ON L2 GRAMMAR AND PROCESSING:
THE CASE OF OBLIQUE RELATIVE CLAUSES
AND THE NULL-PREP PHENOMENON

BY

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DISSERTATION

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This dissertation investigates the acquisition of oblique relative clauses in L2 Spanish by English and Moroccan Arabic speakers in order to understand the role of previous linguistic knowledge and its interaction with Universal Grammar on the one hand, and the relationship between grammatical knowledge and its use in real-time, on the other hand. Three types of tasks were employed: an oral production task, an on-line self-paced grammaticality judgment task, and an on-line self-paced reading comprehension task. Results indicated that the acquisition of oblique relative clauses in Spanish is a problematic area for second language learners of intermediate proficiency in the language, regardless of their native language.

In particular, this study has showed that, even when the learners’ native language shares the main properties of the L2, i.e., fronting of the obligatory preposition (Pied-Piping), there is still room for divergence, especially in production and timed grammatical intuitions. On the other hand, reaction time data have shown that L2 learners can and do converge at the level of sentence processing, showing exactly the same real-time effects for oblique relative clauses that native speakers had. Processing results demonstrated that native and non-native speakers alike are able to apply universal processing principles such as the Minimal Chain Principle (De Vincenzi, 1991) even when the L2 learners still have incomplete grammatical representations, a result that contradicts some of the predictions of the Shallow Structure Hypothesis (Clahsen & Felser, 2006). Results further suggest that the L2 processing and comprehension domains may be able to access some type of information that it is not yet available to other grammatical modules, probably because transfer of certain L1 properties occurs asymmetrically across linguistic domains.
In addition, this study also explored the Null-Prep phenomenon in L2 Spanish, and proposed that Null-Prep is an interlanguage stage, fully available and accounted within UG, which intermediate L2 as well as first language learners go through in the development of pied-piping oblique relative clauses. It is hypothesized that this intermediate stage is the result of optionality of the obligatory preposition in the derivation, when it is not crucial for the meaning of the sentence, and when the DP is going to be in an A-bar position, so it can get default case. This optionality can be predicted by the Bottleneck Hypothesis (Slabakova, 2009c) if we consider that these prepositions are some sort of functional morphology.

This study contributes to the field of SLA and L2 processing in various ways. First, it demonstrates that the grammatical representations may be dissociated from grammatical processing in the sense that L2 learners, unlike native speakers, can present unexpected asymmetries such as a convergent processing but divergent grammatical intuitions or production. This conclusion is only possible under the assumption of a modular language system. Finally, it contributes to the general debate of generative SLA since it argues for a fully UG-constrained interlanguage grammar.
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CHAPTER 1: INTRODUCTION

1.1. Overview and Significance

This dissertation investigates the nature of interlanguage grammars in English and Arabic speakers learning Spanish as a non-native language. One of its main goals is to elucidate the process of acquiring second language (L2) grammatical knowledge and how this knowledge is used in real-time. Thus, this dissertation is about the relationship between L2 grammar representation and L2 processing, and it aims to explore the extent to which one component feeds the other, and the consequences of the relationship between the grammar and the parser for language learning. Ultimately, we want to discover whether L2 grammatical knowledge and L2 processing differ from native grammatical knowledge and processing. If differences are found, the questions are whether those differences are qualitative or quantitative; and whether those are due to possible grammatical deficits in second language learners, or reside in their processing resources.

Specifically, I focus on Spanish prepositional relative clauses acquired by English and Arabic native speakers who are learning Spanish as a non-native language. Prepositional relative clauses are a type of wh-structure that has different properties in Spanish, English and Arabic. By comparing the processing, comprehension, and production of prepositional relative clauses in different types of non-native speakers, I try to determine the role of universal principles, processing strategies and previous language knowledge in acquiring a new language, in this case, Spanish. In addition, I explore the Null-Prep phenomenon which consists of dropping the obligatory preposition in certain constructions. For example, in English prepositional relative clauses such as *The man that María depends economically on is very rich*, L2 learners tend omit the obligatory preposition *on*. This phenomenon has been investigated in L2 English, and its
explanation ranged from being an illegal property sanctioned by Universal Grammar, a case of a “wild” grammar (Klein, 1993), to a way of avoiding the marked English Preposition Stranding together with wh-movement incomplete acquisition (Klein, 2001). Also, it has been interpreted as a matter of economy of computation (Dekydtspotter, Sprouse, & Anderson, 1998), the product of A’-binding and not one of wh-movement. In short, both accounts: namely, grammatical impairment and processing deficit have been proposed to explain the Null-Prep phenomenon. However, none of the previous studies have presented experimental data that could speak to both approaches at the same time and disentangle the discrepancy. This study hopes to gain a better understanding on the Null-Prep phenomenon and the apparent non-convergent L1 and L2 grammars. The reason why this study can contribute to the current theories on Second Language Acquisition (SLA) is that it makes available new on-line and off-line experimental data that provide a more accurate description of the relationship between the grammar and the parser in second language learners, and between the production, processing and comprehension systems in second languages.

This investigation supports the idea that interlanguage (IL) grammars are natural languages, and as such they are affected by linguistic universals in the same way as natural grammars are. In other words, IL grammars are regulated by universal principles, typological considerations and processing complexities as any other natural language. Essentially, the main difference between native and non-native grammars is the prominent role that the L1 plays in the development of the target language, and this L1 effect can be positive, so it can help in the acquisition process, but it can also be a challenge that needs to be overcome. On the other hand, this dissertation demonstrates that the Null-Prep phenomenon is by no means particular to L2 English, as
discussed in the existent literature. Rather, it is a distinctive interlanguage property since it is
also produced in the L2 Spanish grammar of English and Arabic native speakers.

Despite the fact that the second language learners showed an indeterminate knowledge of the
relativization structures investigated, as reported in the on-line grammaticality judgment task, the
results of the on-line processing task indicated that L2 learners and native speakers alike have
less difficulties, i.e. have shorter reaction times (RTs), when processing the grammatical Pied-
Piping, compared to its ungrammatical counterpart (Null-Prep phenomenon). This fact suggests
that the omission of the preposition does not seem to be the consequence of reducing the
processing load, (or applying economy in processing). On the contrary, the data presented in this
dissertation indicated that the appearance of the preposition before the relative pronoun (the
pied-piped preposition) facilitated the integration of the displaced element in real-time
processing. In other words, that the L2 learners read and processed the preposition in a native-
like manner and applied universal processing strategies such as Active Filler Hypothesis (Clifton

Furthermore, the comprehension data revealed that for the L2 learners, but not for native
speakers, the lack of the preposition did not have any interpretability consequences, suggesting
that omission of the preposition, if it took place, had no interpretative consequences and
observed the universal principle of deletion-up-to-recoverability (Chomsky, 1981).

In conclusion, this study shows that L2 learners can present difficulties at the production and
intuitional level, which seem to indicate a representational problem, at least temporarily.
However, these L2 learners can and do converge at the processing and comprehension domains,
indicating full access to Universal Grammar. This asymmetry can be explained assuming that the
differences found in the production and the grammaticality judgment tasks reflected the typical
difficulties that functional morpho-syntax suppose for second language learners, as predicted by the *Bottleneck Hypothesis* (Slabakova, 2009); whereas convergence in processing and comprehension showed full access to universal processing strategies and universal semantics.

This chapter is organized as follows: first there is a brief description of the theoretical linguistic framework that motivates this study. Then, I present the main assumptions I adopt for the grammar of second language learners. Finally, I present a brief introduction to general language processing and the types of syntactic parsers proposed in the literature for language processing and language learning.

1.2. Linguistic Theory

1.2.1. Theoretical Framework: Universal Grammar

Traditionally, Universal Grammar is the name of the theory that characterizes language as an instinct, as a genetic endowment (Chomsky, 1957, 1965). In modern linguistics, however, this traditional meaning has evolved and Universal Grammar (UG) has also acquired a more technical meaning referring to the complex linguistic system that all humans seem to share regardless of the differences in the languages of the world. In this sense, UG is a theory with multiple purposes. On the one hand, it tries to account for what constitutes knowledge of language in mature native speakers, usually by means of a formal description of linguistic properties. This language knowledge is most of the time implicit in the case of native speakers, but, as we will see, this is not always the case in non-native speakers. In addition, the description of this language knowledge is inexorably based on language performance, i.e. on particular language manifestations and linguistic judgments, which can obscure the process of describing pure linguistic competence. This description is even more difficult with language learners, given
the fact that some of the properties that characterize their grammars are variability and
instability. The ultimate goal of this formal description is to reveal the cognitive mechanisms that
human beings employ when using a language.

On the other hand, the theory of Universal Grammar also attempts to explain the relatively
rapid and apparently effortless acquisition of that linguistic knowledge by children. In the next
section, we will briefly explain the first language acquisition endeavor. Nevertheless, this
dissertation is devoted to study the process of acquiring a non-native language by adult speakers.
This process will be described using the linguistic formalisms proposed for native languages. As
we will see, one of the main objectives of this study is to show the extent to which native
speaker’s cognitive mechanisms differ from non-native speaker’s ones when producing,
processing and comprehending a language.

1.2.2. UG and Language Acquisition

How children learn a language -a highly complex computational system- in a relatively short
period of time, (around 3 years), is one of the challenges that any linguistic or psycholinguistic
theory must answer, especially if we consider that children learn the language under conditions
of “poverty of the stimulus”. That is, children are exposed to underdetermined, degenerate input,
and they lack negative evidence (they have no explicit information about ungrammaticality or
what is not possible in the language). In the Chomskyan tradition, the explanation for this logical
problem resides in the assumption of a linguistic biological component. However, despite the
fact that we all share a presumably identical language device, each and every language in the
world seems to be different, with its own properties and complexities. Clearly, this is not a
negligible paradox. In order to disentangle this paradox, Chomsky (1981) developed the
Principles and Parameter framework, which attempts to explain both, the easiness of first language acquisition and the (apparent) variation among natural languages. The main idea is that Universal Grammar constrains the form of a language by means of two elements: Principles and Parameters.

Principles are universal and common to all the languages of the world. So, they do not need to be acquired because they are innate. Parameters, on the other hand, regulate variation among languages. For instance, parameters would determine the properties of particular languages, such as the availability or non-availability of certain functional categories and word order variation, among other things. In more recent accounts of the Principles and Parameters model (Borer 1984; Chomsky, 1995, 1998), parameterization resides mainly in the lexicon. According to the Minimalist program, the lexicon consists of lexical items that will enter into the numeration with pre specified features. These features, specifically the interpretable (semantic) and uninterpretable (morphosyntactic) features are ultimately responsible for syntactic structure. Under this view, one could say that the differences among languages reside in the formal features, for instance, in functional categories such as mood, aspect, tense, some prepositions, etc. Most of these formal features are assumed to be universal and innate, and therefore available through UG. However, different languages instantiate -or not- these features in different ways. Then, the task of a child when learning a language is to map the relevant features from the universal and innate inventory into the specific lexical items that her language exploits. These specific lexical items and their correspondent formal features need to be learned. In Chomsky’s words: “Language acquisition is in essence a matter of determining lexical idiosyncrasies. If substantive elements (nouns, verbs, etc.) are drawn from a universal vocabulary, then only functional elements will be parameterized” (Chomsky, 1995:135).
The case of adult second language learners is somewhat different because mappings between universal features and lexical items have already taken place for their first language. If we extend the ideas of the Minimalist model to SLA, then, the task for a second language learner would be a matter of restructuring or reassembling those mappings (Ladiere, 2008, 2009). In this sense, the true parameters, i.e. the fundamental differences among languages, are these universal features and how each language lexicalizes them. The main parametric differences in prepositional relative clauses among the three languages entertained will be described in chapter 2.

1.2.3. Universal Grammar and Second Language Acquisition: Interlanguage Grammars

While it is clear for some linguists that Universal Grammar explains the rapid acquisition of language by children, given that UG provides for the set of principles (and features) common to all languages, for the past three decades some researchers have considered whether UG also constrains the acquisition of non-native grammars. Specifically, generative research in second language acquisition is concerned with the nature of interlanguage grammars and whether these non-native grammars are within the limits posited by UG.

The concept of “interlanguage” (IL) was proposed by Selinker (1972), and Adjémian (1976), among others, after the observation that learners of non-native languages do not make random errors. Rather, those errors seem to follow a pattern. This systematicity in the mistakes a learner makes when developing a second language took these linguists to propose that interlanguage grammars were rule-governed and could be considered “natural languages”. Adjémian (1976), characterized them as the following:
Underlying the IL hypothesis is the unwritten assumption that ILs are linguistic systems in the same way that Natural Languages are. (By “natural” language I mean any human language shared by a community of speakers and developed over time by a general process of evolution.) That is, ILs are natural languages. (p. 298)

Therefore, if an IL is considered a natural language, it is reasonably to question to what extent ILs are UG-constrained. Moreover, we need to further examine whether second languages are acquired as effortless and rapidly as in L1 acquisition thanks to UG. The immediate response to this question is no. Almost everybody who is an adult second language learner knows that what it takes to master a second language is precisely, among other things, time and effort. Does this mean that we should disregard the idea of a UG-constrained interlanguage grammar altogether? Of course not, and will see why as this study unfolds.

In the next section, several hypotheses with respect to the role of UG in SLA will be examined. This section will discuss the possible sources for the (apparent) non-convergence between native and non-native grammars and in which linguistic domains we can attest these divergences.

1.2.4. The Role of UG in SLA

There is certain disagreement as to the role of UG in L2 acquisition, particularly due to the fact that L1 and L2 acquisition are a priori very different, at least in outcome. While normally developing children are universally successful in acquiring their L1, the degree of success in L2 acquisition is quite variable. One important difference between the two situations, for example, is
the nature of the initial state of acquisition. Adult L2 learners already have a grammar in place, their L1. The L1, assuming the tenets proposed by Chomsky sketched in the previous section, is a particular instantiation of UG, which raises the question of whether the L2 learners are limited to access only the particular form of UG available through their L1, or whether they can (re)access the entirety of UG. In the following sections, we will briefly review the different generative proposals that try to explain the variable upshots in SLA.

1.2.4.1. No Role of UG: Wild Grammars and the Fundamental Difference Hypothesis

If we find an interlanguage grammar that falls outside the bounds set by UG, then we could argue that interlanguage grammars are not constrained by UG. This is precisely what Klein’s (1993) seminal work on prepositional relative clauses seemed to show: an impossible grammar. Klein proposed that some of the outcomes in English second language learners when producing certain wh-constructions did not follow the limits of UG, resulting in a “wild” interlanguage grammar. In particular, L2 English learners were constructing prepositional questions and relative clauses without the obligatory preposition, allowing a null preposition to illegally govern the trace left behind. This would constitute an Empty Category Principle (ECP) violation, which is considered a universal principle. If we assume that an interlanguage grammar is UG-constrained then, that grammar must follow all principles supposed to be universal. Inability to do so would mean that UG did not play a role in the development of that grammar. Such L2 outcomes outside UG have been termed as “impossible” (White, 1982, 1988), “rogue” (Thomas, 1991), “illicit” (Hamilton, 1998), and “wild” (Klein, 1993, 1995).

One of the explanations for this violation could be that, after puberty, an L2 is learnt by very different mechanisms from those operating in L1. Proponents of this explanation believe that UG
is no longer available after a certain age, implying a biologically motivated Critical Period for language learning (Clahsen & Muysken, 1986; Johnson & Newport, 1991; Meisel, 1997). Therefore, L1 acquisition is fundamentally different from L2 acquisition (Bley-Vroman, 1990, 2009) because the latter does not turn to UG to build the new grammar; instead, it resorts to the grammar already materialized, the L1. As a consequence, L2 grammars result in unreliable and nonconvergent linguistic systems.

**1.2.4.2. Partial Role of UG: Failed Functional Features Hypothesis**

Other reasoning to explain the divergent outcomes between native and non-native speakers is proposing partial access to UG. There are several hypotheses that argue for an incomplete role of UG: Failed Functional Features Hypothesis (Hawkins & Chan, 1997), Local Impairment Hypothesis (Beck, 1998), Valueless Features Hypothesis (Eubank, 1994, 1996), Interpretable Features Hypothesis (Sorace, 2000, 2003) or Interface Hypothesis (Serratrice & Sorace, 2003; Serratrice, Sorace & Paoli, 2004; Sorace & Filiaci, 2006), to name a few. Each one of them hypothesizes a different locus for the impairment: some of them propose UG-restriction everywhere except for the formal (uninterpretable) features, others at the level of functional categories, others at the level of interpretable features, or syntax-discourse interface. The common idea is that there is always some remaining difficulty in second language acquisition that will never be overcome or restructured.

**1.2.4.3. Total Role of UG: Full Transfer / Full Access Hypothesis**

Finally, there are those who advocate for a comprehensive UG-constriction in interlanguage grammars: the Full Access Hypothesis (Flynn & Martohardjono, 1994; Flynn, 1996) and the Full
**Transfer / Full Access Hypothesis** (Schwartz & Sprouse, 1994, 1996) are the two most prominent proposals. These two models hypothesize that second language learners can potentially restructure their non-native grammar away from the native grammar thanks to full accessibility to UG. The Full Transfer/Full Access hypothesis further proposes that the previous first language has a crucial, yet initial, role in the development of the new grammar. In this sense, the full transfer (L1 interference) part of the hypothesis would explain the non-target-like performance by most of the L2 learners. There are several other proposals within the *full access* to UG approach that try to explain why, even though the L2 learner has total access to UG, his performance is hardly always native-like. The *Missing Surface Inflection Hypothesis* (Prévost & White, 2000) proposes that despite the fact that the appropriately morphosyntactic features have been acquired, there can be some type of problem in the computation of those features, resulting in morphological variability at the performance level. A similar account is the *Reassembly Features Hypothesis* (Lardiere, 2008, 2009), in which a temporal feature mapping difficulty is predicted. Crucially, these hypotheses argue for a complete grammar representation acquisition, with punctual computational deficits.

### 1.2.5. Computational Problems vs. Processing Problems

Finally, there are the proponents for an approach in which the source of non-native convergence is in the processing resources. Slabakova (2009a), in her recent evaluation of the 20 years of the Fundamental Difference Hypothesis, suggests that “The differences in linguistic achievement between children and adult language learners, then, appears to be gradual and quantitative, but not qualitative, and may be fundamental only in processing” (p. 170).
At this point, I would like to notice the subtle, yet essential, difference between computational and processing shortfalls. Whereas computational impairment typically refers to mismatching effects among grammatical domains, such as feature (re)assembly or problems at the internal interfaces; processing deficits usually refer to the problems that emerge when putting grammatical knowledge in use. In other words, processing is concerned with real-time use of the language and interacts with other cognitive modules, such as memory. Computation, on the other hand, refers to the linguistic calculation of a derivation. Although these two notions are usually used indistinctively, they are essentially different issues.

