referred to as *casa de campo* which is an N + PP structure. If participants relied on transfer, they would produce answers like *house in the country*.

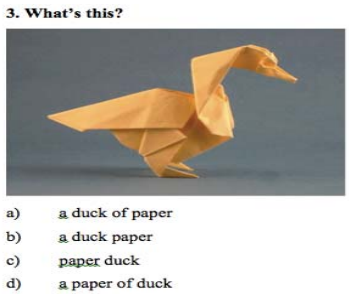
The FCT was made of 10 questions. Contrarily to the production task, in this second one, participants did not have to fill in any blanks, but were already given the answers. That is, they were presented with a picture and 4 different

choices (*a*, *b*, *c*, or *d*) and they had to mark the one they considered more appropriate. The choices contained an NN compound (e.g. *flower suit*), a reversed NN (e.g. *suit flower*), an N + PP (i.e. *suit with flowers*) and a reversed N + PP (i.e. *flowers of suit*). These answer choices were shuffled so that they did not appear always in the same order[2]. Identical to the production task was the fact that half of the items were NN compounds in both languages, and half were only NN in English whereas in Spanish they were alternative constructions (mainly N + PP). This contrast is illustrated in examples (38) and (39) respectively:

(38)



(39)



The correct answer to (38) is *ball clock* (answer d), although for L1 Spanish L2 English, it may be *clock ball* (i.e. *reloj balón*; answer b) if Spanish directionality is used instead. The point here is, though, that it is an NN compound in both

[2] There was only one instance of an alternative relative clause instead of an N + PP (i.e. *feathers that are in arrows*). It is also important to note that there was a typo in question 6: instead of a reversed NN (e.g. *hanger cactus*), the same NN was included twice (e.g. *cactus hanger*).

languages. Nonetheless, even though the more appropriate answer to (39) is *paper duck* (answer c), this can be confusing for our target groups because Spanish would refer to this item not using a compound but an alternative construction such as *duck of paper* (i.e. *un pato de papel*; answer a).

Regarding the interpretation task, participants had to interpret the meaning of 12 different NN compounds. That is, they were presented with an NN compound for which they had to provide a paraphrase of its meaning. Again in this task, an example was given at the beginning. Example (40) illustrates the layout of this task:

(40)

1)	**cheese hat:**	**7)**	**chocolate jar:**
2)	**cheese salad:**	**8)**	**chocolate box:**
3)	**cheese worm:**	**9)**	**chocolate wrap:**
4)	**steel boat:**	**10)**	**cloud island:**
5)	**desert boat:**	**11)**	**monkey island:**
6)	**bomb boat:**	**12)**	**stone island:**

As shown in (40), there were two different modifier families (i.e. cheese and chocolate) and two distinct head families (i.e. boat and island) involved. Thus, three compounds were part of each of the families. The semantic relations tested were HAVE, MADE OF and LOCATED, but any other relation would be codified as correct if consistent.

5.3. RESULTS

The results concerning directionality will be discussed first, and then those on productivity. Once covered, the interpretation task responses will be analyzed.

The overall production and choice of NN compounds is shown in table 6 below:

Table 6. Overall amount of NN compounds in L2 English.

Participant group	Production task	FCT
B2	56% (54)	69% (55)
C2	95% (91)	86% (69)

Table 6 illustrates that there is a high rate of production of NN compounds by both groups: the C2 proficiency group produces a higher amount of NN compounds (95%), while the B2 proficiency group produces fewer NNs (56%). Regarding the choice of NN compounds, it is remarkably high for both groups being C2 group choices above the B2 group ones: i.e. 86% and 69% respectively. What is more, this already anticipates what was predicted in the research questions section (§ 4) with respect to directionality and productivity.