For instance, one of the few studies that explored both, the grammar and the parser in second language learners is Hopp (2007, 2009). In his inspiring work, Hopp discusses the interface between grammar and parsing, in which grammar is considered competence, and parsing is part of the performance system for sentence comprehension. And he groups processing problems (“parsing routes”, Declarative/Procedural Model, Ullman, 2004) together with performance inefficiency at the computational level (Missing Surface Inflection, Prévost & White, 2000) under the general label of “computational” nature of non-convergence. But as Chomsky (1965) clearly put it “When we say that a sentence has a certain derivation with respect to a particular generative grammar, we say nothing about how the speaker or hearer might proceed, in some practical or efficient way, to construct such a derivation. These questions belong to the theory of language use –the theory of performance.” (p. 9). Even though this is an old statement, it still captures the intuition that grammatical analysis, presumably part of competence for him, may say nothing about real-time processing, a performance issue. For this reason, in this study these two concepts are, when possible, kept apart. Also, in this study, although the research questions and ultimate objectives are very similar to the ones in Hopp (2007), the term interface between
grammar and processing is explicitly avoided, for several reasons. First, it is not clear what would be the nature of this interface between the grammar and the processing system, is it a grammatical module? Is it considered part of linguistic competence or part of linguistic performance? And second, it is possible that the term *interface* is somehow overused in recent generative SLA research.

### 1.2.6. Summary

In this section, we have reviewed the effects of the presence or absence of Universal Grammar in second language acquisition. The incidences of UG in this process range from potentially allowing a complete grammar representation, to partially helping with the endeavor of learning a second language or, on the contrary, to playing no role in the whole process. The role of UG basically determines the representational nature of the second language. If UG is not fully available, the second language can result in an incomplete grammar or may present localized gaps, such as lack of certain formal features. In addition, full accessibility to UG does not guarantee a native-like grammar, either. It may provide a potentially complete competence, which does not imply that all second language learners will fully develop it, and it does not guarantee native-like performance. A strong L1 interference and difficulty with the mapping of certain grammatical submodules can cause variability and instability in the non-native grammar.

More generally speaking, the investigation of language acquisition within Generative Grammar is relevant not only because it directly tackles one of the problems posited by Chomsky, i.e., how language is acquired; but also because it attempts to find a response to the key question in linguistic theory: what constitutes knowledge of language. Experimental
language acquisition research is an excellent source of empirical data that can contribute to the description of language knowledge.

The Chomskyan traditional view of language users is that of an idealized native speaker whose knowledge of language is complete and generally errorless. Generative linguistics mainly devotes its studies to formally account for this “ideal” native linguistic system. However, when it comes to experimental data, experience tells us that, depending on the structure investigated, there is more variation in native speaker judgments than generative writing leads us to believe. To this effect, I try to give a broader account of native speakers’ language intuitions including non-standard structures of relative clause formation in Spanish such as resumptive pronouns. Actually, the Null-Prep phenomenon is also worth investigating in native languages because there appears to be certain variation in the grammatical options exercised by native speakers with prepositional relative clauses, particularly in spontaneous oral production.

In order to understand this divergence between the theoretical description of a phenomenon and its use, we need to take into consideration Chomsky’s “fundamental distinction between competence (the speaker-hearer’s knowledge of his language) and performance (the actual use of language in concrete situations)” (1965:4). Linguistic knowledge or competence is the abstract and unconscious mental representation that a speaker (native and non-native) has of a language. Performance is the concrete actualization of that knowledge. But, how do we measure linguistic competence? Even though one of the main purposes of linguistic theory is to reveal the essential characteristics of this knowledge, it is impossible to study it directly. Grammatical knowledge can only be indirectly accessed through the language production and comprehension systems. In other words, linguistic competence can only be observed and estimated indirectly, through performance. For this reason, the working assumption will be that anything that appears in
performance would be necessarily considered part of the speaker’s competence, but not
everything that can be part of the competence of a speaker will be always reproduced in his/her
performance.

During the last three decades, SLA research has been evolving in both theoretical and
methodological sophistication. According to White (2003), there are three types of data resulting
from different language elicitation methods: production, comprehension, and intuition data.
However, White does not mention real-time processing, a different approach to language
investigation that can bring new light not only into our general knowledge about
psycholinguistics but also into second language studies. If processing data can present a wider,
more real picture of what constitutes linguistic knowledge in native grammars, -one of the
objectives of linguistic theory-, then, nothing indicates that this same methodology will not help
us describe the character of interlanguage grammars. Not only does the present study take into
account the syntactic intricacy of relative clauses, but it also considers he real time in which this
type of structure gets processed and how time relates to complexity.

The next section introduces the study of real-time language and summarizes the types of
parsers proposed in the literature and the relationship that the parser holds with the grammar.

1.3. Language Processing Theory

1.3.1. Introduction

The study of real time sentence processing is devoted to discovering the language
mechanisms that a speaker uses when trying to incorporate each new word incrementally into the
discourse. Parsing involves word recognition followed by assigning grammatical structure (word
category, hierarchical structure, grammatical features, etc.) to the input string, as well as
semantic structure ($\theta$-role assignment, interpretation, etc.). The great majority of psycholinguistic research, particularly the one framed in generative grammar, assumes that syntactic and semantic knowledge are different linguistic modules (Trueswell, Tanenhaus, & Garnsey, 1994). We also know that syntactic analysis occurs from the very beginning and very rapidly (Frazier & Rayner, 1982), and that meaning integration is also very quickly processed and incorporated with general knowledge (Traxler & Pickering, 1996). These processes occur incrementally: as soon as a word is recognized aurally or visually, it is semantically integrated with the previous discourse as fast as possible (Just & Carpenter, 1980). And all these actions require integrating previous grammatical knowledge with the appropriate processing strategy by a language processing device called parser.

1.3.2. Types of Parsers

One of the main inquiries about language processing is whether the parsing mechanism is essentially the same for all languages or whether it varies as a function of the language and/or the speaker. Broadly speaking, if we assume a biological component in the human language ability, it is quite straightforward to postulate a universal parser. Furthermore, if we conceive Universal Grammar as consisting of Principles and Parameters, we also need to question whether the parser mechanisms can also be parameterized. In other words, we still need to define which are the universal principles that regulate language processing and which are the options, if any, within those principles.

In terms of universality, parsing theories can be broadly classified into three categories: (adapted from Cuetos, Mitchell & Corley 1996): universal, customized and probabilistic.
1- The “universal” parser theories, which propose the same parsing strategies for all languages (Bever, 1970; Frazier, 1987; Fodor & Inoue, 1994, among others).

2- The “customized” parser, which assumes selection of the processing strategy as a result of parameter setting during grammar-acquisition (Gibson, Pearlmutter, Canseco-Gonzales, & Hickok, 1995; Frazier & Rayner, 1998).

3- The “probabilistic” parser, tuned by the specific language experience that the parser has received from the input (Bates & MacWhinney, 1987; St. John & McClelland, 1990).

Classification 1 and 2 are related: the customized parser is mostly the reformulated version of the universal parser. These two accounts are directly opposed to the statistical parser, which by no means proposes any type of universality. We will analyze in more detail the issue of universality in language processing later when we discuss processing strategies in non-native languages.

1.3.3. Sources of Information

Regarding the type of information the parser uses, we could further reduce the classification into two competing approaches, the syntax-first proposals or principle-based proposal on the one hand, and the constraint-based proposals, on the other. The syntax-first models are generally consistent with universal or parameterized parsers, whereas the constraint-based model mostly exemplifies the statistical parsers.

The idea under the syntax-first parser is that syntax feeds the semantics, so first the syntactic attachment is done, and then the theta roles are assigned. Furthermore, the syntax-first parser can be subdivided into two classes, depending on whether the main sources of information feeding the parser are syntactic principles or lexical items. The principle-based parser is guided by
general syntactic principles; that is, by a set of rules that determine syntactic attachment. The most representative example of this tendency is the *Garden Path Model* (Frazier, 1979, 1987), which proposes two universal principles for sentence parsing: minimal attachment and late closure. To these two principles, we can add a third one directly related to the processing of filler-gap dependencies, the minimal chain principle (De Vincenzi, 1990, 1991).

(1.1) Universal Principles in Language Processing

(a) *Minimal Attachment*

Do not postulate any potentially unnecessary nodes.

(b) *Late Closure*

If grammatically permissible, attach new items into the clause or phrase currently being processed (i.e., the clause or phrase postulated most recently)

(c) *Minimal Chain Principle*

Postulate required chain members at the earliest point grammatically possible but postulate no potentially unnecessary chain members.

These three principles ensure that sentence processing is efficient and economical. More recently, Frazier and Clifton (1996) have further proposed the Construal Theory for those cases in which these principles are not suitable, especially in structural ambiguities, such as RC attachment. The Construal model suggests that in certain ambiguities, the standard parsing strategies do not apply. Instead, the preferences are determined by thematic or discourse processing operations like focus effects, semantic properties, or Gricean principles.
The other source of information for the *syntax-first parser* can be lexical. In this mode, the structural preferences are determined by the subcategorization frames stored in the lexicon (Fodor, 1978; Bresnan, Kaplan, Peters & Zaenen, 1982, Mitchell & Holmes, 1985). If the preferences encoded in the frames are strong, they influence the syntactic analysis; otherwise, default syntactic principles apply (minimal attachment and late closure). The idea behind the lexical parser is very similar to the projection principle (Chomsky, 1981), and goes hand in hand with more recent accounts of generative framework such as minimalism (Chomsky, 1995).

The *constraint-based parsing accounts*, on the other hand, propose that sentence processing is a competition between different cues –lexical, semantic, pragmatic, frequency counts, word order, etc.– that are activated and considered simultaneously. There is not a primacy of syntax over semantics; rather, there is mutual influence on each other (Just & Carpenter, 1980; MacWhinney, 1986; St. John & McClelland, 1990).

We will see that both, native speakers and second language learners follow these three universal parsing principles and that the results of the processing experiments presented in this dissertation provide empirical evidence supporting the syntax-first accounts of language processing.

1.3.4. Language Processing in Second Language Learners

The study of second language processing with psycholinguistic methodology (on-line processing, event-related brain potentials or ERPs, etc.) is recent and scarce, compared to the study of language processing in adult (monolingual) native speakers. One of the main difficulties that this type of research has to deal with is the fact that, most of the times, the second language grammars under investigation are still incomplete or in development. For this reason, it is crucial
to distinguish between the actual knowledge of the target language and the processing mechanisms that the learner uses to parse that knowledge. In fact, unlike with native speakers, for whom possible interpretations of the processing results are usually uncontroversial, the data of non-native speakers directly hinge on the framework we assume: namely, from the relationship assumed between the grammar and the parser. But to define this relationship is not an easy endeavor and it raises important theoretical questions such as: what is first, the grammar or the processor? Does the grammar we know (possible incomplete) customize the parser or does the parser (for instance, shallow or overloaded) condition our grammar representations? In fact, these questions could remind us of the traditional distinction between competence and performance and we could ask ourselves whether processing is just a matter of performance or whether it truly reflects language competence. As we will see, this question is not a trivial matter. An alternative is to think that these two components, the grammar and the parser, interact together and that we build grammar representations as we process them (Carroll, 1999). The next section reviews proposals on the relationship between the grammar and the parser that can be relevant for second language learners despite the fact that very few of them are conceived with this population in mind.

1.3.5. Language Architecture: on the Relationship between the Grammar and the Parser

In order to make claims about the grammatical representations and/or the processing strategies that a language learner exploits when learning a second (or third) language, it would be useful to define how the grammar and the parser work together. However, since this is a relatively new field of investigation, not all theories tackle this issue directly. The relationship
between the parser and the grammar also depends on the type of parser assumed, and its precise characteristics are yet to be determined. The next section summarizes some of the most relevant proposals put forward to explain the relationship between the grammar and the parser. We need to take into account, though, that these proposals were not conceived with second language learners in mind. Nevertheless, we can generally extend their tenets to this population. The following figure represents the standard model of language and its components (from Phillips, 1996, p. 16)

(1.2)

1.3.5.1. The Grammar is shaped by the Parser

Crain and Fodor (1985) assume that the parser and the grammar are well matched, meaning that grammars are the way they are specifically to facilitate parsing, a cognitive operation. What's more, their perspective “sees the overall shape of human languages as the consequence of a very restricted format for their rules, and it sees this restricted format as a means for ensuring that the rules can be put to use quite straightforwardly in sentence processing” (p. 103).

John Hawkins stretches this argument in his crosslinguistic study of relative clauses and further proposed that grammars themselves are “profoundly shaped” by processing. Since filler-gap dependencies are difficult to process, “this difficulty is directly reflected in the convention of
grams” (Hawkins, 1999, p. 245). As a result, he considers processing a central component of grammatical theory that could explain both grammatical variation and possible versus impossible grammars.

1.3.5.2. The Syntax-First Universal Parser

Theories that propose universal processing principles, such as the Garden Path Theories (Frazier, 1979, 1987) or the Refined Garden Path Theories (Frazier, 1990; De Vincenzi & Job, 1993) assume a prominent role of the grammar in which the parser assigns syntactic structure to the word strings. As summarized in section 1.3.2, these proposals hypothesize that Minimal Attachment and Late Closure, the processing principles that ensure efficiency, act universally, independently from the language. So, the grammar does not have the ability to modify in any way the processing strategies, but it has a very important role in the whole process since the syntax drives the overall interpretation.

1.3.5.3. The Tuned Parser: No Particular Relation between the Grammar and the Parser

However, most of the studies that show the application of these universal principles as regulators of the processing strategies are conducted in English (see Frazier, 1987 for evidence in Dutch and Japanese). Cuetos and Mitchell (1988) challenged the non-arbitrary applicability of Late Closure by studying syntactically equivalent structures in Spanish and English. Particularly, they investigated the now pervasive relative clause attachment ambiguity of sentences such as “Alguien disparó contra el criado de la actriz que estaba en el balcón” (Someone shot the servant of the actress who was on the balcony), in which the servant or the actress could potentially be in
the balcony. Their results showed that Spanish native speakers, unlike English native speakers, slightly preferred high attachment over low attachment. Spanish native speakers mostly interpreted the sentences as the servant and not the actress being in the balcony. This result goes against the universality of the Late Closure principle since the new items --in this case, the relative clause-- where not attached to the currently phrase being processed (the actress). To account for these crosslinguistic data, Mitchell (1994) put forward the Tuning Theory according to which the processing preferences in structures with ambiguities are adjusted by the frequency of previous resolved ambiguities in the language. This view assumes no particular relation between the grammar or the grammatical crosslinguistic differences among languages and the parser.

1.3.5.4. The Universal Parser with Adjustable Preferences: Parameters do not change the Parser

On the other hand, Gibson, Pearlmutter, Canseco-González and Hickok (1996) do not want to deny entirely a relationship between the grammar and the parser and they explain crosslinguistic variation such as the one found between English and Spanish relative clause attachment by suggesting the possibility of a universal parser with rateable preferences. In their hypothesis, Gibson et al. do not mind whether crosslinguistic differences in the processor come from frequency in the input or from grammatical parameterization, but they explicitly deny the possibility of grammatical parameters directly setting the preferences in the processor. Accordingly, Gibson et al. proposed a variant of the Late Closure principle that can be ranked according to parsing attachment preferences. These crosslinguistic parsing preferences can be the result of a ranking between two factors, the Recency Preference or the Predicate Proximity:
(1.3) **Recency Preference:**

Preferentially attach structures for incoming lexical items to structures build more recently.

(Gibson et al. 1996, p. 26)

(1.4) **Predicate Proximity:**

Attach as close as possible the head of a predicate phrase. (Gibson et al. 1996 p. 41)

For instance, in RC attachment, Predicate Proximity would favor high attachment, whereas Recency Preference would ensure a low attachment. Therefore, in Spanish RC, Predicate Proximity prevails over Recency Preference.

**1.3.5.5. The Grammar-Derived Parser**

Pritchett (1992) gives a very prominent role to the grammar and considers parsing “the local application of global grammatical principles”. Basically, language is constructed following a syntactic principle: the theta criterion applied locally. Pritchett proposes three main principles that guide the processing:

(1.5) **Theta Attachment:** the theta criterion attempts to be satisfied at every point during processing given the maximal theta grid.

(1.6) **Theta Reanalysis Constraint (TRC):** Syntactic reanalysis which reinterprets a theta-marked constituent as outside of its current theta domains is costly, or impossible for the automatic human sentence processor.
(1.7) **Theta Domain:** \( \alpha \) is in the \( \gamma \) theta domain of \( \beta \) iff \( \alpha \) receives the \( \gamma \) theta role from \( \beta \) or \( \alpha \) is dominated by a constituent that receives the \( \gamma \) theta role from \( \beta \). (Pritchett, 1992, Chapter 3)

Pritchett’s approach is compatible with a linguistic model such as the Minimalist framework (Chomsky, 1995) in the sense that each word comes to the derivation with its specific features; then the parser tries to incorporate it to the string, interpret it, and fulfill the grammatical principles as soon as possible, basically theta role assignment and case. So, the parser works because the grammar feeds it with the appropriate information.

### 1.3.6. Implications for Second Language Learning

With regards to second language acquisition, one possible implication of Pitchett’s assumption on the prominence of grammar is that the L2 learners’ performance, usually different from the natives’ performance, is not necessarily the result of a competence or representational deficit but the result of processing difficulties (Juffs & Harrington, 1995). In that sense, we can assume that the particular L2 grammar for that structure would be complete or target-like, but the processing strategies are not. It is an empirical question whether the processing strategies or the parser continues to develop as proficiency or automaticity increases. For instance, according to Carroll (1999, 2001), second language learning occurs when parsing fails, that is, when there are mismatches between the learner’s grammatical representation and the processed input. These parsing failures usually occur as a consequence of applying L1 processing operations to parse the L2, implying that L1 processing is fully transferred into the L2. Similarly, under Pritchett’s approach, the parser is perceived as tailored by the L1 grammar, and both the L1 grammar and the L1 processing strategies can be transferred into the L2 (Juffs, 2005).
Crucially, these parsing perspectives hinge directly on the concept of grammar assumed, as it does in the Clahsen & Felser’s (2006a,b) *Shallow Processing Hypothesis*. Clahsen & Felser believe that L2 grammatical processing is fundamentally different from grammatical processing in one’s native language; they believe it is shallower compared to L1 processing, in the sense that it has less syntactic detail than L1 processing and relies more on lexical-semantic cues for interpretation. “We believe that although both processing routes are available to L2 learners in principle, successful structural parsing depends on the availability (and accessibility) of sufficiently detailed, implicit grammatical knowledge” (Clahsen & Felser, 2006a, p. 117-118).

So, since they assume that the grammar feeds the parser, they further claim that the different L2 processing is due to a deficient L2 grammar: “under this view, whether or not L2 learners can also develop nativelike parsing abilities will depend on their acquiring a nativelike grammar” (Clahsen & Felser, 2006a, p. 118).

Clahsen and Felser’s hypothesis is important for several reasons. It is the first processing hypothesis that exclusively tries to account for divergent processing results in the L2 acquisition literature and goes beyond the classic distinction between competence and performance. Clahsen and Felser’s most compelling evidence comes from the L2 learner’s inability to postulate intermediate traces, a syntactic gap that native speakers use to facilitate on-line filler integration in sentences such as “The nurse who the doctor argued *t1* that the rude patient had angered *t2* is refusing to work late”. Their studies showed that native speakers would slow down at this intermediate gap position (*t1*), meaning that they reactivated the filler at this position and then easily integrated the filler’s semantic information with its subcategorizer. Similar sentences without this intermediate trace such as “The nurse who the doctor’s argument about the rude patient had angered *t* is refusing to work late” did not display a slow down at an intermediate
position. L2 learners responded equally to these two types of constructions, presenting no differences in reaction times. According to Clahsen and Felser, this proves that L2 learners underuse syntactic information when processing the second language. Instead, they rely on lexical-semantic and pragmatic information to establish filler-gap dependencies. But as discussed before, they assume that this difference between the L2 learners and the native speakers is the result of having an incomplete L2 grammar and not a processing deficit per se, and they even propose that L2 learners will not be able to employ universal processing mechanisms such as minimal attachment “if the L2 grammar fails to provide sufficient grammatical information” (Clahsen & Felser, 2006a, p. 120).

1.4. The Present Study: General Research Questions

It is generally known that the linguistic systems of second language speakers are very often far from complete and errorless with respect to the monolingual baseline. How different these systems are from those of native speakers is one of the questions this study tries to answer. Specifically, the general research question is about the nature of this L2 learner’s divergence from the native systems. If we find differences in the language of the non-native speakers, are those differences representational in nature, that is, at the level of linguistic competence, or the problems are present only at the performance level? Moreover, what is the source of the problems: L1 influence, the computational system, or an over-loaded processing system?

Additionally, I will assume that the grammar is tightly linked to a parser, the language module that compiles the sentence elements and assigns them a structure and an interpretation. Consequently, the research questions I pose extend to the level of language processing and go beyond the nature of interlanguage grammars, including a necessary inquiry into the role and
performance of this parser in second language learners. Specifically, some of the questions that arise after assuming that grammar also goes hand by hand with the parser in SLA are the following: does the parser follow the same principles in native and non-native languages? Does the parser constrain grammatical representations or, by contrast, is the non-native grammatical representation what conditions the parser?

In order to answer these general questions about the relationship between the grammar and the parser, I compare off-line to on-line data. The off-line data consist of oral production, and the on-line data include a self-paced grammaticality judgment task and a self-paced processing comprehension question task. As mentioned before, the linguistic structure under investigation is Spanish prepositional relative clauses acquired by English and Arabic native speakers. Despite the fact that relative clauses are widely studied in both theoretical linguistics and language acquisition, to my knowledge, the study of L2 Spanish relative clauses produced some preliminary research in the 1980s but has not received much attention since those early days, except in the on-line processing literature. However, mainly one aspect of the processing of these constructions has been studied, and this is the attachment of relative clauses to complex NPs in sentences such as “Someone shot the servant of the actress who was on the balcony”. This study attempts to go beyond the processing literature in Spanish relative clauses by analyzing and comparing the grammar and on-line processing of filler-gap dependencies in prepositional and direct object relative clauses. In the next chapter, I examine the linguistic properties of relative clauses in the three languages involved in the study.

The rest of the dissertation is organized as follows: chapter 2 describes at length the linguistic properties of relative clauses in Spanish, English and Arabic, including their real-time processing. Chapter 3 reviews the relevant literature on the acquisition of relative clauses by
non-native speakers. The results of the experimental studies are presented in Chapter 4, 5 and 6. In particular, Chapter 4 describes the production of relative clauses by English and Arabic native speakers learning Spanish. Chapter 5 presents the data from the self-paced grammaticality judgment task. Chapter 6 goes over the data from the self-paced reading comprehension task. Finally, the discussion and conclusions of the study are presented in Chapter 7.
CHAPTER 2: THE LINGUISTIC PROPERTIES OF RELATIVE CLAUSES

2.1. Introduction: *Wh*-Movement

*Wh*-movement is an extensively studied topic in generative linguistics, especially since 1977 when Chomsky showed that the movement transformation involved in a large number of constructions such as questions, relative clauses, comparatives, easy-to-please construction, etc. could be reduced to the general transformation “*wh*-movement”, a successive cyclic movement to COMP. Later, in 1981, Chomsky’s Government and Binding framework presented *wh*-movement as an instance of a more general transformation: *move α*. This transformation is regulated among others, by the Subjacency Principle (Chomsky, 1986), which basically controls how far a *wh*-phrase can move. Ever since this proposal was put forward, Subjacency has been studied widely in the SLA field because it makes interesting predictions with respect to the role of UG. If L2 acquisition is constrained in all its instances by UG then, all possible L2 interlanguage grammars should obey universal principles, including the Subjacency Principle, regardless of the learners’ L1 or the target language. This has been the central issue in studies such as Johnson and Newport (1991), Hawkins and Chan (1997), and White and Juffs (1998), which investigated the L2 English of Chinese native speakers. Chinese is a language that does not present overt *wh*-movement, so Subjacency seems not to be an issue, at least with argumental *wh*-movement (Huang, 1982). As expected, Hawkins and Chan, and Johnson and Newport found that the Chinese-speaking learners had problems recognizing Subjacency violations in English, a result that made these researchers argue that L2 learners do not have full access to UG, otherwise they would respect the universal principle of subjacency. On the other hand, White and Juffs found that Chinese speakers with more advanced knowledge of English
were accurate at judging these violations, arguing that these L2 learners could indeed access UG. More recently, Belikova and White (2009) have reformulated subjacency into a simpler constraint on extraction and argued that assuming a universal semantic mechanism, subjacency need not be an exclusive property of UG. If this is true, then the fact that L2 learners do not obey subjacency would not necessarily imply a UG violation.

The present dissertation investigates the properties of *wh*-movement in SLA, but differs from the previous studies because the question of Subjacency, albeit relevant, is not the central issue investigated here. Instead, other parametric differences among languages, such as the use and distribution of resumptive pronouns or the availability of pied-piping and/or preposition stranding are considered. If these linguistic properties are language specific and could therefore be considered examples of parametric variation, understanding how these phenomena work and how they are acquired can significantly increase our insights on *wh*-movement beyond Subjacency. In the following pages, I briefly describe the main syntactic analyses proposed for relative clauses and the particular properties of prepositional relativization in the three languages discussed in the study, i.e., Spanish, English and Arabic. Ultimately, these descriptions will help us understand and analyze the phenomena typically found in interlanguage grammars (chapters 4 and 5).

### 2.2. The Syntax of Restrictive Relative Clauses

Traditionally described, a relative clause (RC) is a clause that modifies a noun. There are, broadly speaking, two major categories, restrictive and non-restrictive relative clauses. Restrictive relative clauses limit the meaning of the noun they modify, such as in “the paper that is unfinished is about word order”, suggesting that there is only one unfinished paper and that the
rest of the possible existing papers are finished. That is, the relative clause denotation intersects with the NP denotation. On the other hand, in non-restrictive relative clauses, such as in “the paper, which is unfinished, is about word order”, the relative clause does not modify the NP denotation, that is, there is no intersection between the NP denotation and the RC denotation. In this example, it indicates that this word order study is the only one that is unfinished; the non-restrictive relative clause does not exclude the possibility of other unfinished papers. In this dissertation, I am only concerned with restrictive relative clauses.

When it comes to analyzing restrictive relative clauses, there are basically two competing approaches in the generative literature. The first one, put forward by Chomsky (1977) is the “matching”, “adjunct” or “operator movement” analysis. The other one, initially proposed by Schachter (1973), Vergnaud (1974), and Kayne (1994), assumes a “head-raising” analysis. In the following paragraphs, I explore the main differences between the two accounts and the pieces of evidence that support each analysis. We will see that there is evidence for and against both analyses, which makes this construction somehow ambiguous with respect to its detailed structure. For the most part, the dilemma comes from the position where the head of the relative clause gets its interpretation, i.e. whether the head of the relative can be reconstructed. In fact, some believe that both analyses are possible and even necessary to account for different properties of relative clauses and that both are made available by UG, although for the most part they adopt only one (Aoun & Li 2003; Bhatt, 2000; Hulsey & Sauerland 2006; Sauerland, 2000). When necessary, I exemplify these analyses with Spanish data. I will consider the two analyses because both have been extended to the analysis of relative clauses in Romance languages, and because both have evidence in favor and in contra. However, the field of SLA has mainly
adopted a version of the matching analysis, and for this reason, this will also be the analysis that I will adopt.

Nonetheless, as we get familiar with the Spanish prepositional relative clauses, we will observe that the theoretical debate on Spanish RC is not about the competition between the matching and the raising approaches. Rather, it has to do with the nature of *el que* oblique relatives, with the Doubly COMP Filter, and with whether the *que* particle is a Complementizer or a relative pronoun. Again, we will see that there are arguments in favor and in contra of both proposals, but the most commonly adopted analysis for oblique relative clauses is the one in which the *que* is considered a relative pronoun.

### 2.2.1. The Matching Analysis vs. the Raising Analysis

Since relative clauses show the same properties of other wh-movement constructions such as island sensitivity, Chomsky (1977) proposed an analysis of movement of the relative pronoun to COMP. This is a movement analysis comparable to the way interrogative wh-phrases move in questions. The semantic interpretation comes from the “rule of predication” (Chomsky 1982, Browning 1987), by which the relative pronoun or a phonetically unrealized λ operator, coindexed with the head, moves to Spec,CP and then, as a result of this movement, the relative clause is interpreted as a predication, precisely as a predication of the head. In fact, syntactically, the relative clause is a CP adjoined to the head. The base-generated head (NP) and the predicate (CP; and C° through percolation) agree for φ-features, and then C° agrees with the relative pronoun by a Specifier-Head relation. The graphic representation of this structure is in (2.1).
On the other hand, under the Antisymmetry theory (Kayne, 1994), an XP cannot adjoin to a head; it must do it to another maximal projection. Besides, agreement is considered a local relation of government, therefore the head and the relative pronoun cannot agree. As a consequence, Kayne proposes that the relative clause is generated in a complement position, and since relative clauses do not carry a θ-role, they are considered to be a complement of a functional head (an external determiner) instead of the complement of a lexical head. The “raising” part of the proposal is that the NP is generated in the gap position, and then raises to Spec,CP. Later, Bianchi (1999) built on Kayne’s scheme and incorporated the DP hypothesis (Abney, 1987, Longobardi, 1994) so it is a DP and not an NP what raises to Spec,CP. In the raising account, the relative pronoun is assumed to be a relative determiner that takes the relative head NP as its complement, forming the pre configuration [who boy], as in (2.2). To get the correct word order, there is a second raising movement by which the head of NP raises to the Spec,DP: [boyi whoij]. The derivations below also display how the nominal head boy is base-generated externally in the matching analysis whereas in the raising analysis it is generated.
internally, within the VP, and moved afterwards. As we can see, in the raising analysis, the whole DP moves to Spec,CP.

(2.2) The raising analysis

\[
\begin{array}{c}
\text{DP} \\
\text{D} \quad \text{the} \\
\text{DP_i} \\
\text{i} \\
\text{C'} \\
\text{C} \\
\text{TP} \\
\text{D'N} \\
\text{D} \quad \text{who} \\
\text{t_j} \\
\text{2} \\
\end{array}
\]

Still, there is a third analysis which is a variation of the matching analysis. I will call this third analysis, the \textit{standard analysis} because it is usually the most common analysis assumed in SLA studies, for example in Hawkins (2001). Here, relative clauses are considered a complement of the head, instead of an adjunct. In the matching and the standard proposals, the head is external to the relative clause and base-generated. In these approaches, if there is a wh-phrase, it moves to Spec,CP and then the C° is empty. If, on the other hand, there is no wh-phrase, and the relative clause is formed with the complementizer \textit{that} or without a complementizer (an option not available in Spanish), then it is a Null Operator that moves to Spec,CP and the complementizer occupies the head,CP position. Examples (2.3) and (2.4) exemplify the derivation of a relative clause formed with the complementizer. In complementizer relative clauses, both accounts propose insertion of the complementizer in its base position, and then in this case, the raising analysis would only predict one head movement.
The main piece of evidence that supports the analysis in which the head is not external to the relative clause is based on binding effects, particularly Principle A effects (Schachter, 1973, Kayne, 1994).

(2.5) John bought the [picture of himself\_] \_ [CP that Bill\_ saw t\_] .

If the head picture of himself were generated externally to the relative clause, the anaphor himself could not be c-commanded by its antecedent, Bill. Therefore, to achieve the interpretation of (2.5), the head needs to be reconstructed to its original position. Nonetheless, there is further evidence for the raising analysis, such as pronouns that can be bound by quantifiers (Bianchi, 1999), these examples are from Arregi (1998):

(2.6) a. The room of his\_ house in which [each boy sleeps t\_] is always the smallest one.
b. La habitación de su casa en la [que duerme cada niño] es siempre la más pequeña.¹

In (2.6a) and in its Spanish equivalent (2.6b), the fact that the pronoun *his* or *su* can be correferential with the QP inside the relative clause indicates that the head *his house* gets its interpretation in a position where the QP c-commands the pronoun, this is, inside the RC. Nonetheless, the strongest argument in favor of the raising analysis comes from idiomatic expressions, as proposed by Schachter (1973) and Vergnaud (1974) on the basis of French examples. The main assumption for this test is that the idiom must be interpreted as a constituent. For instance, in the idiom chunk *tirer parti* ‘to take advantage’, the object can be relativized only if the idiomatic verb stays in the relative clause, as in sentence (2.7a). If the verb is external to the relative clause, as in its counterpart (2.7b), the sentence becomes ungrammatical. Vergnaud (1974) and Schachter (1973) explained this contrast as the result of the requirement for idiomatic expressions to be adjacent in D-structure. This means that the verb and object must be generated next to each other to keep its idiomatic interpretation.

(2.7)  

a. Peu de gens ont parlé du parti [qu’il a tiré des difficultés économiques].

Few of people have spoken of the advantage that he has taken of the economical crisis.

¹ There is certain debate in the Spanish literature about the nature of *que* in an expression such as *en la que*, literally, “in the that”. Whether it is a complementizer or a wh-phrase is an open question. In (2.8) it is analyzed as a complementizer, and as such, it is not part of the raising head; rather, it occupies head,C, unlike the English *which*. We will discuss this issue more in depth later in the chapter.
b. *Il a tiré (des difficultes économiques) un parti [dont peu de gens ont parlé ti]

He has taken of-the difficulties economical an advantage of-which few of people have spoken

However, this argument does not hold in Spanish, in which the equivalent idiomatic expression of the French prendre parti, sacarle partido (a algo), can be interpreted idiomatically regardless of the position of the idiomatic verb and the object\(^2\). These data would be another piece of evidence for the matching analysis in Spanish.

\[(2.8)\] a. Poca gente habla del partido; [que le ha sacado ti a las dificultades económicas].

Few people speak of-the advantage that CL. has taken to the difficulties economical

‘Few people speak about the advantage that he took of the economical crisis’.

b. Le ha sacado a las dificultades económicas un partido; [del que poca gente habla ti].

CL. has taken to the difficulties economical an advantage of-the that few people speak

c. Le ha sacado un partido; a las dificultades económicas [del que poca gente habla ti].

CL. has taken an advantage to the difficulties economical of-the that few people speak

\[(2.9)\] a. Poca gente habla de las largas; [que Zapatero le ha dado ti a los catalanes con el tema del Estatut].

Few people speak of the excuses that Zapatero CL. has given to the Catalonians with the issue of-the Estatut.

\(^2\) The discrepancy between French and Spanish may be due to the fact that the Spanish expression requires the dative clitic le.
‘Few people speak about how Zapatero is stalling the Catalonians with the Estatut issue’.

b. Zapatero le ha dado a los catalanes con el tema del Estatut unas largas de las que poca gente habla ti.

Zapatero CL. has given to the Catalonians with the issue of the Estatut some excuses of the that few people speak.

c. Zapatero le ha dado unas largas a los catalanes con el tema del Estatut de las que poca gente habla ti.

Zapatero CL. has given some excuses to the Catalonians with the issue of the Estatut of the that few people speak.

However, McCawley (1981) observed that the idiom chunk construction could also serve as evidence against the promotion analysis of relative clauses. Sometimes, the direct object of the idiomatic expression can be related to the matrix verb instead of to the verb of the relative clause. This same author pointed out some contrasts between relative constructions that use wh-pronouns and those that do not, suggesting that the use of a wh-pronoun indicates derivation by operator movement whereas the use of a complementizer would indicate head raising.

To sum up, there is evidence that supports both analyses, and new proposals (Aoun & Li, 2003; Bhatt, 2000; Hulsey & Sauerland, 2006, Sauerland, 2000) argue for the need for both analyses available from UG. However, for economical reasons and because SLA literature has mainly used the matching analysis, I will adopt this one for the discussion of the results. In the next section, I will present the relevant data for prepositional relative clauses in Spanish, English and Arabic.
2.3. Crosslinguistic Differences in Oblique Relativization

In oblique restrictive relative clauses, the relativized phrase is a prepositional phrase (PP). These types of relative clauses have similar features in English, Moroccan Arabic and Spanish but also differences, as the examples in (2.15-2.17) will show. These differences and similarities among the three languages make this property an ideal locus of investigation for second language acquisition, particularly when dealing with transfer and crosslinguistic effects.

2.3.1. Pied-Piping

Arabic, English and Spanish oblique relative clauses can be formed through Pied-Piping, a strategy which consists of moving the obligatory preposition along with the relative pronoun, as in the examples in (2.10). In Spanish, Pied-piping is the only grammatical option for oblique relative clauses, unlike in English and Arabic. Besides, English and Arabic Pied-Piping can only occur when the preposition comes with a relative pronoun, not a complementizer, as the ungrammatical sentences in (2.10a’’) and (2.10b’’) show. However, as we will see later, there is some debate in the Spanish syntax literature about the status of que in (2.10c’’’).

(2.10) Pied-Piping strategy:

a. The book about which you talked ti.

a’ The boy about whom you talked ti.

a’’ *The book/ boy about that you talked ti.
b. L-katab ‘la-aši ḫdar-ti $t_i$. 
the-book about-what talked-you

b’ l-weld ‘la-menli ḫdar-ti $t_i$. 
The boy about-whom talked-you

b’’*l-katab/weld ‘la-lli ḫdar-ti $t_i$. 
The-book/boy about-that talked-you

c. El libro del cual hablaste $t_i$. 
The book about-the which speak-you-past

c’ El chico de quien hablaste $t_i$. 
The book about who(m) speak-you-past

c’’El libro/ chico de(l) que hablaste $t_i$. 
The book/ boy about-the that speak-you-past

Even though it is not the purpose of this dissertation to determine the nature of the Spanish
*que* in relative clauses, whether this *que* is always a complementizer or it can also be considered
a relative pronoun can have implications for the acquisition of Spanish relative clauses. For
instance, if this *que* is always a complementizer in Spanish, then learners need to learn that,
unlike in their native languages (in this case Arabic and English), complementizers in Spanish
relative clauses can be preceded by a preposition. On the other hand, if *que* in prepositional
relative clauses is a true relative pronoun, then second language learners need to map one word
“que” to two different functions, namely complementizer and relative pronoun, which should not
be particularly problematic.