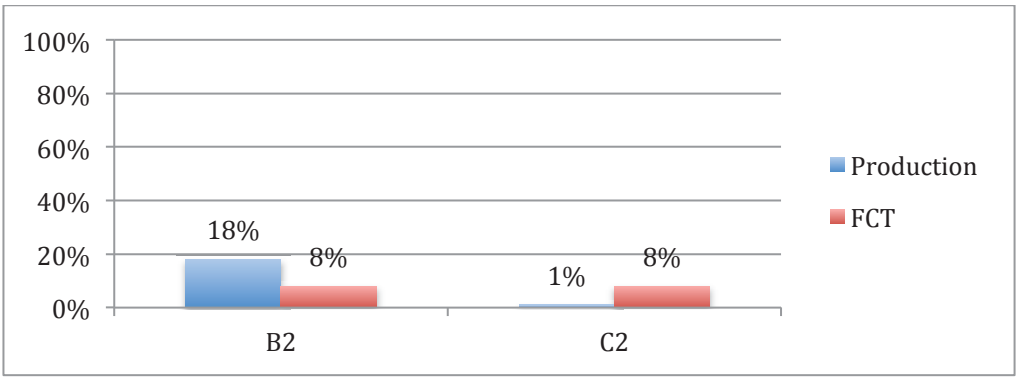
Although it was speculated in prediction 1 (§ 4) concerning directionality that the B2 group of participants would prefer reversed NN compounds or alternative constructions (i.e. N + PP), the results of the production and FC tasks indicate something different, as suggested in table 6 and as it will be shown now. In order to compare their results with those of the C2 group, table 7 is used:

Table 7. NN directionality in the production and FC tasks.

Participant group	NN	Reversed NN
B2	62% (109)	13% (23)
C2	91% (160)	4% (7)

According to table 7, low proficient L2 English (B2 group) prefer NN compounds (62%) to reversed NN. What is more, the number of reversed NN is very low (13%) compared to the amount of NN selected. That is, contrary to what was expected, low proficient L2 English learners seem not to rely on transfer when producing or selecting NN compounds, as the sum of reversed NN is unremarkable. On the contrary, as predicted in formulation 1, high proficiency L2 English (C2 group) have no problems selecting and producing the correct NN compound. In other words, 91% of the responses stand for NN compounds, whereas reversed NNs constitute an insignificant proportion: 4%. A breakdown of the total of reversed NNs in the two tasks is provided in graph 5 below:

Graph 5. Reversed NNs in the production and FC tasks.

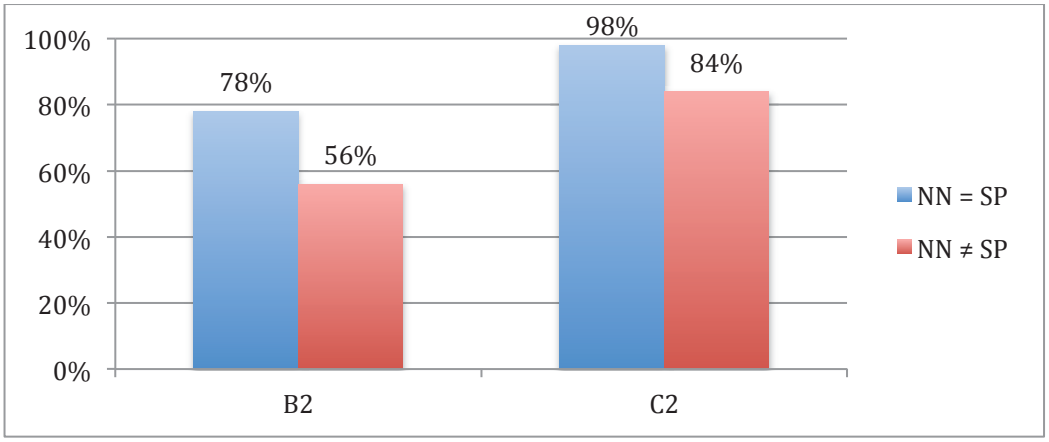


This graph emphasizes the point that reversed NNs do not represent a noteworthy amount. In addition, it confirms the fact that there is indeed a difference between internal knowledge (i.e. the production task) and external knowledge of the language (i.e. FCT) regarding directionality. In other words, B2 participants perform better at judging than at producing as their ungrammatical amount of responses decreases. This seems not to be operative for C2 participants who perform slightly worse judging than producing. However, this difference is not particularly substantial in the latter group.

Apart from all this, the amount of correct responses with both NNs in Spanish and English, and NNs only in English needs to be further explored. When describing the tasks (§ 5.2.), it was stated that half of the items were NN compounds in both languages whereas the other half designated NN compounds

only in English which in Spanish were expressed with an alternative construction. The data obtained and classified along these terms are represented in graph 6:

Graph 6. Correct NN compounds in the correlation between English and Spanish.