---

3 Moroccan Arabic examples come or are adapted from Ennaji (1985).
2.3.2. Preposition Stranding

In addition, the main difference between English, Arabic, and Spanish is that only English accepts Preposition Stranding in oblique relative clauses, with both, the relative pronoun or the complementizer (2.11a). That is, English can leave the preposition dangling in its original place once the displaced constituent has moved, whereas this option is ungrammatical in Spanish and Arabic, as the examples in (2.11b,c) show.

(2.11) Preposition Stranding strategy:

a. The book (which/that)\textsubscript{i} you talked about \( t_i \). \hspace{1cm} \textit{English}

   a’ The boy \textit{who} \textsubscript{i} you talked about \( t_i \).

b. *L-katab aš/lli\textsubscript{i} ḥdar-ti ‘la \( t_i \). \hspace{1cm} \textit{Moroccan Arabic}

   the-book what/that talked-you about

c. *El libro \textit{el cual/(el) que} \textsubscript{i} hablaste de \( t_i \). \hspace{1cm} \textit{Spanish}

   the-book the-which/(the)-that talked-you about

2.3.3. Resumptive Pronoun

Finally, Arabic is the only language of the three we are discussing here that accepts relative clauses with resumptive pronouns in its standard varieties. In fact, it is the most common strategy in standard Arabic, whereas it is ungrammatical or non-standard in English and Spanish, as the contrasts in (2.17) illustrate.
(2.12) Resumptive pronoun strategy:

a. *The book which you talked about it. \[English\]

a’ *The boy who you talked about him.

a” ??The book/boy (that) you talked about it/him.

b. L-katab \[lli \, hdar-ti \, ‘li-*(h).\] \[Moroccan Arabic\]

The-book that talked-you about it

b’ L-weld \[lli \, hdar-ti \, ‘li-*(h).\]

The-boy that talked-you about him

b’’ *L-katab \[aš hdar-ti \, ‘li-h.\]

The-book what talked-you about it

c. *El libro \[cual \, hablaste \, de él.\] \[Spanish\]

The book which speak-you-past about it

c’ *El chico \[quien \, hablaste \, de él.\]

The boy who speak-you-past about him

c’’?El libro \[que \, hablaste \, de él.\]

The book that speak-you-past about it

2.3.4. Summary: the Syntax of Spanish, English and Arabic Prepositional Relative Clauses

Generally speaking, in Spanish, English, and Arabic the preposition can move along with the wh-phrase, --although in English is quite restricted to formal registers--, a phenomenon called Pied-Piping (PiP) as the sentences is (2.10) exemplified. In standard and oral English though, the
most common strategy is to leave the preposition in its original position, remaining stranded at
the end of the phrase, and governing the wh-trace as in (2.11a).

Despite the overwhelming manifestation of preposition stranding (PS) in English, this
phenomenon is quite rare in the languages of the world, and only some Scandinavian languages
share this property with English. This is a topic that has been largely discussed in the acquisition
literature of both L1 and L2 English. I address this issue within the context of markedness in
chapter 3.

In Arabic, the common way to relativized is with the preposition staying in its place, but
unlike in English preposition stranding, the Arabic preposition cannot govern an empty category,
as the ungrammaticality of (2.11b) shows. This gap position, except in subject relatives, needs to
be filled by a weak resumptive pronoun, as in (2.12b). However, in Moroccan and Standard
Arabic direct object relative clauses, this resumptive pronoun can be optional, such as in l-mra lli
ff-ti-(ha) [the-woman that say-you-(her)], “the woman that you saw”. Crucially, this optionality
of the resumptive pronoun does not occur in the case of prepositional relative clauses.

The theoretical issue with the resumptive pronoun strategy is whether it implies movement at
all. Traditionally, when there is a pronoun in a RC it is assumed to be interpreted through
binding and not through movement, but there are some authors (Aoun, Choueiri & Hornstein,
2001; Choueiri, 2002) who propose a movement account for Arabic where resumption entails a
weak resumptive pronoun, not a strong one.

Finally, in Standard Spanish, PiP is the only option (2.10c) and preposition stranding is
ungrammatical, as illustrated in (2.11c). Examples (2.12a, 2.12c) show that the resumptive
strategy can be available in oral registers in Spanish, and marginally in English.
To summarize, Spanish, English and Moroccan Arabic have available the pied-piping strategy in a very similar way (PiP: Eng = MA = Sp). With respect to Preposition Stranding (PS), Moroccan Arabic and Spanish do not accept this strategy, unlike English (PS: Eng ≠ MA = Sp). Regarding the Resumptive Pronoun (RP) strategy, only Moroccan Arabic allows this strategy: in fact, it is the most generalized. In Spanish, by contrast, it is mainly an oral option, and in English it is substandard (RP: MA ≠ Eng = Sp). These differences are summarized in Table 2.1.

Table 2.1: Similarities and differences in oblique relativization among Spanish, English and Arabic.

<table>
<thead>
<tr>
<th></th>
<th>Spanish</th>
<th>English</th>
<th>Arabic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pied-Piping</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Preposition Stranding</td>
<td>*</td>
<td>√</td>
<td>*</td>
</tr>
<tr>
<td>Resumptive Pronoun</td>
<td>?</td>
<td>??</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>(non-standard)</td>
<td>(non-standard)</td>
<td></td>
</tr>
<tr>
<td>Null-Prep (absence of the obligatory preposition)</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

2.4. On Relative Pronouns and Complementizers

2.4.1. Definition and Crosslinguistic Differences

Arabic, English and Spanish also differ in the selection of the morpheme that links the head noun with the relative clause. In order to differentiate between wh-words or relative pronouns and complementizers, I introduce the main characteristics that define these two relativizing forms next.
Table 2.2: Characteristics of wh-words and complementizers (adapted from Radford, 1988, pp. 482-85)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Wh-word</th>
<th>Complementizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can encode morphological features (gender, number, person, etc.)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Can encode syntactic features such as case.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Can encode semantic features such as definiteness or animacy.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Can follow a preposition (can enter into a pied-piping configuration)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>In a relative clause, it implies the appearance of a gap.</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

There is no debate as to the status of English who and which, on the one hand, and that, on the other. The latter is clearly a complementizer and the former are wh-pronouns: that has no case, whereas who can be declined in accusative whom, or genitive whose. Also, that does not carry an animacy feature, whereas who is restricted to [+animate] and which to [-animate]. That cannot follow a preposition: *The men on that Mary depends, whereas who and which can. However, in case of preposition stranding, all the relative words can be used, although that is preferable. If a resumptive pronoun were to occur, the complementizer would be needed. This means that the appearance of that does not necessarily imply movement. Compare the next two sentences:

(2.13)  a. *He is someone that you never know whether to trust him or not.
       
   b. *He is someone whom you never know whether to trust him or not.
Modern Standard Arabic⁴ has definite wh-pronouns, called in Arabic “nouns of the connected”. The pronoun agrees with its antecedent in gender and number. In the dual forms, the pronoun also inflects for case (nominative and accusative/genitive/oblique). These forms do not have semantic features, and they are always definite. They can translate as *that, which* or *who/m/se*, although the plural forms are only used for human beings.

Table 2.3: Relative words in Standard Arabic, adapted from Ryding (2005)

<table>
<thead>
<tr>
<th></th>
<th>Singular</th>
<th>Dual</th>
<th>Plural</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Masculine</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominative:</td>
<td>al-ladhaan(i)</td>
<td></td>
<td>al-ladhiin(a)</td>
</tr>
<tr>
<td>Genitive/accusative:</td>
<td>al-ladhayn(i)</td>
<td></td>
<td>al-ladhiin(a)</td>
</tr>
<tr>
<td>Nominative:</td>
<td>al-lataan(i)</td>
<td></td>
<td>al-latii ~ allawaatii</td>
</tr>
<tr>
<td>Genitive/Accusative:</td>
<td>al-latayn(i)</td>
<td></td>
<td>al-latii ~ allawaatii</td>
</tr>
<tr>
<td><strong>Feminine</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominative:</td>
<td>al-latii</td>
<td></td>
<td>al-latii ~ allawaatii</td>
</tr>
<tr>
<td>Genitive/Accusative:</td>
<td>al-latayn(i)</td>
<td></td>
<td>al-latii ~ allawaatii</td>
</tr>
</tbody>
</table>

There are also two indefinite relative words specified for animacy, *man* "who/m" used only for [+humans] “who/m”, and *maa* "what" (not “which”).

---

⁴ The linguistic situation of Morocco is complex. Besides the presence of Berber and foreign languages such as French and Spanish, the situation of Arabic is one of diglossia or triglossia (or even quadriglossia if we consider the educated spoken Arabic variety). There are three major varieties of Arabic in Morocco: Classical Arabic or *fuska*, Standard Modern Arabic, also called *fusha*, and Moroccan Arabic or *darija*. Classic Arabic is the “high” variety, associated with Islam and it is the official language of the nation. Standard Modern Arabic is the “middle” variety, the lingua franca of the Arab world, associated with the media, and it is the variety used in education and literacy. Moroccan Arabic is the “low” variety, associated with day-to-day activities and informal settings. Despite the considerable prestige of Classical and Standard Arabic, Moroccan Arabic is the predominant spoken language, as it is used in everyday conversation. However, Moroccan Arabic is not standardized, varies from region to region, and is not usually written except for text-messages, advertisements, etc. (Ennaji, 2005)
In Moroccan Arabic (MA), the forms in Table 2.3 have reduced to an uninflected complementizer that does not inflect for number or person, it is invariably lli. MA also has two relative pronouns, -men and -aš, ‘who’ and ‘what’, which only relativize prepositional objects. These are bound morphemes and cannot stand by themselves, that is why they pied-pipe the preposition (2.10b, 2.10b’). On the other hand, lli can be used for all functions.

Spanish quien and el cual are unmistakably two wh-words or relative pronouns. They are inflected for number, quienes and los cuales are their plural forms, and the article in el cual also agrees in gender with the antecedent: la cual, las cuales are the feminine forms\(^5\). Besides, quien is restricted to [+human]. These two wh-words cannot be used in subject and direct object restrictive relative clauses; instead, the invariable complementizer que is required. In fact, the invariable que can be used in any syntactic function, even in prepositional relative clauses (2.15c), either with the definite article el/la/los/las, as was the case of the wh-pronoun cual, or just by itself. If the article appears, then it needs to agree with the antecedent.

### 2.4.2. Optionality of the Complementizer

A further difference between the three languages under study is the possibility of complementizer omission. In English, both, the complementizer and the wh-word can be omitted in all syntactic positions except for subject position or in the case of pied-piping. In contrast, in Moroccan Arabic definite relative clauses, the linking word, either a wh-pronoun or a complementizer, is never deletable and needs to appear in all syntactic positions. In this sense,

\(^5\) In non-educated spoken Spanish, there is a tendency to explicitly mark gender agreement in the relative pronoun. Then, the nonstandard feminine form adds an –a: la cuala, las cualas, and the masculine is formed with an –o, although this form is less common: el cualo o lo cualo. The Panhispanic Dictionary of Doubts written by the Real Academia Española (2005) acknowledges these facts. The Spanish edition of Yahoo Answers, for instance, contains numerous examples of this type.
Spanish works exactly as Moroccan Arabic and, unlike English, relative expressions in Spanish never delete.

2.4.3. The Spanish Que

2.4.3.1. Introduction

To determine the status of the Spanish word *que* is not easy matter since we can find evidence supporting proposals that argue it is always a complementizer and evidence that indicates that it can be both, a relative pronoun and a complementizer, depending on the context.

On the one hand, there is the “bare *que* hypothesis”, which claims that there are two homophonous *ques*, one that is a complementizer and another one that is a relative pronoun, when it appears with a preposition (Suñer, 2000). On the other hand, there is the “unique *que* hypothesis” (Brucart, 1992), in which *que* is always a complementizer, regardless of the fact that it can follow a preposition. This difference has non-trivial learnability implications for second language acquisition. If we consider that in Spanish there is only one *que*, always a complementizer, then Spanish L2 learners whose native languages are English or Arabic must learn that unlike in their own languages, the distribution of complementizers is wider in Spanish than in their language, since a complementizer can be preceded by a preposition in a relative clause. In this sense, the L2 learners need to make their grammar less restrictive. If, on the other hand, we assume that Spanish has two types of *ques*, as the “bare *que*” hypothesis proposes, then, Spanish L2 learners need to acquire both as different lexical items with different syntactic properties. In fact, they would need to also acquire the third form *el que* since it would act as a unit and not as an article and a complementizer. Then, L2 learners would need to distinguish
these forms and learn their distribution. That is, they need to assign the correct properties of complementizers to one que, and the properties of wh-words to the other que.

2.4.3.2. The Bare Que Hypothesis

The “bare que hypothesis” proposes that que is a complementizer in subject and object restrictive subordinate clauses such as (2.14), but it is not a complementizer where que is not bare, that is, when it is preceded by a preposition.

(2.14)  

a. La persona que dijo esa barbaridad se acaba de desdecir.
the person QUE said that atrocity herself finish of retract
‘The person that said that atrocity just took it back’.

b. El profesor que invitamos a dar una conferencia no pudo venir.
the Professor QUE (we) invited to give a conference not could come
‘The Professor that we invited to give a talk couldn’t come’.

The proponents of this hypothesis argue that que is a wh-pronoun in Pied-Piping configurations, basically because crosslinguistically only true wh-words can follow a preposition (see Kayne, 1976 for French; Hirschbühler and Rivero, 1981 for Catalan; Bello, 1847; Rivero, 1980, 1982; and Suñer, 2000 for Spanish):

(2.15)  

a. El chico en (el) que confia...

---

6 The presence of the article is optional in prepositional relatives, although preferable. This optionality is explained by Suñer (2000) as a difference in register: P+ article+ que belongs to a more formal variety of Spanish, as well as P+ article + cual and, if the antecedent is human, P + quien. I do not agree with this statement with respect to the el que sequence. In Spanish prepositional relativization, the most common relativizer is the el que sequence, as a corpus-based study of the spoken Madrid Spanish shows (Butler, 1992). For this reason, this is the form that I used in my tests. Brucart (1992) acknowledges the fact that there is no satisfactory explanation for the distribution of the article in RC, but attempts to propose two possible accounts, one phonological and another one semantic. The phonological explanation describes the tendency of obligatoriness of the article when the preposition is bisyllabic, whereas with monosyllabic prepositions, the appearance of the article is freer. The semantic explanation consists of the referential vs. non-referential character of the head. Although these explanations are rather inconclusive, Brucart proposes that in prepositional relativization, “the increasing preference of Spanish for the second pattern
the boy on-(the) QUE relies
‘The boy that she relies on…’
b. La muchacha con (la) que salió hasta hace poco
The girl with-(the) QUE went out until ago little
‘The girl with whom he went out until recently…’

Thus, according to the “bare que hypothesis”, sentences in (2.14) and (2.15) would have different structures, given the different nature of que. If we assume the matching proposal, these sentences’ derivations could be roughly schematized as in (2.16a) and (2.16b). These two schemata clearly show that the word que occupies different positions in the tree according to the syntactic position of the relativized constituent.

(2.16) Matching analysis

(a) Que as complementizer

```
DP  ru
  ei
  la wi
  ru
  Op_
  C
  tu

6  t_i
Ø  TP
  6  dijo
```

(b) Que as relative pronoun

```
DP  ru
  el NP
  eu
  chico CP
  Ø  TP
  que  TP
```

Whenever que is alone, this is in subject and direct object relative clauses, it is the complementizer of the adjectival clause and it is the functional head of C^0 as in (2.16a). In this case, the relative clause is formed by moving a null Op(erator) from inside the embedded clause

[pre+article+que as opposed to prep+que] is due to the fact that the definite article reproduces the grammatical features of the antecedent and therefore permits the identification of the empty relative operator more easily.”
to SpecCP. When *que* is preceded by a preposition, this hypothesis considers *que* -actually the entire sequence *(P)+(el) que*- a relative pronoun that moves together to SpecCP. As a consequence, there is nothing in the head position.

2.4.3.3. The Unique *Que* Hypothesis

On the other hand, the “unique *que* hypothesis” (Brucart, 1992) tries to give a more general account proposing only one structure for (2.14) and (2.15), in which *que* is always a complementizer, regardless of the syntactic position of the element relativized. In oblique relative clauses, the sequence *(P+ article)* is considered the *wh*-phrase, and it is followed by the complementizer, as (2.17) illustrates. This account, if accepted, would present a theoretical advantage leading to a simpler, more economical grammar. As for L2 learners, it is hard to see which proposal would make their learning task easier, whether to learn two different *que*’s, or learning a wider distribution of the complementizer.

(2.17) The matching analysis and the “unique *que* hypothesis”
The main piece of evidence that leads Brucart (1992) to propose the “unique que hypothesis”, on the other hand, comes from some superlative movement constructions in the Canary Islands dialect attested in Bosque and Brucart (1991), and also found in Puerto Rican Spanish (Rohena-Madrazo, 2007):

(2.18) a. La amiga con la que tengo [QP más confianza] 
the friend with the QUE I-have most confidence

a’ La amiga con la que [QP más confianza] tengo.

the friend with the QUE most confidence I-have

‘The friend I trust the most’

b. Ellos hablan del que lee [QP menos libros].

they talk about-the QUE HE-reads least books

b’ Ellos hablan del que [QP menos libros] lee.

they talk about-the QUE least books HE-reads

‘They talk about the one that reads the least books’.

c. María es la que corre [QP más rápido].

María is the that SHE-runs more fast

‘María is the one that runs the fastest’

c’ María es la que [QP más rápido] corre.

María is the that most fast SHE-runs

‘María is the one that runs the fastest’

---

7 General Spanish also includes the dialects from Puerto Rico and the Canary Islands.
(2.19)  a. La amiga con la \([QP \text{ más confianza}]\) que tengo  \(\text{Canarian & Puerto Rican Sp.}\)

the friend with the most confidence \(\text{QUE I-have}\)

‘The friend I trust the most’

b. Ellos hablan del \([QP \text{ menos libros}]\) que lee.

they talk about-the least books \(\text{QUE HE-reads}\)

They talk about the one that reads the least books.

c. María es la \([QP \text{ más rápido}]\) que corre.

María is the most fast that SHE-runs

‘María is the one that runs the fastest’

Crucially, the examples in (2.19) show that \(P\) \text{el} and \text{que} need not form a constituent, fact that can only be accounted for by the “unique que hypothesis”\(^8\). Arregi (1998) gives further evidence in favor of the “unique que analysis” with a constituency test. According to him, the sequence \(P\) \text{el que} cannot be coordinated, but the other relative pronouns can, as shown in (2.20).

(2.20)  a. la persona con la cual y de la cual estábamos hablando

the person with the-F CUAL and of the-F CUAL WE-were speaking

‘The person with whom and about whom we were speaking’

\(^8\) Suñer (2000) considers that the speakers of the Canary Islands whose dialect allows (2.19) –she is not familiar with the Puerto Rican data- are misanalyzing this structure by analogy with other structures allowed in Standard Spanish. Then, Suñer thinks that sentences such as (i) and (ii), where the que “is truly the complementizer”, can be taken as a model for misanalysis.