As graph 6 indicates, L1 Spanish L2 English learners tend to produce and choose NN compounds in their L2 that have an equivalent NN compound in their L1: i.e. *pirate skull* is an NN compound in Spanish (*calavera pirata*). This is remarkably high for both groups of participants: 78% for B2 and 98% for C2. However, these participants perform worse when they are faced with NN compounds in their L2 which are not found in their L1 (e.g. *arrow feathers*). This is especially problematic for the B2 group which experiences a 22% accuracy fall (down to 56%). Therefore, the results in graph 6 demonstrate the weight of transfer from the L1 into the L2, which in this case is positive: that is, the higher resemblance in structure between NN compounds in both languages leads to a higher accuracy rate which increases according to the proficiency in the L2. However, even though the influence of the L1 diminishes, it does not disappear utterly.

As for formulation 2 concerning productivity, it has already been displayed in table 6 above that both groups show a high number of NN compound responses. As formulated in section 4, the lower proficient

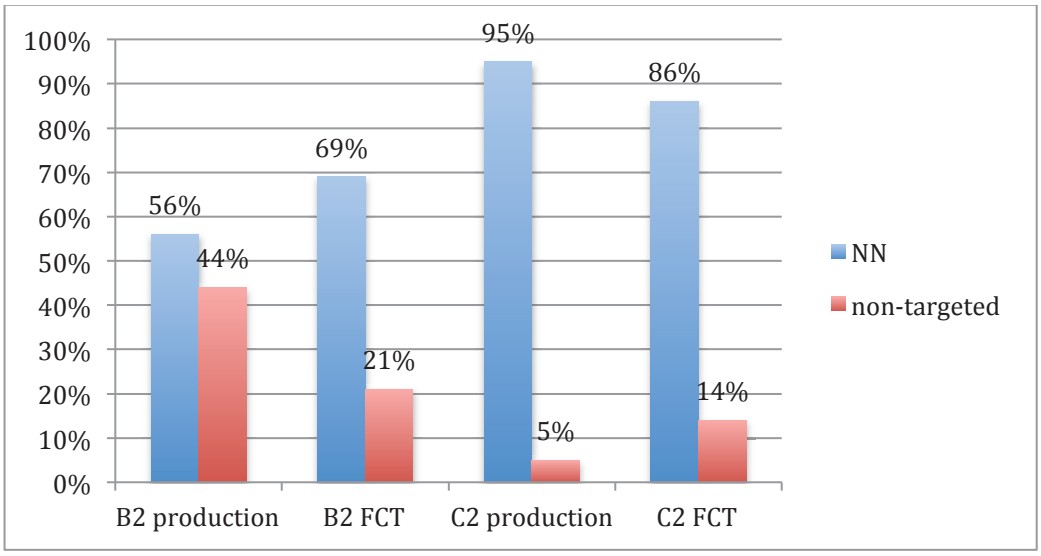
participants exhibit fewer NN compounds than the higher proficient group. A summary of the data is presented in table 8:

Table 8. Overall amount of NN compounds and non-targeted structures.

Participant group	NN	non-targeted
B2	62% (109)	38% (67)
C2	91% (160)	9% (16)

Considering table 8, the data have been divided into grammatical NNs and non-targeted structures. The latter category includes reversed NNs, alternative constructions (N + PP) and any other unexpected structure. The B2 group shows a tendency towards NN compounds (62%) instead of non-targeted structures but this latter category rate is relatively high (38%). This is not so remarkable in the C2 group which inclines towards NN compounds in the great majority of the cases (91%). The ungrammatical responses of this group should be treated as minor since they only represent 9% out of the total. A closer examination of these results is provided in graph 7 which shows the amount of NNs and non-targeted structures divided by tasks:

Graph 7. Overall amount of NN compounds and non-targeted structures by tasks.



Taking into account graph 7, it can be concluded that there is indeed a difference between production and judgment regarding productivity as well. That is, participants perform better when they are given the compound and they only have to judge it than when they have to produce the compound themselves. What is more, the number of ungrammatical responses decreases, yet not vanishes. This difference between internal and external knowledge is only active in the B2 group whereas it seems not to be operative for the C2 group. Rather, they are actually better at producing (5%) than at judging (14%). It is worth mentioning, though, that as the proficiency in the participants' L2 increases the sum of non-targeted structures decreases. This reinforces the data in table 8.