(i) Son los \(Ø\) peores que se portan
(ii) Ese libro es el \(Ø\) más que me gusta

This is the analysis she proposes for (i):

(iii) son los \([XP \Ø \ [CP \text{ Op}_k \ [C\ [QP \text{ peores}_{\text{m}} \ [C\ [\text{ que } \ [p \text{ pro } \text{ se portan t}_k \ t_m ]]]]]]]\)

Due to space limitations, I will not attempt to evaluate this proposal here.
b. ¿la persona con quien y de quien estábamos hablando

c. *la persona de la que y con la que estábamos hablando

If *el que* were a unit acting as relative operator, as the “bare que hypothesis” proposes, we would expect to be able to coordinate the sequence P *el que*; as well as P *el cual* and P *quien* in (2.20a, b). However, (2.20c) is ruled out. This fact is correctly predicted only by the analysis in which *que* is a complementizer and *el que* does not form a constituent.

One drawback of the “unique que hypothesis” is the violation of the Doubly Filled COMP Filter⁹ (Chomsky & Lasnik, 1977), which excludes the co-occurrence of a wh-phrase and a complementizer in a CP position, such as in */I wonder who that I saw*. This filter is maintained in Spanish relative clauses, except for prepositional *el que* relative clauses. If this *que* is a complementizer, as the unique *que* hypothesis proposes, then there is a violation of the Doubly Filled COMP Filter because both C and its specifier would be overt. Arregi proposes an analysis within Optimality Theory (OT) (Prince & Smolensky, 1993, 2004) that solves the puzzle between the Doubly Filled COMP filter and prepositional RCs with the unique *que* hypothesis. More specifically, he builds on the analyses that Pesetsky (1998) and Keer and Baković (1998) advanced within the OT framework. These authors proposed one constraint to ensure that the complementizer would be generated overtly only if it appears at the left edge of the CP, called Le(CP). Additionally, there is another constraint concerned with recoverability, Rec, which makes sure that anything that is covert is recoverable. Thus, a PP, for instance, can never be covert (or delete in other accounts’ terms) because a P head is not recoverable. With these constraints in mind, prepositional relative clauses are ensured to be formed with the PP to the left.

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⁹ This Filter is not necessarily universal because several constructions violate it. For instance, in English interrogative questions, the wh-phrase is in the SpecCP position and C is occupied by the tensed verb form after the obligatory movement from T-to-C.
of the CP and never with a complementizer, but a wh-word. Arregi modifies Pesetsky’s analysis by incorporating Brucart’s idea that embedded sentences need to be marked as such. Thus, *el que* prepositional relatives need the complementizer *que* to indicate that they are embedded; in Rizzi’s (1990) terms, this *que* is marked as [+predicative]. Obligatory complementizers in completive subordinate clauses also carry this feature. Arregi calls the constraint that ensures the appearance of this [+predicative] feature in embedded clauses OVEMBED and ranks it above another constraint (TEL) that guarantees that the complementizer in prepositional relative clauses cannot be overt. Finally, rearranging these constraints in the following order, REC >> LE(CP), OVEMBED >> TEL, EVAL rules out the ungrammatical candidates and accepts prepositional *el que* RC, with no need of postulating a Doubly Filled COMP Filter.

### 2.4.3.4. Summary

To sum up, the two competing hypotheses for the status of *que* in *el que* prepositional relative clauses make different predictions for constituency and for what resides in the left periphery in Spanish prepositional RCs. Following the “bare *que* hypothesis”, the entire sequence *del que* occupies the SpecCP and *que* would be a lexical relative pronoun equivalent to *cual* or *quien*. Whereas according to the “unique *que* hypothesis”, only the preposition and the article could be in the SpecCP position and *que* would remain always in C°, being the head of a functional projection. As we will see, this distinction can be relevant to this dissertation because some of the Spanish L2 data to be discussed present omission of the preposition and/or the
article, but never omission of *que*, which would indicate that *del que*, indeed, does not form a constituent:\(^{10}\):

(2.21) a. El señor *que* depende María es muy rico. 

The man QUE he-depends Mary he-is very rich 

*English-speaking learners* of Spanish

Expected: El señor *del que* depende María es muy rico.
‘The man on whom Mary depends is very rich’.

b. Estamos muy contentos con este proyecto, *era una cosa que nadie creía*.

WE-are very happy with this project, IT-was a thing QUE nobody believed.

*Oral Sp.*

Expected in Standard Spanish: … *era una cosa en la que* nadie creía
‘We are very happy with this project, it was a thing that nobody believed in’

Besides, almost every case of omission of preposition occurs when *que* is used, never with *cual* or *quien*. A parallel situation is found in the Puerto Rican and Canary Islands dialects, where the QP raise can only take place when *que* is in place, never with a relative pronoun. These two facts indicate that, in effect, as the “unique *que* hypothesis” proposes, *que* and *cual/quien* have different linguistic properties. Brucart (1992) accounts for this distinction assigning two binary selection features to the head of the CP, à la Rizzi (1990). The features are \([\pm QU]\) and \([\pm rel]\). The \([+QU]\) feature implies that the sentence does not have propositional independence; this is to say, it is a subordinate or embedded sentence. The \([+rel]\) feature indicates that the construction is a relative clause. Crucially, *que, cual, quien* share the feature

\(^{10}\) This is not compelling evidence in favor of the “unique *que* hypothesis” because the “bare *que* hypothesis” can always argue that Null-Prep relative clauses are equivalent to object RC, in which case *que* would be a complementizer and not a relative pronoun.
[+QU], but not the feature [+rel], since que, in all its manifestations lacks this specification. Brucart assumes that in cases in which a relative clause is formed with the complementizer que, or el que, the necessary [+rel] is carried by an empty operator that moves to Spec,CP.

Similarly, Suñer (1998), accounts for the different behavior of que and cual/quien proposing that the C of relatives has the feature [+pronominal]. This feature would be specified for [+pronominal] when the relative pronoun moves to Spec,CP to check this strong feature in the overt syntax, or it would be specified as weak [-pronominal] when the relative pronoun cannot be attracted to Spec,CP and therefore, it would stay in situ. Crucially for Suñer, que in prepositional relative clauses is marked as [+pronominal]. If Co is [-pronominal], for instance, que in subject or direct object relative clauses, a NullOp merges into Spec,CP and the complementizer que is inserted in Co. As we will see this analysis was originally proposed to explain resumptive relatives.

I do not consider omission of the article in RCs problematic because it can be optional, despite the fact that omitting the article is not always possible in Spanish. We will see in the L2 data that very few learners used the article, and whenever there was omission of the required preposition, the article was never included. But since there is no satisfactory explanation for the distribution of the article in these circumstances, I will leave it aside for now.

Finally, if we evaluate the two proposals in terms of L2 learnability, the Bare que Hypothesis seems to predict a simpler acquisition process. Since this approach keeps practically the same distinction between relative pronouns and complementizers that English and Arabic already have, the L2 learners would only need to transfer the properties of their native languages’ relativizers into the grammar of Spanish. However, this full transfer would not produce the use of que as a prepositional relativizer, which is the most common one. In that case, the L2 learners
would need to acquire a whole new lexical item, i.e. *que* with the properties of a true relative pronoun. On the other hand, the *Unique *que Hypothesis*, which predicts different grammars between English/Arabic and Spanish, would require the L2 learners to expand their grammars and accept a new function for a lexical item that can be transferred from their native grammar. Either way, we will see that prepositional relative clauses are not an easy venture for L2 learners.

2.5. Non-standard Spanish Relative Clauses

2.5.1. Resumptive Relatives

There are two main issues in the study of resumptive pronouns: one is whether these pronouns appear optionally, in free variation with gaps; or if, on the contrary, their distribution is fixed and regulated by specific principles. The other issue has been about the derivation of the resumptive pronoun. This is, whether they are obtained via movement or whether they are base-generated.

According to Suñer (1998) Spanish is a language that optionally allows resumptive pronouns in all its types of relative clauses (direct and indirect object, prepositional, subject, genitives, locatives). However, they are condemned by prescriptive grammars and never taught in a classroom setting, although resumptive pronouns are obligatory, as last resort, to prevent the structure from an island violation, as in (2.22a,b) in Spanish and English:

(2.22)  a. ¿Qué libro me dijiste (tú) que no recuerdas dónde *(lo)* pusiste?

Which book me told you QUE no YOU-remember where  it  YOU-put

‘Which book did you tell me that you don’t remember where you put (it)?’

b. The settlement that Caroline asked when we would get *(it)*

(Suñer, 1998:1-3)
If the resumptive pronoun occurs, the complementizer *que* must be used, hence the contrast between (2.23a) and (2.23b).

(2.23) Resumptive pronouns in prepositional RC in Spanish

a. *El libro/hombre cual/quien hablaste de él*

   The book/man which/who speak-PST.2SG about IT (strong pronoun).

b. *El libro/hombre que hablaste de él*

   the book/man that speak-PST.2SG about it-(strong)

c. *El libro/hombre que hablaste de lo.*

   the book/man that speak-PST.2SG about it-CL

As in the case of Arabic, if the language has weak pronouns for the relativized function, those are preferred. However, Spanish prepositions cannot be followed by clitics (weak pronouns); instead, a strong pronoun must be inserted, as the ungrammaticality of (2.23c) shows.

In Standard Arabic, weak resumptive pronouns are always possible in all relativized syntactic positions, except for subject position. In Lebanese Arabic, however, a strong pronoun could appear, instead. But, if this is the case, following Aoun, Choueiri & Hornstein (2001) and Choueiri’s (2002) analysis, this would not be a relation of movement but one of binding, since strong pronouns are not subject to island sensitivity and do not present reconstruction effects.

In fact, in Spanish only direct and indirect objects appear with clitic pronouns. However, one could find in spoken language that in the prepositional RC, the weak resumptive pronoun is used and, as a consequence, the preposition is lost, as shown in (2.24a). One possible explanation for
this fact, in line with Aoun et al. and Choueiri’s reasoning, would be that a movement construction (i.e. with a weak pronoun) is more economical than a binding one (with a strong pronoun). In any case, this construction is very unusual and mostly judged as ungrammatical by native speakers:

(2.24) a. El fantasma es algo que ya lo puedes convivir\(^{11}\)

\begin{quote}
the ghost is something that already it can.2s to-coexist
\end{quote}

‘The ghost is something that you can coexist with’

b. El fantasma es algo que ya puedes convivir con él

\begin{quote}
the ghost is something that already can.2s to-coexist with it-strong
\end{quote}

‘The ghost is something that you can coexist with’

c. *El fantasma es algo que ya puedes convivir con lo

\begin{quote}
the ghost is something that already can.2s to-coexist with it-clitic
\end{quote}

‘The ghost is something that you can coexist with’

d. El fantasma es algo con lo que ya puedes convivir

\begin{quote}
the ghost is something with article that already can.2s to-coexist
\end{quote}

‘The ghost is something with which you can coexist’

Like in English, the Spanish verb *convivir* “coexist” requires the preposition *con* “with” to introduce its internal argument. If the preposition and the resumptive pronoun appear together, the pronoun should be strong (2.24b). Recall that in Standard Spanish the preposition needs to be pied-piped and then omit the pronoun as in (2.24d) and omit the pronoun.

\(^{11}\) Sentence produced by the writer Arturo Pérez-Reverte in an interview in the Spanish Public Television, TVE, March 2006.
Diachronically, Lapesa (1981) observes that in medieval Castillian texts and in *aljamiada* literature (literature written in an Iberian Peninsular Romance language using the Arabic alphabet), there is higher frequency of resumptive pronouns than in other romance languages such as French or Italian. Cases such as “la jarra *que yaze en ella* muerte supitaña” (the pitcher that lays in it sudden death), or “la estrella *que tú quisieres saber su lugar*” (the star that you would like to know its place) are common in Medieval Castillian Spanish (Lapesa 1981:149). Lapesa believes that this phenomenon is not exactly an Arabic loan, but a truly Romance phenomenon promoted and boosted by the Arabic influence in the Iberian Peninsula. It remains uncertain whether resumption in current Spanish has its origin in this period.

### 2.5.2. Null-Preposition in Spanish

When forming prepositional relative clauses in Spanish, there is still another non-standard (or almost ungrammatical) option that does without preposition and pronoun, namely, a null preposition (2.25). This configuration has been studied in L2 English (Klein 1993, 1995, 2001) but it has not received any formalization in contemporary generative grammar of Spanish, possibly because it is a quite marginal construction in standard Spanish. Whereas resumptive Spanish relative clauses are for the most part accepted, although depending on the context, Null-Prep is generally rejected, so there is a clear grammatical contrast between these two constructions. Example (2.25) is extracted from an interview from Spanish Public TV:

(2.25) Estamos muy contentos con este proyecto, era una cosa que nadie creía\(^\text{12}\).

WE-are very happy with this project, was-3s a thing that nobody believed

\(^{12}\text{Expected: “*en la que* nadie creía”. This sentence was produced by the tennis player Emilio Sánchez Vicario in an interview in the Spanish Public Television (TVE), March 2006.}\)
‘We are very happy with this project; it was something in which nobody believed’

### 2.5.3. Towards an Explanation

From a functionalist perspective, Lope Blanch (1984) considers resumptive relatives and Null-Prep sentences the result of an internal tendency in Romance languages, which converts relative pronouns, especially \textit{que}, into mere connectors, i.e. complementizers. This tendency, already present in Vulgar Latin, would impoverish the \textit{wh}-word until it loses its pronominal function; as a consequence, a resumptive pronoun is inserted to perform syntactically the function of the antecedent. In Spanish, prepositional arguments cannot be referred to by clitics, so a strong pronoun is needed, which is not the preferred option when using resumptive pronouns. So, this strong pronoun could weaken into a clitic, and eventually disappear. And then, the preposition would disappear along with it. This is a hypothetical process that could explain the Null-Prep in Spanish. If this is a viable option, then this weakening phenomenon would constitute a continuum for prepositional relative clause formation, in which PiP is the most complex and formal structure and the Null-Prep strategy would be the simplest but also most marginal, at least in standard Spanish. This hypothetical continuum is represented in (2.35).

Null-Prep is more often than not considered ungrammatical by native Spanish speakers, mainly because it conveys interpretability problems, since the preposition cannot be recovered. In the next chapter, I will discuss the Null-Prep structure in the context of language acquisition, which is where we find it more pervasively.

\begin{equation}
\text{(2.26) } P + \text{Relative Pronoun (PiP)} > \text{Complementizer} + P_{\text{Strong Pronoun}} > \\
\text{Complementizer} + \text{Weak Pronoun} > \text{Complementizer (Null-Prep)}.
\end{equation}
Note that, according to (2.26), the preposition disappears when a weak pronoun is used to refer to an oblique argument, and there is not preposition stranding.

A piece of evidence for this process could come from other Romance languages that have available clitic pronouns for prepositional arguments, because they can properly use the resumptive pronoun without the preposition. In Catalan and French, the pronoun *en* can refer to arguments introduced by the preposition *de* (of); the pronoun *hi* or *y* can refer to arguments introduced by the preposition *a* or *à*:

(2.27)  a. El Joan parla *(de) temes importants.*  
        The Joan talk-PR.3SG of topics important  
        ‘Joan talks about important topics’

a’. El Joan *en* parla.  
        The Joan CL talk-PR.3SG  
        ‘Joan talks about them’

b. El Joan va *(a) l’escola cada dia  
        The Joan go-PR.3SG to the school every day  
        ‘Joan goes to school every day’

b’. El Joan *hi* va cada dia  
        The Joan CL go-PR.3SG every day
As a result of the availability of this pronoun in Catalan, prepositional relative clauses with a weak resumptive pronoun, but crucially without the required preposition, are perfectly acceptable in this language.

(2.28)  a. És un home que n’han parlat molt. (From Hirschbüler & Rivero 1981)
   Is a man that CL have-PR.3PL spoken much
   ‘This is a man about whom they have talked a lot’

b. És un riu que s’hi ha negat molta gent
   Is a river that CL CL have-PR-3SG drowned much people
   ‘This is a river in which a lot of people have drowned’

In fact, this is the children’s preferred option when constructing oblique relative clauses in other Romance languages such as French and Italian (Guasti & Cardinaletti, 2003), in which weak pronouns for oblique positions also exist. It remains for further research whether children learning L1 Spanish would produce sentences with strong pronouns or Null-Prep. If we suggested that a parallel process would occur in Spanish, but without the obligatory clitic because Spanish does not have clitics for oblique arguments, then, the cases of Null-Prep could rather be interpreted as cases of Null (clitic) Pronouns. This suggestion is not that far-fetched if we keep in mind that clitic object drop is a not a rare phenomenon in Spanish, especially in contact varieties of Spanish such as Spanish/Quechua (Lipski, 1994; Klee, 1989), and Basque Spanish (Landa & Franco, 1996).

In Moroccan and Standard Arabic, oblique relative clauses (relativized prepositional arguments and indirect objects) are obligatorily formed with resumptive pronouns, (or through
Pied-Piping) as we saw in (2.11b) and (2.29a) and (2.29b) below. But in other constructions, particularly in the direct object RC construction, the omission of the pronoun is the preferred and most common structure (Ennaji, 2005, Harrell, 1962), as in (2.29c). So, this weakening process is also attested in Arabic.

(2.29) Moroccan and Standard Arabic resumptive pronouns

a. al-waladu llaðii ẓaaʔa (*hu)  
   he-boy that came him  
   'The boy who came'

a’. l-mra lli maatat sɣira (*ha)  
   The-woman that died young her  
   ‘The woman who died young’

b. al-waladu llaðii ʔa jta-*(hu) al-kitaaba  
   the-boy that gave.you to-him the-book  
   ‘The boy to whom you gave the book’

c. al-waladu llaðii raʔajta-(hu)  
   the-boy that saw.you-(him)  
   ‘The boy who you saw’

c’ l-mra lli ʃʃ-ti-(ha)  
   the-woman that saw.you-her  
   ‘The woman who you saw’

As mentioned before, Spanish only has weak pronouns for direct and indirect object positions. As a result, the use of resumptive pronouns is more common in these relativized
positions than in subject or prepositional relative clauses. Nonetheless, as Suñer (1998) points out, they are possible in all syntactic positions, as (2.30) shows.

(2.30) Resumptive Pronouns in Spanish

a. el otro día un amigo nuestro que él es notario nos dijo
   the other day a friend ours that he is notary us told
   ‘The other day a friend of ours who is a notary told us’  (Lope Blanch, 1984)

b. yo tengo un primo que lo admiro mucho
   I have a cousin that him I-admire much
   ‘I have a cousin whom I admire a lot’  (Caracas 1997 sociolinguistic corpus)

c. y ese médico que tú le llevas un muchacho grave
   and that doctor that you to.him take a young.boy very.ill
   ‘And that doctor to whom you take a very ill young boy’  (Caracas 1997 corpus)

d. Me hablas de un asunto que yo no puedo opinar sobre él
   me YOU-talk of a topic that I not can opine about it  (Lope Blanch, 1984)

In fact, the Null-Prep version of this last sentence is not difficult to imagine, as in (2.31). I believe this type of Null-Prep is more easily acceptable and the one we saw in (2.21a) because the missing preposition can be interpreted as the one already presented in the sentence, de, although not with the same verb. In this context, sobre, the missing preposition, and de are synonymous.