In spite of the fact that the C2 group does not select a considerable quantity of non-targeted structures (5% in the production task and 14% in the FCT as in graph 7), there is a difference between the two groups of participants in the type of non-targeted structures produced and chosen. This difference between the B2 and C2 groups is visible in both the production and the FC tasks and can be observed in tables 9 and 10 respectively:

Table 9. Non-targeted structures in the production task.

Production task	**Reversed NN**	**N + PP**	**Other**
B2	41% (17)	50% (21)	9% (4)
C2	20% (1)	20% (1)	60% (3)

Looking at table 9, it can be evidenced that the B2 group has a preference for prepositional phrases (i.e. N + PP): 50%. The following category is reversed NN displaying a 41%. On the contrary, the number of non-targeted structures in the C2 group production task is insignificant as it amounts only 5 cases (a 5% according to graph 7). The label *other* has been added when codifying the participants' production task and it includes any type of element that is not an NN, a reversed NN, an N + PP, or a reversed N + PP. In other words, it consists of simple nouns (e.g. *pirate*) and Saxon genitive forms (i.e. *pirate's skull*).

Table 10. Non-targeted structures in the FCT.

FCT	Reversed NN	N + PP	Relative clause
B2	38% (6)	57% (18)	5% (1)
C2	57% (6)	36% (4)	7% (1)

Table 10 emphasizes that the B2 group has the same tendency regarding non-targeted structures also in the FCT. What is more, their preference for N + PP is slightly more marked in the FCT: 57% (as opposed to 50% in the production task), while the number of reversed NNs decreases to a 38%. This can be explained due to the higher frequency and productivity of these constructions in the participants' L1. The category with the least number of responses is the relative clause structure, which only appears in the FCT: 5%. It is important to remember, as pointed in section 5.2. (i.e. footnote 2), that there was only an instance of a relative clause but this choice was only selected once.

In addition, table 10 suggests that the C2 group has this order of preference reversed. That is, this group tends to produce reversed NN compounds rather than N + PP: 57% and 36% respectively. Identical to the B2 group, they only select the relative clause once which corresponds to 7%.

In short, these two tables show that there is a small difference between the two groups of participants in the production and FC tasks. That is, B2 participants are inclined to display a higher amount of N + PP (which is emphasized in the FCT), whereas they tend to reduce the ungrammatical reversed NNs, which become marginal options in the FCT. In contrast, C2 participants produce an insignificant number of non-targeted structures. Even though, the proportion is not very high in the FCT either, there is a difference with respect to the B2 group as their order of preference is swapped: reversed NNs are chosen over N + PP. Disregarding this last fact, the FCT proves to be more successful than the production task because not only the number of non-targeted structures diminishes, but also the amount of ungrammatical NN compounds.

Heretofore, the results obtained from the production and FC tasks have been analyzed which are consistent with formulations 1 and 2 (that is,

directionality and productivity). Thus, the data elicited through the interpretation task will be dealt with next. In order to determine all the semantic relations used by the participants, table 11 has been drawn:

Table 11. Semantic relations used by both groups of participants.

HAVE	38% (74)
MADE OF	26% (50)
LIKE	10% (20)
USED	8% (15)
LOCATED	7% (14)
DESERTED	3% (4)
EAT	1% (3)
COVERED BY	1% (3)
STORE	1% (3)
EXPLODE	1% (1)
WITH A VIEW OF	1% (1)
PART OF	1% (1)
NN reversed	1% (2)
Nonsense relation	1% (1)

Even though there are twelve distinct semantic relations, only five of them were used repeatedly: HAVE (38%), MADE OF (26%), LIKE (10%), USED (8%) and LOCATED (7%). These five relations represent 89% of the total, whereas the other seven correspond to 11%. Not all the paraphrases classified using these relations in table 11 include the exact verbs or prepositions presented in table 11. That is, an NN compound codified as HAVE may not involve the verb 'have' in the meaning, as illustrated in example (41) taken from one of the interpretation tasks:

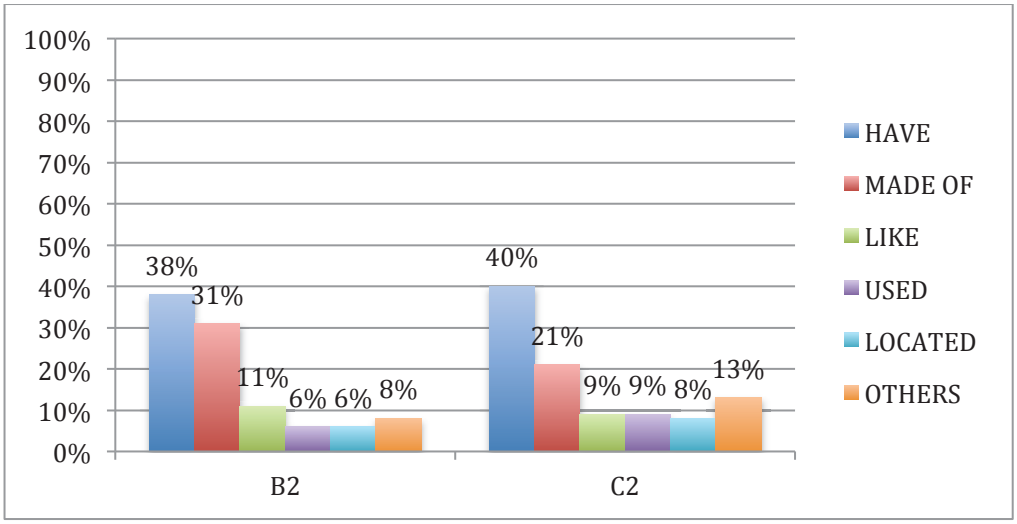
(41) *cheese salad*: a salad with cheese.

The preposition ‘with’ indicates that the salad contains cheese. It is this inherent property of ‘contain’ that was looked for when classifying relations under HAVE. Similar to ‘with’, other verbs and prepositions were thought of as HAVE: e.g. ‘full of’ and ‘contain’. It is interesting to note that the NN compound *monkey island* was referred to by some participants as ‘an island where monkeys live’. This was also labeled as HAVE because if monkeys live on an island, it is because the island has monkeys. The same was done with the rest of the semantic relations so that ‘a hat with the shape of a cheese’ was grouped as LIKE, for example.

Apart from the semantic relations described above, other categories (i.e. *NN reversed* and *nonsense relation*) have been included because there were cases of misinterpreted NN compounds. More specifically there were two cases (1%) in which the directionality of the compound in English was reversed and so was the interpretation: for instance, a C2 participant interpreted *cloud island* as ‘a cloud in the middle of an open space’. Likewise, a B2 participant paraphrased *cheese worm* as ‘a cheese with a worm’. These are the only two samples in which the directionality from Spanish has been transferred into English and thus has altered the meaning of the compounds. Additionally, there was an NN compound whose meaning was confused by one of the B2 participants (1%): this participant took the word *desert* in *desert boat* for the word *dessert*. Thus the meaning for this item was explained as ‘a sweet boat’.

It was expected that the B2 group would prefer to use conceptually easier semantic relations, as predicted in formulation 3 (§ 4.), but this is not what the results evidence. The preferred semantic relations according to the different proficiency levels are portrayed in graph 8:

Graph 8. Semantic relations by participant groups.



What is displayed in table 11 for the overall results is consistent with the semantic relations chosen by both groups of participants presented above in graph 8. B2 and C2 groups tend to use HAVE (38% and 40%) with a higher frequency than MADE OF (31% and 21%). These constitute the major semantic categories in the task. The other 3 categories do not amount to a great proportion: LIKE (11% and 9%), USED (6% and 9%) and LOCATED (6% and 8%). In other words, the participants' responses do not show great differences regarding interpretation but, in contrast, substantial similarities. What is more, LOCATED, contrary to what was expected for B2, is the least of major semantic relations which correlates with the performance of the C2 group. That is, the idea of conceptually easier relations as suggested by Krott et al. (2009) for L1 English children is not relevant for L1 Spanish L2 English adults. Moreover, graph 8 shows that C2 participants do not exhibit a significantly wider range of semantic relations due to their higher proficiency level: as represented by the category OTHERS, C2 use relations such as DESERTED (3), WITH A VIEW OF (1), STORE (3), EAT (2), COVERED BY (1) and PART OF (1), while B2 employ DESERTED (1), STORE (1), EXPLODE (1) and COVERED BY (2).

In addition, a hierarchy of semantic relations for both groups can be established according to the responses presented in graph 8. This hierarchy appears in (42):

(42) HAVE > MADE OF > LIKE > USED > LOCATED.

The last issue regarding interpretation is concerned with modifier and head families. The relations favored with the distinct modifier and head families are displayed in tables 12 and 13 respectively where only the relations HAVE, MADE OF and LOCATED have been considered because these were the relations contemplated when the task was designed:

Table 12. Relations favored with the same modifier family.

Modifier families	**HAVE**	**MADE OF**	**LOCATED**	**OTHER**
Cheese hat	0%	31% (5)	0%	69% (11)
Cheese salad	94% (15)	6% (1)	0%	0%
Cheese worm	0%	19% (3)	50% (8)	31% (5)
TOTAL	31% (15)	19% (9)	17% (8)	33% (16)
Chocolate jar	37% (6)	37% (6)	0%	25% (4)
Chocolate box	75% (12)	19% (3)	0%	6% (1)
Chocolate wrap	25% (4)	25% (4)	13% (2)	37% (6)
TOTAL	46% (22)	27% (13)	4% (2)	23% (11)

When the same modifier is used for three NN compounds of each set, rather than providing analogous interpretations, participants are able to deduce the specific type of semantic relation that applies in each case, as shown in table 12: e.g. *cheese hat* is MADE OF, whereas *cheese salad* is HAVE. In the case of compounds belonging to the modifier family of *chocolate*, there is a tendency to classify them as HAVE (46%). Disregarding this, it can be stated that analogy between NN compounds illustrating similar semantic relations is not pertinent in the interpretation of novel NN compounds done by these L1 Spanish L2 English learners.

Table 13. Relations favored with the same head family.

Head families	HAVE	MADE OF	LOCATED	OTHER
Steel boat	6% (1)	94% (15)	0%	0%
Desert boat	0%	0%	13% (2)	87% (14)
Bomb boat	69% (11)	0%	0%	31% (5)
TOTAL	25% (12)	31% (15)	4% (2)	40% (19)
Cloud island	19% (3)	13% (2)	6% (1)	62% (10)
Monkey island	94% (15)	0%	0%	6% (1)
Stone island	31% (5)	69% (11)	0%	0%
TOTAL	48% (23)	27% (13)	2% (1)	23% (11)

As seen in table 13, there are no analogous interpretations of NN compounds belonging to the same head family either. The only exception is the head family of *island*: 48% of the times it is classified as HAVE. What can be inferred from these two tables is that participants rely on both modifier and head families to provide a consistent interpretation: they analyze the meaning of the head and that of the modifier and then they establish the semantic relation between them on a case by case basis. That is, the relation is marked by a perceivable connection between both nouns forming the compound, as previously argued by Downing (1977) and Krott et al. (2009).

6. GENERAL DISCUSSION

The purpose of this study was to investigate how NN compound properties such as directionality, productivity and semantic interpretation are used by L1 Spanish L2 English speakers when facing English NN compounds. The data analysis in section 5.3. allows to confirm or reject the formulations set in section 4 and answer the research question articulated in that same section. In this discussion section, these findings are highlighted and divided into 3 parts

corresponding to those in section 4: directionality and transfer, productivity and transfer, and semantic interpretation.

1. *Directionality and transfer*. Overall B2 and C2 L1 Spanish L2 English speakers have no problems regarding directionality in English NN compounds. Both groups show a remarkable success rate which was particularly high for the C2 speakers. This leads to partially reject the formulation that B2 speakers would have problems producing a noticeable amount of reversed NNs due to transfer from Spanish. In fact, the small amount of reversed NNs indicates there is no transfer when producing NN compounds in their L2. As to the C2 group, the error proportion is as low as it was initially predicted. Therefore, it is confirmed that B2 participants do not rely on transfer to produce or select NN compounds in their L2, and that C2 participants understand the underlying relations within compounds and do not have problems producing or choosing them.