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13 The case with indirect objects could be controversial since IO clitic doubling is preferred, if not obligatory, in most Spanish dialects. Nonetheless, since the preposition is omitted (the standard sentence would be with the preposition a, “to”: y ese médico al que tú (le) llevas un muchacho grave), this could also be interpreted as a case of Null-Prep.

14 Larson (1987) proposed an analysis of Antecedent Contained Deletion for this type of Null-Prep constructions, in which the ellipsis of the preposition is possible and in fact quite common because it is fully recoverable. This would be the ACD Larson’s analysis of (2.31):
(2.31) Me hablas de un asunto que no puedo opinar

me YOU-talk of a topic that no can opine

‘You are talking to me about something on which I have no opinion’

In subject position, Spanish can accept a gap (2.32a), which is the standard form, or a resumptive pronoun (2.39a). What it does not accept is a relative pronoun (2.41b, c).

(2.32) a. el científico que ganó el premio Nobel

the scientist QUE won the prize Nobel

b. *el científico quien ganó el premio Nobel

the scientist who won the prize Nobel

c. *la propuesta la cual fue aceptada

the proposal the-which was accepted

(Suñer, 1998:37)

In Standard Arabic (2.33a) and Moroccan Arabic (2.33b), the only option in subject position is the use of a gap, unlike in direct object position. In Hebrew (2.33c), on the other hand, the presence of the pronoun is optional.

(2.33) a. al-waladu llaðii Ǧaaʔa (*hu)  

the-boy who came

(Anneji, 2005)

b. l-mra lli maatat syira (*ha)  

Moroccan Arabic

(i) Me hablas [pp de [np un asunto [s: que no puedo opinar[pp e]]]]

(ii) [s [np un asunto [s: que no puedo opinar [pp e]]] [s me hablas [pp de [np, e]]]

(iii) [s [np un asunto [s: que no puedo opinar [pp de [np, e]]]] [s me hablas [pp de [np, e]]]}
the-woman who died young

c. ha-ʔiš še-raʔiti (ʔoto)  
_Hebrew_

the-man that I-saw (him)

‘The man I saw’  
(Shlonsky, 1992:1)

There are several theoretical accounts for resumptive pronouns. For instance, Shlonsky (1992) considers them a last resort strategy, meaning that they are used when operations general to UG are blocked (Chomsky, 1991). So, the use of resumptive pronouns is a language specific rule that must apply whenever movement is not available. According to him, there is no optionality in the grammar about the use of resumptive pronouns or gaps, despite the data in (2.33c) or (2.29). Shlonsky (1992:448) explains these examples as “an illusion of free variation that is propped up by the morphological nondistinctness of two crucially different types of relative clauses”, one in which movement is possible and then obligatory; another one in which movement is blocked and then a resumptive pronoun must occur. Suñer (1998), on the other hand, argues that resumptive pronouns are inserted at PF and that they are not last resort, except for cases of island configurations. So, they are not needed at LF for well-formedness, as Shlonsky proposed. In fact, she argues that precisely because they have no semantic features, they can be introduced at PF, after spell-out, where LF cannot read them, so no meaning is lost. Suñer conceives resumptive pronouns as “an instance of pure manipulation of the internal structure of a lexical item, more precisely, as the manipulation of the corresponding relative pronoun that has remained in its base position” (1998:355). As evidence of this proposal, she shows that relative pronouns, as _quien_ in (2.34b), unlike interrogatives (2.34a), cannot stay in situ:
(2.34) a. ¿quién le dio qué cosa a quién?

Who CL HE-gave what thing to who

Who gave what to whom?

b. *la mujer que vimos a quién

the woman QUE WE-saw A who

(Suñer, 1998:73)

Brucart (1999) suggests several factors that promote the emergence of resumptive pronouns in Spanish RCs, as (2.35) illustrates (from Brucart, 1999). One of them is the distance between the relative pronoun and the gap: the longer the distance, the more common the appearance of the pronoun; needless to mention the necessity of the pronoun in island configurations. Other factors are the generic interpretation of the sentence, the indeterminacy that an external indefinite determiner provides, or the marked modality of some RCs. These factors can be marked by the use of second person singular in the present tense or a free relative, such as the cases of (2.35a,b); the presence of the indefinite determiner (2.35c,d); or the combination of all these factors plus a raising intonation (2.35e,f).

(2.35) a. Es un libro que lo compras y lo lees con gusto

It-is a book that CL buy-PR.2SG and CL read-PR.2SG with pleasure

‘This is a book that you buy and you read with pleasure’

b. Un libro que todo el que lo compra lo lee con gusto

A book that everybody the that CL buy-PR.3sg CL read-PR with pleasure

‘A book that whoever buys it, reads it with pleasure’
c. Tenía algunas novelas que no las habíamos visto nunca. (Trujillo, 1990:30)

‘He/I had some novel that we had not seen before’

d. Son dos chicas que Teresa las estima mucho. (Lope Blanch, 1984:122)

‘These are two girls that Teresa loves a lot’

e. Tienes una hija (↑) que no te la mereces.

‘You have a daughter that you don’t deserve’

f. Es una persona (↑) que no la verás nunca triste.

‘This is a person that you will never see sad’

According to Trujillo (1990), the manifestation of the resumptive pronoun helps to identify the antecedent, a similar account to the one that Brucart proposes for the determiner in *el que* relatives.

Summarizing, standard relative clauses in English and Spanish imply *wh*-movement, either of a null operator or of the head itself. Evidence in favor of this movement is the impossibility of relativization from an island configuration, as shown in (2.36a,b). In Spanish, and also in English, this ungrammatical configuration can be overcome with the insertion of a resumptive pronoun, which demonstrates that relatives with resumptive pronouns in Spanish and English are not movement constructions.
(2.36) a. *We know [the woman], that you left before John met *(her i).

b. Conocemos [a la chica], que dejaste antes de que Luis *(la i) conociera.

We have seen in (2.38) that Arabic uses the resumptive pronoun in all its relative clauses, except in subject ones. This weak pronoun seems not to be a last resort mechanism as it could be interpreted in English and Spanish to avoid Subjacency. The question that arises is whether these Arabic constructions involve movement or binding. Island sensitivity would provide good evidence in favor of one or the other analysis if it were not the case that island effects seem to be contradictory. On the one hand, relativization of an argument out of an island configuration does not produce ungrammaticality, as illustrated with Lebanese Arabic in (2.37a). On the other hand, relativization of an adjunct does violate Subjacency (2.37b).

(2.37) a. mnaṣrif l-mara lli fallayto ?abl ma y?eebøl-a Karim

Know.1p the-woman that left.2p before Comp meet.3sm-her Karim

‘we know the woman that you left before Karim met (her)’

b. *ssræa lli btaṣrfo miin byištìyìl fiy-*(a) hiyye l-maṭluube

the-speec that know.2p who works with- (*it) she the-required

‘The speed with which you who works is the required one’

These data indicate that movement is available at least in some Arabic relative clauses. Aoun and Benmamoun (1998) presented further evidence from reconstruction effects that also points to a movement analysis for Arabic relatives, but I will not be considering this analysis any further here.
In conclusion, I will assume that English and Arabic speakers learning Spanish already master the syntactic procedure of *wh*-movement and crucially Pied-Piping in their native languages. Then, the task of acquiring Spanish prepositional relative clauses for these learners would consist of revealing the particular properties of *wh*-movement in Spanish, namely, the obligatoryness of pied-piping, the peculiarities of *que* and *el que* constructions, and the sporadic optionality of resumptive pronouns.

To conclude with this extensive description of relative clauses, the next section provides a general account on the processing of relative clauses, and relates syntactic structure with real-time parsing.

2.6. Relative Clauses: Real-Time Processing

2.6.1. Introduction: the Filler-Gap Dependency

The psycholinguistic effect of syntactic movement is usually known as a filler-gap dependency. Most of the theories that seek to describe how we parse language in real-time are concerned with how we identify and interpret filler-gap dependencies. These dependencies are attractive to study for several reasons. To begin with, they present a challenge to the parser: we need to give an interpretation to an element that is displaced in the sentence, so it cannot be instantly incorporated into the sentence representation. Furthermore, the parser needs to retain the information in short-term memory until it reaches a point where it can be fully interpreted, that is usually when it gets a theta-role. Admittedly, this is a costly operation for the human computational system, and this is why the human parser tries to keep this filler-gap dependency as short as possible, as postulated by the *Active Filler Hypothesis* (Clifton & Frazier, 1989; Frazier, 1987; Frazier & Flores d’Arcais, 1989) and the *Minimal Chain Principle* (De Vincenzi, 1991). Evidence for these hypotheses comes from the “filled-gap effect” (Crain & Fodor, 1985;
Stowe 1986), which is an increased reading time in a point where a gap was expected. Stowe studied pairs of sentences with (2.38a) and without (2.38b) displaced elements.

(2.38) a. My brother wanted to know who Ruth will bring us home to at Christmas.
    b. My brother wanted to know if Ruth will bring us home to Mom at Christmas.

Stowe found increased reading times at encountering the pronoun us in (2.38a) compared to the same point in (2.38b). This increased time was interpreted as a surprise effect due to the fact that the wh-word was already interpreted as the moved direct object of the verb bring. So, the wh-word, the “filler”, was active before the relevant information for interpretation is available. This effect is explained by the Active Filler Hypothesis, defined by Frazier (1987) as follows:

(2.39) Once an element of a category XP is identified as moved from its argument position, then posit a corresponding empty XP category as soon as the grammar of the language allows you to do so.

Note that the surprise effect found in (2.38a) implies that the wh-word was fully interpreted before encountering the pronoun us; that is, it was integrated at the verb region. This fact will have relevant consequences later on the analysis of the processing data (chapter 5).

Later, De Vincenzi (1991) reevaluated the idea of the Active Filler Hypothesis together with Fodor’s (1979) Superstrategy intuition into the more general Minimal Chain Principle. Fodor’s proposal said that the parser prefers to analyze a sequence as being in its deep-structure position, postulating movement as a last resort strategy. The Minimal Chain Principle regulates the
decision the parser needs to take when it arrives at an ambiguous point in the sentence. Basically, it ensures that the parser will always take the shortest chain because it is the simplest computationally.

(2.49) *Minimal Chain Principle:* Avoid postulating unnecessary chain members at S-structure, but do not delay required chain members.

As we saw in chapter 1, this principle also determines the complexity of sentences that do not present ambiguities. As for relative clauses, this principle implies that complex chains will be processed slower than simpler chains. De Vincenzi (1991) adopts the definition of *chain* from Rizzi (1988): a set of elements nondistinct in indices (or nondistinct in feature content, or nondistinct in category), bearing one and only one θ-role and one and only one case, where each element of the chain is in an antecedent government relation with the next one. Although Rizzi is not completely explicit about the type of link between the head and the tail of the chain; traditionally, in G&B and in more recent accounts such as the copy theory, we assume that the relation between the moved element and the trace left at the original position is a syntactic one.

### 2.6.2. Lexical or Syntactic Relation?

Other linguistic frameworks, such as the Head-Driven Phrase Structure Grammar (HPSG) (Pollard & Sag, 1994), assume that displaced elements are linked directly to its subcategorizer through a lexical relation. As Marinis, Roberts, Felser & Clahsen (2005) clarify, these two linguistic approaches predict different ways of processing filler-gap dependencies. On the one hand, if we assume that the relation between the filler and the gap is a syntactic, indirect one, we
could hypothesize that the trace can be activated before encountering the subcategorizer. This is what the *Trace Reactivation Hypothesis* (TRH) proposes: the human parser postulates empty categories—traces—during the online comprehension of sentences containing such dependencies. (Bever & McElree, 1988; Love & Swinney, 1996). On the other hand, if we assume that the dependency between the filler and the gap is lexical, then the dependency will be solved only at the moment of encountering the thematic-role assigner. This is what the *Direct Association Hypothesis* (DAH) proposes: the filler-gap dependency is a lexically driven process triggered by the automatic mental reconstruction of the subcategorizer’s argument structure when it is encountered (Pickering & Barry, 1991; Sag & Fodor, 1995, 1996). The predictions of these two hypotheses are indistinguishable in most of the filler-gap cases, at least in head-initial languages. Unfortunately, we cannot tease apart these two hypotheses in the case of Spanish relative clauses. However, I am presenting these two hypotheses because most of the research on L2 processing has dealt with this issue.

There is some evidence that support the TRH in verb-final languages such as in Japanese (Nakano, Felser & Clahsen, 2002) and German (Clahsen & Featherton, 1999), where it is empirically shown that there are trace reactivation effects before reading the subcategorizing verb. In head-initial languages, we can distinguish between these two ways of processing dependencies in long distance dependencies. Constructions that require intermediate traces, such as in successive cyclic wh-movement (2.50), present the trace separated from its subcategorizer, so they are an ideal locus of investigation to distinguish between the TRH and the DAH.

(2.41) Who_i do you think t_i (that) John says t_i (that) Mary likes t_i?
Kluender & Kutas (1993) and Gibson & Warren (2004) have found L1 psycholinguistic evidence that supports the syntactic account of filler-gap long distance dependencies (the TRH). In both studies there is empirical evidence showing that the intermediate landing site facilitates the filler’s interpretation in long distance movement structures, but generally, the studies on L2 processing (Marinis et al., 2005) failed to find these same intermediate trace effects.

2.6.3. L2 Processing: Relative Clauses

As we have mentioned before, there is not much data on L2 processing since it is a relatively new area of investigation. The most prominent hypothesis is the Shallow Structure Hypothesis put forward by Clahsen and Felser (2006). Clahsen and Felser synthesized the main findings from data on L1 child processing, ERPs, and L2 processing, particularly Marinis et al., (2005), and concluded that L2 learners process fundamentally differently than native speakers. In particular, Clahsen and Felser believe that L2 learners have a shallow processor because they only make partial use of native processing mechanisms and experience L1 transfer of the processing strategies into the L2. As a result, L2 learners process filler-gap dependencies trying to directly link the filler with its subcategorizer, employing a lexically driven strategy and not a syntactic or structure-based one as native speakers would do. Instead, L2 learners need to rely on form-function mappings that are more direct and less complex than syntactic configurations. As stated in the previous chapter, Clahsen & Felser (2006) claim that this difference in processing is due to the L2 learners’ incomplete acquisition of the target grammar, but they did not test the L2 leaner’s knowledge of grammar, nor did any of the experiments in which they based their hypothesis. These studies only tested the processing of complex sentences by non-native speakers, but did not examine the off-line knowledge of these structures, which makes it
impossible to discriminate the real factors causing the differences in processing. In fact, this raises some interesting questions as to the function of grammatical knowledge required to build native-like representations. In the present study, knowledge of grammar is tested by means of an on-line grammaticality judgment task, an off-line production task, and an on-line sentence comprehension reading task.

The next chapter is a review literature of the acquisition of relative clauses by second language learners and sets up the context in which this study is framed.
CHAPTER 3: THE ACQUISITION OF RELATIVE CLAUSES

3.1. Introduction

Assuming that relative clauses involve the movement of a constituent of the clause, as we have discussed in the previous chapter, one of the central issues addressed in the studies dealing with the acquisition of relative clauses has been the availability of deriving this structure by movement, whether overt or covert. This debate has been especially relevant in the investigation of the development of children’s grammar (Guasti, 2002; Labelle, 1990, 1996; Perez-Leroux, 1994, 1995, among others) and it has also motivated some studies in L2 acquisition dealing with learners whose mother tongue presents wh-in situ (no overt wh-movement). The study on Chinese learners acquiring L2 English by Hawkins and Chan (1997) that we will review later exemplifies the concern with the availability of wh-movement in adult L2 acquisition. But for the most part, the studies on the acquisition of L2 prepositional relative clauses have dealt with the type of relative construction formed by the learners. For instance, with the learners’ preferences between Preposition Stranding and Pied-Piping and how markedness conditions these choices. To a lesser extent, they have dealt with the Null-Prep phenomenon and the resumptive strategy, and have barely considered the availability of movement in interlanguage grammars.

Next, the relevant L2 acquisition studies that directly speak to the phenomenon explored in this dissertation will be reviewed, and this investigation will be framed within the field of SLA. Then, the main working hypotheses will be laid out.
3.2. Earlier Studies on Acquisition: Typology and Markedness

3.2.1. The Noun Phrase Accessibility Hierarchy

The acquisition of relative clauses has been largely studied after the Keenan and Comrie’s (1977) famous proposal of Noun Phrase Accessibility Hierarchy (NPAH thereafter). This hierarchy ranks relative clauses according to two main considerations: crosslinguistic or typological evidence and frequency of the relative pronoun function. The NPAH predicts that subject (SU) relative clauses are the less difficult and more frequent, followed by the direct object ones (DO), and so on. The proposed order is represented in (3.1).

(3.1) Noun Phrase Accessibility Hierarchy (NPAH)

Subject (SU) > direct object (DO) > dative (IO) > oblique (OBL) > genitive (GEN) > object of comparison (OComp)

The possible types of relative clauses in a language such as English are summarized in Table 3.1.

Table 3.1: Syntactic functions of the relative pronouns in English

<table>
<thead>
<tr>
<th>Function</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject</td>
<td>The girl who talks a lot…</td>
</tr>
<tr>
<td>Direct Object</td>
<td>The girl who/whom John recognized…</td>
</tr>
<tr>
<td>Indirect object</td>
<td>The girl to whom John gave a present…</td>
</tr>
<tr>
<td>Oblique (object of preposition)</td>
<td>The girl about whom John talk a lot…</td>
</tr>
<tr>
<td>Genitive</td>
<td>The girl whose boyfriend is John…</td>
</tr>
<tr>
<td>Object of comparison</td>
<td>The girl that John is taller than…</td>
</tr>
</tbody>
</table>
The crosslinguistic evidence that crucially supports this hierarchy is the fact that there exists at least one language that relativizes in a certain position but not on a lower one from the scale, so the particular order in (3.1) not only presents a continuum of complexity but also an implicational scale. If a language relativizes in genitive position, this hierarchy predicts that it will also do so in all the higher positions, so that language obligatorily has SU, DO and IO relative clauses, too. Since this hierarchy is implicational, it also implies a markedness relationship among its categories: i.e. subject relatives are less marked than direct object ones, and direct object RC are less marked that Indirect object RC, and so on. Besides the typological reality of this hierarchy, the authors also suggest that it has psycholinguistic validity: the NPAH “directly reflects the psychological ease of comprehension. That is, the lower a position is on the AH, the harder it is to understand RCs formed on that position” (Keenan & Comrie, 1977:88).

Keenan & Comrie also proposed two further pieces of evidence that support the psychological soundness of this hierarchy. One is the extension of this cross-linguistic hierarchy into an intra-linguistic one: within one language, the higher the position in the hierarchy, the more acceptable the construction will be judged. In other words, the higher the syntactic function in the hierarchy, the easier to process the information that the relative clause conveys. So, subject relatives are always the most accepted in a given language. For instance, compare the marked genitive construction in English *the boy whose pants are blue arrived later* to the preferred subject relative *the boy who has blue pants arrived later*.