Despite the fact that transfer from the L1 into the L2 is not crucial for the production of ungrammatical NNs, the results also lead to the belief that transfer can be involved in the production and selection of grammatical NNs. That is, when denoting an item that is an NN compound in the L1 and in the L2, learners tend to produce or select the target structure in their L2. However, if the item denoted is expressed with a different structure in the L1 and in the L2, learners have an inclination to produce or choose not only the target structure in their L2 (i.e. NN compounds) but also the non-targeted structure in their L2 (i.e. N + PP primarily). This means that English NN compounds, which correspond to Spanish NN compounds, are identified with lesser difficulties than English NNs which correspond to an alternative construction in Spanish. This evidences that the L1, Spanish, does play a role in the production and selection of English NN compounds.

In addition to this, the results confirm the prediction that there is actually a difference between internal knowledge of the language, where speakers have to build a structure themselves, and external knowledge, where learners simply have to interpret an already produced structure. This means that L1 Spanish L2 English learners perform better at judging the grammaticality of NN compounds

(i.e. in the FCT) than at producing the NN compound (i.e. in the production task). As a result, the number of reversed NNs decreases in the FCT compared to the production task, although it does not disappear completely. This seems to be only operative for the B2 group as it is not displayed in the C2 group data, as their level of correctness is more stable.

2. *Productivity and transfer.* Although it was postulated in formulation 2 that B2 participants would prefer alternative constructions (i.e. N + PP) to NN compounds because the latter are unproductive in the participants' L1 (i.e. Spanish), data demonstrate that both L1 Spanish L2 English groups show a preference for NN compounds in English. That is, the most productive structure is the one actually targeted in the L2. This formulation, though, is only partially rejected as the results conform to what was also predicted: B2 speakers perform worse than C2 speakers as they produce a notable amount of non-NN compounds. That is, the higher the proficiency, the higher amount of NN compounds. This also indicates that C2 participants produce a high rate of well-formed NN compounds and adequately judge well-formed and ill-formed compounds.

Again, the difference in the results of NN compounds in the production and FC tasks reaffirms the contrast between production and judgment and that is only operative for B2 speakers. Besides, according to the results obtained from both tasks, a hierarchy of NN compounds could be suggested for L1 Spanish L2 English as in (43), in the line of (42) above:

(43) NN > N + PP > reversed NN.

This also explains that transfer is not especially involved when dealing with productivity either, except for the fact that N + PP structures follow NN compounds in the hierarchy indicated.

One of the reasons why transfer is not so crucial, and which connects directionality and productivity, may be the amount of negative evidence these participants have received throughout their study of English (as in Slabakova 2002). This seems quite plausible as the participants selected have been (and

some still are) in contact with English for several years. Therefore, the advice of teachers and lectures regarding the productivity and directionality of NN compounds could have influenced their choices.

3. *Semantic interpretation.* Twelve relations were chosen to classify the semantics of compounds, but only five of them were of real significance. This is related to the fact that, even though differences in the semantic interpretation of NN compounds were predicted between both groups, there are actually great similarities and not that many contrasts. Higher proficient speakers do not show a wider range of semantic relations. What is more, both groups favor the same ones in the same hierarchical order as illustrated in section 5.3. and repeated here in (44):

(44) HAVE > MADE OF > LIKE > USED > LOCATED.

This is not in accordance with the claim that a relation such as LOCATED would be favored by the intermediate speakers: as seen in this scale, LOCATED is barely used by both groups. Thus, this rejects the following two assumptions: on the one hand, the B2 group does not use conceptually easier relations; and, on the other hand, the C2 group does not show a wider range of semantic relations. Rather, both groups favor the same relations and in the same proportion.

Apart from this, it was stated in section 4 that, if the directionality of NN compounds was reversed, so would be their interpretation. Except for two cases, all of the compounds were interpreted according to the grammar (i.e. left-headed). The two special cases were thus misinterpreted as their directionality was reversed (see section 5.3. for the exact examples). These were the only cases in which transfer was involved in the interpretation of compounds. Thus, it may be worth considering that a reversed directionality can lead to assigning a wrong interpretation to the compound. Nevertheless, two cases are not enough to prove this; in order to make a stronger claim, more instances would be required.