The NPAH has been extensively tested in acquisition studies, especially during the 80’s in English L2 studies (Gass, 1979, 1981, 1983, 1984; Hamilton, 1994; Hawkins, 1989; Hyltenstam, 1984; Pavesi, 1986; among others, see R. Ellis, 2008, pp. 563-575 for a comprehensive review), and lately, it has been revisited for Asian languages (see the special issue of Studies in Second
Language Acquisition 29, 2007). Nonetheless, recent research with East Asian head-final languages such as Japanese, Chinese or Korean questions the universality of the NPAH proposal. Authors such as Kanno (2007) and Shirai & Ozeki (2007) claimed that the NPAH is not always a good predictor for the development of the L2 interlanguage grammar, particularly in typologically different languages. Comrie (1998, 2007) accounted for the L2 data on East Asian head-final languages, which does not always seem to follow the NPAH, by proposing that the equivalent translation of a RC in Japanese, for example, is not a relative clause but a noun-modifying clause more similar to an attribute than to a relative clause. And since it is not a relative clause, it is not bound by the NPAH. Nevertheless, despite the interesting debate raised in these studies, I will not attempt to review them any further because the results cannot be easily generalized for other languages beyond head-final languages.

The research questions in most of the early studies testing the NPAH were about the influence that typological universals can have on the order of acquisition of certain grammatical structures, and on the power of these universals to explain the easiness or difficulty in learning some linguistic features. The main assumption was that interlanguages are natural languages (Adjémian, 1976). If linguistic universals constrain natural languages, then, they will also affect the development of L2 languages. With respect to relative clauses, the hypothesis was that if the ranking proposed by Keenan & Comrie (1977) is the correct one, then it should also hold in the development of a language, be it L1 or L2 acquisition.

Gass (1979) studied a total of 188 students learning English as a second language. Their linguistic backgrounds were quite diverse; their native languages were Italian, Arabic, Portuguese, Farsi, French, Thai, Chinese, Korean and Japanese. Nonetheless, no results are reported according to the native languages of the students. All subjects completed three tasks: a
free composition, a sentence combining task and a grammaticality judgment task. The overall results showed that the L2 production of relative clauses, except for the case of genitive, can be correctly predicted by the NPAH. Gass claimed that the genitive did not conform to the hierarchy proposal maybe because of the salience of the relative pronoun whose. In another study, Gass (1984) described the results of an instructional intervention: the first group of students was instructed on subject and direct object relative clauses, whereas the second group only received instruction on prepositional relative clauses. When both groups were tested, the results indicated that the first group did well only in SU and DO relative clauses, but not in the rest of RC, whereas the second group did well in all types of relative clauses that were higher in the accessibility hierarchy. These results corroborated the psychological and implicational validity of the NPAH for L2 learnability. Then, the prediction was that if knowledge of a difficult structure (lower in the hierarchy) is acquired, it automatically generalizes to a related easier structure (higher in the hierarchy).

So far, Keenan & Comrie’s proposal is strongly corroborated by the L2 data. However, Tarallo and Myhill (1983), and Hawkins (1989) argued that the reason why the learners were apparently following the NPAH is not because of the existence of such a typological relational hierarchy. Instead, they believed that the reason why L2 learners were constructing first subject RCs, then object RC, and so on is due to the proximity between the head of the RC and the extraction site; the closer the extraction site, the easier to process the RC. In other words, relative clauses are formed on the basis of the linear ordering of the constituents in the surface configuration, and not on the basis of the syntactic relational ordering of the constituents. Hawkins (1989) tested this hypothesis analyzing the acquisition of “stylistic inverted” relative clauses in L2 French (Kayne & Pollock, 1978). In the Romance languages, the subject and the
verb of an embedded relative clause can be optionally inverted. In French, the following pair of relative clauses is basically equivalent:

(3.2) a. L’homme que, Pierre connaît tï.
    b. L’homme que, connaî tï, Pierre.

   ‘The man who Pierre knows’

Hawkins’ predictions go as follows: if the NPAH is right as proposed by Keenan & Comrie, then L2 learners of French should not have any problem with inverted direct object RCs compared to non-inverted DO relative clauses because the relationship of the antecedent and the gap is the same in both cases. Whereas if the reason for the tendencies explained by the NPAH exist not because of the syntactic position of the gap, but because of the surface proximity of the constituents, then inverted DO RC should be treated as subject RCs because their surface configuration is practically the same, as shown in (3).

(3.3) L’homme qui, tï, connaî t Pierre.

   ‘The man who knows Pierre’

As showed in the examples above, the direct object relative in (3) and the subject relative in (2b) have the embedded words in the same surface order, but they do not have the same distance from the antecedent to the extraction site\(^\text{15}\).

\(^{15}\) Of course, this conjecture is debatable since it all depends on where we assume the subject is in the deep-structure. However, I will not attempt to cover this topic here.
Hawkins (1989) tested 119 English speakers learning French as an L2 from different proficiency levels. They all completed a main cloze task, and also a GJT, a sentence-combining task, and a free cloze task. Overall results showed that the selection between *que/qui* (*que* is the complementizer used for DO RC and *qui* is the relative pronoun used for Subject RC) is made based on the semantic feature [± animacy] instead of the grammatical function of the trace. This semantic tendency is quite strong at the intermediate level group (his lower group) and it gradually disappears as the proficiency increases. Similar results are reported by Pagani (1986) with Italian native speakers learning L2 French. Regarding the selection of the complementizer in DO RC with and without inversion, the results showed that selecting *que* in RC with inversion was much more difficult than with those without the inversion. Hawkins also reported that the common mistake was to use the relative pronoun *qui* instead of *que* in the case with inversion. For Hawkins, this supports the configurational approach to the L2 acquisition of relative clauses: L2 learners are driven by surface structural configurations and not by syntactic relations, so L2 learners start constructing RC on the basis of adjacent categories in the surface configuration. Hawkins further explained that the reason behind these results is not in the L2 learners’ grammatical knowledge, but in their real-time processing capacity. L2 learners parse linearly, and with “difficulty” the RCs, and the question is not a matter of typological markedness but a matter of processing capacity. In a way, this is what Keenan & Comrie meant when suggested that the NPAH had a “psychological validity”. In any case, this is an interesting line of argument that will be revisited in the analysis of the results presented in this dissertation.
3.2.2. Resumption and the NPAH

The other psycholinguistic consideration of the Noun Phrase Accessibility Hierarchy is related to the entailment of the distribution of resumptive pronouns. The assumption is that the lower down the position in the hierarchy, the easier it is to find a resumptive pronoun in that position. If a language uses resumptive pronouns in the DO position, for instance, it will also retain a pronoun in lower positions, but not necessarily in a higher position. This is precisely the case of Arabic since it does not accept resumptive pronouns in subject position but it needs them in the other functions that are placed in lower positions in the hierarchy.

Since the Noun Phrase Accessibility Hierarchy also predicted the appearance of pronoun retention in relative clauses, Hyltenstam (1984) investigated this topic in the acquisition of Swedish as a second language. Typologically, there are more languages with resumptive pronouns than languages with gaps. Therefore, the presence of a pronoun in a relative clause is considered unmarked and its absence marked. In this case, Hyltenstam did take into account the L1 of the participants. Swedish, the L2, does not present pronoun retention, as neither do two of the four L1 languages investigated, Spanish \((n = 12)\) and Finnish \((n = 9)\). There were also two L1 languages that needed a resumptive pronoun, Greek \((n = 12)\) and Persian \((n = 12)\). All the participants saw 8 pictures and had to identify 6 of the people depicted in them by forming a relative clause. Results indicated that all subjects produced resumptive pronouns when producing relative clauses and that the pronouns were deleted “roughly in the order predicted by the NPAH, although the ordering is not perfect” (Hyltenstam 1984:47). These results led Hyltenstam to conclude that even though the learners have a marked category in their native language, such as the absence of resumptive pronouns, they all use unmarked options in their interlanguage grammar, i.e.: pronominal copies. The degree to which they use the pronominal
retention, though, depends on the characteristics of the native language of the learner: the Persian speakers used resumptive pronouns to a bigger extent (240 pronouns in total), followed by the Greek speakers (205 pronouns), the Spanish speakers (144 pronouns), and the Finnish (27 resumptive pronouns) speakers.

Lastly, regarding the resumptive strategy, the results found by Liceras (1986) led her to conclude that there is not a correlation between the hypothesis stated in the Noun Phrase Accessibility Hierarchy and the appearance of resumptive pronouns in SLA. That is to say, there is not an increase of resumptive pronouns in the lower positions of the hierarchy. But if we examine closely the responses of the native group, we can see that they only produced resumptive pronouns, although residually, in the lower positions of the hierarchy.

Table 3.2: Acceptance of resumptive pronouns by syntactic position, adapted from Liceras (1986)

<table>
<thead>
<tr>
<th></th>
<th>Beginners (n = 15)</th>
<th>Intermediate (n = 15)</th>
<th>Advanced (n = 15)</th>
<th>Natives (n = 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU</td>
<td>.60</td>
<td>.33</td>
<td>.07</td>
<td>--</td>
</tr>
<tr>
<td>LOC</td>
<td>.53</td>
<td>.13</td>
<td>.07</td>
<td>--</td>
</tr>
<tr>
<td>OBL</td>
<td>.83</td>
<td>.33</td>
<td>.20</td>
<td>.20</td>
</tr>
<tr>
<td>GEN</td>
<td>.60</td>
<td>.50</td>
<td>.03</td>
<td>.10</td>
</tr>
</tbody>
</table>

More recently, and with different research questions, Hawkins and Chan (1997) revisited the issue of resumption in L2 acquisition of relative clauses. They tested Chinese (n = 147) and French (n = 113) native speakers learning L2 English subdivided in different proficiency levels. Again, they used a grammaticality judgement task. The important facts for our study are that,
taking into account that Chinese is a language that licenses resumptive pronouns, Chinese learners showed a noticeable improvement at rejecting ungrammatical sentences with resumptive pronouns in English as their proficiency in L2 increases. The relevant data is in table 3.

Table 3.3: Accurate judgements of GJT (in %), from Hawkins & Chan (1997), adapted from White (2003: 124):

<table>
<thead>
<tr>
<th>L1 Language</th>
<th>Level</th>
<th>Grammatical relative sentences</th>
<th>Resumptive (ungrammatical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1 Chinese</td>
<td>Elementary (n = 47)</td>
<td>56</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Intermediate (n = 46)</td>
<td>67</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>Advanced (n = 54)</td>
<td>79</td>
<td>90</td>
</tr>
<tr>
<td>L1 French</td>
<td>Elementary (n = 33)</td>
<td>81</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>Intermediate (n = 40)</td>
<td>88</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>Advanced (n = 40)</td>
<td>92</td>
<td>96</td>
</tr>
<tr>
<td>L1 English</td>
<td>Control (n = 32)</td>
<td>96</td>
<td>98</td>
</tr>
</tbody>
</table>

According to Hawkins and Chan these data support their hypothesis: the Failed Functional Features Hypothesis, according to which adult L2 learners are unable to acquire features differing from those found in the L1. Chinese and English differ in the [± wh] feature in C: Chinese does not have it. According to their hypothesis, this parametric difference is predicted not to be acquired by adult Chinese learners of English, which means that Chinese learners will never derive relative clauses by movement. Given the fact that French has the same value of [± wh] feature as English, French learners are not expected to have problems mastering the structure of English relative clauses. Overall, results showed significant differences due to L1.
None of the groups of French speakers differed significantly from the Control group and French speakers always performed better than the Chinese group. For Hawkins and Chan, these results provide strong evidence for the claim that parameters cannot be reset in adult L2 acquisition and, although Chinese speakers accommodate L2 input, they do it by means of fronting the \textit{wh}-phrases as a topic and not by mastering \textit{wh}-movement.

To sum up, despite all the differences in theoretical frameworks, all these studies show that there seems to be an effect of markedness in the acquisition of relative clauses but this can be altered by L1 transfer. In Gass (1984) words, typological markedness is not an ‘absolute constraint’ in L2 acquisition, but rather an ‘overall shaping factor’. As we will see in the next section, Mazurkewick (1984) and Bardovi-Harlig’s (1987) studies show that typologically unmarked options are not always acquired first, but that salience and/or frequency in the input can also be a determining aspect. These and similar findings in other SLA studies which did not seem to make a clear-cut statement about the role of markedness in the explanation of L2 acquisition made the SLA researchers in the early 90s to abandon the markedness theory as a working hypothesis. Also, the continuous change in the paradigm from the concept of grammar as the sum of a ‘core’ and a ‘peripheral’ grammar to the Principles and Parameters model, along with the theoretical impact of the Government and Binding program (Chomsky, 1981) and the development of the concept of Barriers (Chomsky, 1986) make investigators focused their SLA research into other linguistic structures with different theoretical questions. This does not directly imply that markedness is an irrelevant factor or an incompatible theory to explain and predict the development of a non-native language. For instance, it might be the case that some parameters are set before others because of markedness considerations. Finally, it is worth noting that none of these studies have paid special attention to the fact that the vast majority of L2 learners omit
the obligatory preposition when starting to form oblique relative clauses, the topic of the next two sections.

3.2.3. The Oblique Position: Preposition Stranding and Pied-Piping

What Keenan and Comrie did not take into account in their hierarchy is the relationship between two forms within oblique relative clauses; that is, between Pied-Piping and Preposition Stranding. During the 1980’s, some studies explored the L2 acquisition of pied-piping and preposition stranding in relative clauses using the theory of markedness (Bardovi-Harlig, 1987; Liceras, 1981, 1984, 1986; Mazurkewich, 1984). For this reason, in the following lines, I will explain the essentials of this theory and its implications for L2 acquisition. The general assumption for the studies that investigated L2 acquisition exploiting the theory of markedness was that unmarked characteristics of grammar facilitate acquisition. So, the markedness theory may entail a preferred structure and this would be a property of UG. The UG theory at that time was concerned with the distinction between core and periphery. Core grammar, as defined by Chomsky (1981), is the language built by setting the appropriate parameters according to the input and by the structural preferences and implicational relations. The periphery consists of “borrowings, historical residues, inventions, and so on, which we can hardly expect to – and indeed would not want to—incorporate within a principled theory of UG” (Chomsky 1981: 8). To sum up, core grammar consists of unmarked principles whereas the periphery represents the marked properties of the language.

If we apply the markedness theory to oblique relative clauses, we first need to establish the markedness relationship between pied piping and preposition stranding. To decide which structure is marked and which one unmarked, we can follow different classification criteria. For
instance, we can define markedness following a language typology approach such as the one proposed by Van Riemsdijk (1978). He observed that preposition stranding is a quite rare phenomenon, common and relatively free in English and Scandinavian languages, but more restricted in Germanic languages such as Dutch, so within the languages of the world, PS is a marked property. Gundel, Houlihan & Sanders (1983) proposed the following definition of typological markedness:

A structure X is typologically marked relative to another structure, Y (and Y is typologically unmarked relative to X), if every language that has X also had Y, but every language that has Y does not necessarily have X.

If we observe the languages that have preposition stranding (PS), they also have Pied-Piping (PiP) although in different degrees of productivity. The reverse does not hold. This would make PS a typological marked structure in comparison to PiP. There are also structural reasons, for instance, preposition stranding is not a free phenomenon that can occur everywhere, compare (3.4) to (3.5). Van Riemsdijk argued that extraction from a PP is not always possible because PPs are islands or bounding nodes. In fact, he proposed that PS is structurally marked compared to PiP because it violates a universal grammar principle such as Subjacency. If PP is a bounding node, then the wh-movement that results in PS crosses two bounding nodes: PP and S.

(3.4) The person who they saw a picture of.

(3.5) *This is the journalist that Bill resigned according to.
Van Riemsdijk concluded that PS can occur when the preposition is part of the verb; that is, when there is reanalysis. So the NP can move by its own. Also, he proposed an ‘escape hatch’ for wh-phrases to stop at a provisional landing site before moving to COMP. Later, Hornstein & Weinberg (1981) formalized this idea proposing a language specific rule of syntactic reanalysis. Briefly, they all agreed in considering PS structurally marked compared to PiP, and as such, part of the periphery.

Several authors tried to pursue the suitability of the distinction between core and periphery in nonnative grammars. Mazurkewich (1984) and Bardovi-Harlig (1987) conducted two studies that investigated the markedness of the two structures in relation to English L2 acquisition. Mazurkewich investigated French and Inuktitut native speakers producing English dative wh-questions; she also investigated double object alternations, but I will not consider these data here. The results revealed that French speakers used more PiP than the Inuktitut speakers did since these produced more questions with PS. Mazurkewich explained these results by saying that Inuktitut speakers were more advanced than the French ones and that this is why they already acquired the marked structure, preposition stranding. But, as Kellerman (1985) and White (1987) suggested, the results showed an essential role of the L1, since Inuktitut does not have prepositions, whereas French allow PiP but not PS. So, the effect of language transfer need not be an issue in the Inuktitut speakers, but it clearly is in the French learners. Nonetheless, it is quite revealing that in the case where L1 influence is not a factor, it is preposition stranding, the supposedly typological marked option, and not Pied-Piping, the option more frequently produced. Mazurewich finally concluded that marked parameters in the L2 will favor transfer (permeability, as it was understood in that time) into the nonnative language whereas marked properties in the L1 will be hardly transferred into the L2.
Bardovi-Harlig (1987) tested 95 L2 English learners from different proficiency levels with a sentence-combining task. The subjects were from several L1 backgrounds, almost half of them were Arabic speakers (n = 43), and there were also Chinese (n = 17), Malaysian (n = 11) and Korean (n = 5), among others. Bardovi-Harlig controlled for the unavailability of preposition stranding in the subject’s languages, but there are other factors in these languages that she did not consider, such as wh-in-situ or resumption. She replicated Mazurkewich’s dative wh-questions study and added prepositional and phrasal verbs in relative clauses. The cross-sectional results showed that preposition stranding is acquired before pied piping, an outcome also attested in Mazurkewich’s Inuktitut speakers and on English L1 acquisition (French, 1984; McDaniel & McKee, 1996; McDaniel, McKee & Bernstein, 1998). In fact, White (1989) pointed out that there are two main approaches to the study of language universals, the typological approach and the acquisition approach. These two approaches need not make the same predictions, as it seems to be happening in this case since PS is marked typologically speaking but it seems it is acquired before PiP. So, we can not always assume that the typological relationship between two structures would predict the acquisition order of those structures.