As to modifier families, Krott et al.'s (2009) proposal on child L1 participants was proved not to apply in the case of adult L2 participants as they did not provide analogous interpretations. In general, participants did not show

an inclination to a particular relation when the same modifier was involved. Rather, they tended to change the sematic relation. An explanation for this is that L1 Spanish L2 English speakers provide semantic relations for an NN compound based on the plausible and possible connection between the two nouns in the compound. This correlates with Downing's (1977) idea that there must be a clear connection between the two elements and Krott et al.'s (2009: 24) point that the interpretation of compounds is determined by a distinguishable relation between the two parts. This can be the result of the claim that the meaning of compounds depends on the individual's knowledge of the world: e.g. for some, a *cheese worm* can refer to 'a worm that lives inside cheese' whereas to others it may mean 'a worm that eats cheese'. That is, we can associate different senses to the same denotation.

7. CONCLUSION

The present undergraduate dissertation has been concerned with the analysis of how L1 Spanish L2 English learners perform in the production and judgment of NN compounds in English according to two different proficiency levels (i.e. B2 and C2). The following conclusions have been reached after the analysis of the data elicited.

First of all, there is not a great contrast between B2 and C2 groups regarding directionality since they show a general tendency to left-headed compounds. It is true though that the C2 group performs better, which demonstrates that the higher the proficiency the lower amount of ungrammatical responses. In addition, the difference between production and judgment evidences a contrast between internal knowledge and external knowledge which is only present in the B2 group: participants find it easier to select the correct NN compound than to actually produce it.

Secondly, regarding productivity, it has been proved that both groups favor the most common structure in the target language: that is, NN compounds. However, it is worth mentioning that the lower the proficiency, the higher rate of

alternative constructions in the L2. More specifically, the N + PP structures are the preferred non-targeted structures.

Thirdly, the hypothesized dissimilarities between both groups considering the semantics of NN compounds have been rejected. What is more, there are no differences but rather similarities. In other words, both groups opt for the same semantic relations when interpreting NN compounds. Besides, no analogous interpretations based on the modifier families have been accounted for: i.e. participants made use of various relations for the same NN compound families.

In addition, transfer needs to be considered. The influence of the participants' L1 does not have as much incidence as initially expected. In fact, transfer does not play a very significant role in either directionality or productivity. This answers the question formulated at the end of section 4: as B2 L2 English learners perform well in producing and judging NN compounds and not very differently from the C2 group, this means that both intermediate (e.g. B2) and advanced (e.g. C2) L1 Spanish L2 English speakers are aware of the differences between NN compounds in the two languages and avoid relying on transfer from their L1 in this particular area of grammar.

The analysis of the factors affecting the production and understanding of NN compounds by L1 Spanish L2 English speakers and of some of the differences between Spanish and English compounds provide an interesting insight into the defining properties of NN compounds: directionality, productivity, and their semantics. In spite of the conclusions reached, it is important to mention that this study was carried out with a small number of participants. Thus, further research should be done to explore this aspect of the English grammar. For instance, it could be interesting to use a beginner A2 L1 Spanish L2 English group and compare their results with those of the B2 and C2 groups. Such a study would shed light on whether transfer from the L1 into the L2 disappears in the production or selection of NN compounds as the proficiency increases, on how strong the influence of the negative evidence (i.e. error corrections and metalinguistic explanations in the classroom) is, and on

whether there is a difference in the semantic interpretation of NN compounds in lower proficiency groups.

AFTERWORD: OBJECTIVES REACHED

With this study I believe I have reached two of the most important objectives as in the official description of the English degree (Universidad de Valladolid 2009: 14) which are (1) a complete learning process in linguistics, [culture and literature] of the English language and (2) a solid instrumental competence in English in a general environment but also in a professional one.

Regarding the first objective, this study has given me the opportunity to put into practice a series of aspects that I have learned in different courses throughout the degree. These involve mainly the following:

- Grammatical background: English Grammar I, II and III (1st and 2nd year); Linguistic Theory and the Structure of English; and, English in Time and Space (Erasmus exchange University of Edinburgh).
- Organization of the data and presentation of the information: Information and Communication Technology (4th year).

As to the second objective, I have been able to combine these aspects and to relate them to two of the main professional fields in our degree: teaching and research. As I have suggested along my dissertation, the grammatical analysis of aspects that are problematic for L2 English speakers (such as NN compounds) can have an effect on teaching strategies and methodologies and this may reduce the effect of transfer or errors. Furthermore, since my study is based on the analysis of empirical data, it is also linked to a specific research methodology used in the fields of bilingual acquisition, L2 acquisition and language learning.

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