In addition, Bardovi-Harlig also reported that the L2 learners, before mastering PiP or PS, go through a stage in which they do not produce the preposition, what she calls the ‘no-prep strategy’. These findings led her to propose the following developmental acquisition order: (1) No-Prep < (2) PS < PiP. She also found certain asymmetries between questions and relative clauses, as L1 acquisition, with questions developing earlier than relative clauses. And PiP develops first in questions than in relative clauses. In fact, they are in an implicational relationship: if a subject is able to use PiP in relative clauses, she also knows how to make use of PiP in questions, but not the reverse. Bardovi-Harlig argued that the results were due to the
availability of the input, a factor similar to frequency effects, but that she denominates ‘salience’. She considers that PS in English is more frequent than PiP, and then more salient to the learners. However, Bardovi-Harlig did not provide an explanation for the “No- Prep” strategy, largely attested in her 3 beginner levels (around 80% of their production). First of all, this is a construction not found in the input, so it cannot be explained by salience or frequency effects. Second, she assumes that the No-Prep rule is a grammatical developmental stage and that grammaticality is not at stake in any case since in dative constructions the lack of the preposition is not problematic. But compare the grammaticality of the dative *Who did Mary give a book? to the ungrammatical *the clerk who Jill had complained was fired. It is not clear whether Bardovi-Harlig does not count the constructions that require a preposition in her results or whether she just does not pay attention to them in this case. In summary, the author concluded that the predictions made by the markedness theory hold as long as there is not another relevant factor which interacts with it, such as salience, in other words, frequency.

More recently, Ohba (2003) studied the acquisition of L2 English oblique relative clauses by Japanese native speakers. Since Japanese does not have an equivalent construction to PiP or PS, he assumed, as in the Inuktitut case, that transfer of L1 cannot be a possible explanation for any preference of the learners in the L2. He used two different tasks, a GJT and a sentence-combining task. While the GJT results did not display any sort of preference for a particular construction, the sentence-formation task exhibited similar findings to the ones discussed before. The beginner group of learners used the PiP strategy only in the 3% of the oblique relative clauses, but they used stranding 33.3% of the cases. The PiP structure increased as proficiency improves, a fact that makes Ohba claim, as McDaniel & McKee (1996) and McDaniel et al.
(1998) already suggested, that PiP is just a prescriptive rule taught in classroom settings which does not truly reflect the real grammar.

As for L2 Spanish, Adjémian and Liceras (1984) also tested the markedness theory with an experiment involving native speakers of English learning L2 French or L2 Spanish, and native speakers of French learning L2 English or L2 Spanish. They used elicitation, translation and grammaticality judgment tasks in a variety of sentences with Complementizer Phrases. As for pied-piping and stranding, they expected different results according to the L1: French native speakers would accept, as well as transfer, pied-piping in L2 English, while English native speakers would not transfer stranding into L2 French or Spanish because of its marked character. According to them, their results fit within their expectations. However, looking deeper into the data, we can see that the Anglophone learners corrected most of the ungrammatical French and Spanish preposition stranding in the grammaticality judgement task, around 75%, but there is still a 25% of acceptance of preposition stranding that the authors do not address. So, especially in beginner levels, marked options can also transfer into the L2.

There are not many studies on acquisition of relative clauses in L2 Spanish, except for Liceras’ work, which has largely studied the acquisition of relative clauses in non-native grammars within the markedness framework (1981, 1986, 1988). Liceras (1986) studied the acquisition of L2 Spanish restrictive relative clauses by English-speaking learners, who had previous instruction in French. She tested a total of 50 students, 45 experimental subjects divided into three levels according to their class enrolment: beginner, intermediate and advanced, and 5 native speakers acting as the control group. The subjects completed three tasks, a translation task, a grammaticality judgment task and a fill-in-the-blank task, in that order. Liceras’ assumption was that marked L1 rules should not cause permeability (i.e. transfer) into the
interlanguage grammar, so we would not expect PS to transfer into the L2, whereas marked L2
rules may transfer into the non-native grammar. Nonetheless, she found preposition stranding in
the beginner levels of L2 Spanish, as the results in Table 4 indicate. Not only the learners did
accept PS in the GJT but they also produced it in the translation task. The fact that PS practically
disappears in the intermediate and advance learners made her conclude, as in Liceras (1981) that
“nonnative learners include no marked structures in reconstructing Spanish” (Liceras 1986:113).
As expected, native speakers did not accept or produce preposition stranding.

Liceras also studied the selection of the complementizer in Spanish restrictive relativization.
Unlike English, Spanish requires the complementizer que in all non-oblique restrictive relative
clauses, using the relative pronouns exclusively for oblique constructions, be these direct,
indirect, or prepositional objects.

\[
\begin{align*}
(3.6) \quad \text{Es el lingüista} & \quad \begin{cases} 
\text{que} \\
* \text{quien} \\
* \text{el que} \\
* \text{el cual} \\
* \varnothing
\end{cases} \quad \text{vive en Nicaragua.}
\end{align*}
\]

‘He is the linguist that/who lives in Nicaragua’
\[
\begin{align*}
\text{(3.7) } & \text{ Es la lingüista}\quad \\
& \{\text{que} \quad *\text{quien} \quad *\text{la cual} \quad \text{conocimos allí.}\} \\
& \text{la que} \\
& *\emptyset
\end{align*}
\]

‘She is the linguist that/who(m)/ Ø we met there’

Compared to the control group, who used que around 37-41% of the time, the non-native groups used que –either as a complementizer or as a relative pronoun- between 46% and 64% in the three tasks. So, they generalized the use of this complementizer to non-obligatory contexts, especially in oblique relativization where natives prefer to use the relative el que. But Liceras did not take into account the fact that preposition + que is a grammatical, although not a very productive strategy in oblique relativization. At the same time, non-native speakers use ungrammatical relative pronouns (quien, el que, el cual) in obligatory que contexts such as subject or DO, particularly in subject position. In Table 2, data from different syntactic positions are collapsed in one category by task\(^{16}\).

\(^{16}\) Since Liceras conditions are not balanced, amounts could vary depending on what and how is averaged. For these averaged proportions, I used raw numbers instead of individual proportions for each syntactic position.
Table 3.4: Responses on PS, and *que* in restrictive relativization, adapted from Liceras (1986).

<table>
<thead>
<tr>
<th></th>
<th>Beginners ((n = 15))</th>
<th>Intermediate ((n = 15))</th>
<th>Advanced ((n = 15))</th>
<th>Natives ((n = 5))</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preposition Stranding</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GJT (acceptance)</td>
<td>.43</td>
<td>.13</td>
<td>.10</td>
<td>--</td>
</tr>
<tr>
<td>Translation (production)</td>
<td>.20</td>
<td>.01</td>
<td>.01</td>
<td>--</td>
</tr>
<tr>
<td><strong>Proportion of complementizer <em>que</em> in obligatory contexts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GJT</td>
<td>.42</td>
<td>.64</td>
<td>.68</td>
<td>.98</td>
</tr>
<tr>
<td>Translation</td>
<td>.87</td>
<td>.85</td>
<td>.83</td>
<td>.90</td>
</tr>
<tr>
<td>Fill-in-the-blanks</td>
<td>.91</td>
<td>.87</td>
<td>.87</td>
<td>1</td>
</tr>
<tr>
<td><strong>Proportion of ungrammatical relative pronouns in obligatory complementizer contexts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GJT</td>
<td>.42</td>
<td>.23</td>
<td>.28</td>
<td>.05</td>
</tr>
<tr>
<td>Translation</td>
<td>.09</td>
<td>.10</td>
<td>.15</td>
<td>.03</td>
</tr>
<tr>
<td>Fill-in-the-blank</td>
<td>.09</td>
<td>.13</td>
<td>.13</td>
<td>0</td>
</tr>
</tbody>
</table>

Liceras (1988) re-examined these data extending the definition of markedness to the notion of subset relations, following Hirschbühler & Rivero (1982). The following diagrams represent the markedness (core/periphery) distinction with respect to insertion of *que* (deletion) or maintenance of relative pronoun in COMP (non-deletion) on the one side (3.8a) and preposition stranding (non-bounding PP) and pied-piping (bounding) on the other side (3.8b):
According to these subset principle assumptions, Spanish has a more restrictive grammar than English since it only makes available the smallest sets depicted in the diagrams. That is, Spanish is a proper subset of English with respect to these two structures. Hirschbühler and Rivero (1982) assumed that the Spanish options are marked, because they both require an obligatory restriction of the core grammar. Taking into account these subset relations, the markedness predictions were that English speakers learning L2 Spanish would neither use relative pronouns in non-oblique RC (non-deletion option) nor would they produce preposition stranding (non-bounding PP) because these would be the marked options. Since the results showed that this is not exactly the case, Liceras (1988) concluded that the definition of markedness in terms of subsets makes the wrong predictions about L2 development, maybe because the L1 cancels its effects.
3.3. The Null-Prep Phenomenon in Language Acquisition

As we saw earlier, Bardovi-Harlig found ‘No-Prep’ in the interlanguage grammars of her subjects, but she did not give an explanation for it because it was not perceived as a markedness constraint, nor as a frequency effect, the main two factors that she was investigating. In effect, neither L1 transfer nor input frequency can explain this systematic phenomenon. Tarallo and Myhill (1983) also found incorrect deletion of prepositions in beginner and intermediate learners of L2 German, Portuguese, Chinese and Japanese\(^\text{17}\) whose native language was English. They found that the rate of omission was higher when a case-marked relativizer was involved, as in German. Overall, they found 39% of ungrammatical omission of preposition in German and 15% in the rest of the languages.

3.3.1. Null-Prep in L1 Acquisition

The Null-Prep phenomenon has also been attested in L1 acquisition. Hildebrand (1987) found pervasive omission of the preposition in both, questions and relative clauses in child language. She tested 48 English speaking children in their L1, ages 4 to 10, and found that the predominant error in both tasks, an imitation and a production task, was the omission of the preposition, 45% of the total of errors\(^\text{18}\). Hildebrand also noticed that this frequency decreased as the age of the speakers increased. Her reasoning was that children were omitting the preposition in order to avoid stranding, a marked constraint. This omission may be possible due to the fact that children perceive prepositions as morphemes with a “less important grammatical role”, compared to other word categories (Hildebrand 1987, p. 77).

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\(^{17}\) Japanese and Chinese allow grammatical omission of preposition in certain cases, depending on the preposition and its relation with the verb. The numbers reported here only include the ungrammatical cases of deletion of preposition.

\(^{18}\) Unfortunately, Hildebrand does not provide the raw data or the percentage of omission of preposition with respect to the total sentences tested.
3.3.2. Null-Prep as an Instance of Wild Grammar

Only Klein (1991, 1993) has extensively considered and explained the omission of preposition in wh-movement constructions, what she named as ‘Null-Prep’. This dissertation builds on her pioneer work for ‘Null-Prep’ in L2 English acquisition, but also departs from her analysis and takes into accounts new eliciting methodology that can reveal and broaden our understanding of this linguistic phenomenon.

Klein (1993, 1995) studied the null preposition phenomenon in relative clauses and questions and argued that this construction was an example of a “wild” interlanguage grammar, a solution outside UG because it violates the universal principle of recoverability of deletion (Chomsky 1964, 1965; Chomsky and Lasnik, 1977). She studied L2 English learners with different L1 backgrounds and concluded that Null-Prep is a specific property of L2 interlanguage grammars, but not a possible option in natural languages, at least not in interrogative sentences. She claimed that this construction violated universal principles such as the ECP and because of that, it could not be part of UG.

Klein tested 196 learners of L2 English from 18 different linguistic backgrounds and 40 educated speakers of standard American English as the control group. The main task consisted of a GJT with correction and confidence rating scale. There were a total of 70 sentences in the form of declarative, interrogative and relative clauses. The experimental prepositional verbs that she included were: wait for, apply for, pay for, dance with, play with, live with, talk about, complain about, and worry about. The GJT had 27 ungrammatical Null-Prep sentences in each sentence condition (declarative, interrogative or relative clause) and for each verb (9 x 3 = 27). She only reported results from sentences in which the subjects demonstrated knowledge of the
subcategorization frame for that particular verb in the declarative sentence condition. This reduced the data by half, as only 49% of the declarative sentences were corrected as to the subcategorization properties of the target verbs. The percentages of subcategorization accuracy ranged from live with with 77.6% of correct responses to apply for with only 27.6% of correct responses. Overall results for non-native speakers indicated 47% of acceptance of Null-Prep in question sentences and 54% of Null-Prep in relative clauses. Native speakers accepted a mean of 1% of Null-Prep in questions, and a mere 2% in relative clauses. Results by proficiency level are displayed in Table 3.

Table 3.5: Mean percentage of Null-Prep per proficiency level

<table>
<thead>
<tr>
<th>Proficiency Level</th>
<th>% of correct subcategorization</th>
<th>Mean acceptance of Null-Prep, in %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Questions</td>
</tr>
<tr>
<td>Low-Intermediate learners (n = 55)</td>
<td>30.5</td>
<td>69</td>
</tr>
<tr>
<td>Intermediate learners (n = 66)</td>
<td>47.6</td>
<td>52</td>
</tr>
<tr>
<td>Advanced learners (n = 75)</td>
<td>63.4</td>
<td>30</td>
</tr>
</tbody>
</table>

There was a significant interaction of proficiency level x acceptance of null preposition, the lower the level of the learner, the higher the probability of finding Null-Prep. Although a

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19 We will see that this fact, the learner’s generalized lack of knowledge of the subcategorization frame, is attested again in my data. Note that Klein’s analysis included all verbs whose declarative sentence was corrected with “the insertion of a preposition”, regardless of the accuracy of this preposition.

20 It is also significant the fact that only five of the verbs were corrected more than 50% of the times, and that three of these five verbs were the ones that used the preposition “with”, which is the preposition with a more transparent meaning. Particularly, live with was corrected 77.6% of the times, talk about 65.33%, dance with 54.6%, worry about 53.6% of the times, play with 51.3%, wait for 43.9%, pay for 33.2%, complain about 32.7%, and apply for 27.6% of the times. So, it seems to me that the less transparent the meaning of the preposition, the easier to drop it.

21 It is important to notice that Klein’s Null-Prep percentages are based on acceptance performance, and not on production. This may explain why her Null-Prep data is much more frequent than the Null-Prep data reported in other studies (Bardovi-Harlig, 1987; Perpiñán, 2008; Tarallo and Myhill, 1983).
systematic comparison between pairs of L1 language groups did not reach significance, I believe there may be a significant effect of the L1. Null-Prep is easy to find in standard Japanese, Korean, Chinese, Greek and colloquial Brazilian Portuguese, (and in nonstandard dialects of Spanish and French), and crucially, the subjects’ native languages more represented in the study were Japanese, Korean, Spanish, Chinese and French (79% of the total). Nevertheless, Klein argued that there is “tentative support for the claim that the native language of a second language learner is not responsible for the appearance of null-prep” (Klein 1993, p. 100). The age of arrival to the United States and the mode of acquisition (predominantly oral or predominantly visual) were not significance factors, either. At this point, further studies of Null-Prep controlling for the participants’ native language are needed to discard the idea that L1 transfer may play a role in the appearance of Null-Prep in the interlanguage. Another factor that does not seem to affect the frequency of Null-Prep is the selection of a relative pronoun (which) or a complementizer (that), unlike what Tarallo and Myhill (1983) found for German and the other languages that used a complementizer instead of a case-marked relative pronoun.

To sum up, Klein found more Null-Prep in relative clauses than in questions. She also acknowledged the fact that Null-Prep is a natural language phenomenon because it occurs in relative clauses in other languages in the world, but not in interrogative sentences. For those languages, she proposed, Null-Prep only exists in non-movement relative constructions and it is part of the core grammar; whereas in English, Null-Prep is in the periphery.

In conclusion, Klein believed that a defective UG is the cause of the manifestation of the Null-Prep structure in L2 English. Although she did not completely disregard the role of UG in L2 acquisition because, as she pointed out, if this were the case, we would expect to find a severe deviance from the languages of the world; her rationalization for Null-Prep is grounded on the
idea that the adult L2 learner cannot have full access to certain innate linguistic principles. These particular linguistic and learning principles, then, would be available only in L1 through UG, but no longer available for adult L2 acquisition. The more detailed explanation for Null-Prep that Klein provides is that, L2 learners, in the process of setting parameters, hypothesize the wrong grammar of English, maybe because they formulate peripheral hypotheses about the L2 grammar.

3.3.3. Null-Prep as an Economical Option

Dekydtspotter, Sprouse and Anderson (1998) reevaluated Klein’s data and explained it within UG constraints. In particular, they proposed that Null-Prep is the result of computational economy. Following the tenet’s of Chomsky’s minimalist program (1995), they assumed that the operation Merge alone is less costly than movement, because movement implies Merge and Move. Therefore, they considered than the instances of Null-Prep attested in Klein’s interrogatives are the result of a general phenomenon in second language acquisition, i.e. the use of A-bar binding instead of movement. They further argued that Null-Prep is a sort of operator-variable dependency that binds the independently generated operator with a null pro (Cinque, 1990; Rizzi, 1990), as represented in (9).

\[\text{(3.9)} \quad [\text{CP} \ Op_i [\text{IP} \ \ldots \ldots \ [\text{PP} \ pro_i] \ \ldots]]\]

Furthermore, in order for the verb to be able to govern the empty category, and avoid a nonmatching wh-word and gap, there is incorporation of the preposition into the verb (Baker, 1988). This proposal, however, is only needed to explain cases of Null-Prep in interrogative
sentences, since apparently this phenomenon is not attested in natural languages. For relative clauses, Dekydtspotter et al. proposed that Null-Prep are cases of simple A-bar binding without incorporation because the operator and the gap can be interpreted as an NP or as a PP, assuming that the relative connector is always in these cases a complementizer and not a relative pronoun.

More recently, and in light of this proposal, Klein (2001) revisited her original position and put forward an analysis for Null-Prep within UG. This new approach considered Null-Prep the result of a null operator movement. This movement would take place before obligatory overt wh-movement is acquired, and crucially, it would only occur in L2 interlanguage grammars of English, not in L1 English. According to Klein, Null-Prep is due to incomplete acquisition of wh-movement combined with the English-learners’ tendency to avoid preposition stranding. This tendency to avoid PS would be unique to L2 learners and it would explain why English children do not produce Null-Prep. (Apparently, Klein was not familiar with Hildebrand (1987) results.)

In brief, Klein concluded that the Null-Prep phenomenon is a unique L2 (English) interlanguage property, resulting from the L2 avoidance of preposition stranding and the incomplete knowledge on wh-movement. Klein (2001) proposed the following developmental sequence: L2 learners start without noticing that the target grammar, i.e. English, has strong wh-features and it requires overt wh-movement for interrogatives and relative clauses. Then, by economy conditions, L2 learners prefer movement of features (movement of an empty operator) over movement of a whole category (overt movement). Klein solves the problem of the analysis of the Null-Prep assuming that the object of the preposition is a big PRO, acting as an empty operator (Op), following Bennis and Hoekstra (1989). So, the preposition preceding the PRO (or Op) must also be null. This null preposition formally licenses its PRO complement providing
null case. The entire representation (before and after spellout) of a Null-Prep question such as “Which bus are the children waiting? is in (3.10), Klein’s (39):

(3.10) a. \([_{CP\text{ wh}} [_{C\text{ [FOCP [FOC [PP \text{ PØ Op}]]]}]}]\] 

b. \([_{CP\text{ wh}_i [_{C\text{ [FOCP [PP \text{ PØ Op}]_i [FOC \ldots [PP \text{ ti}]---]}]}]}]\]

According to her, the Null-Prep construction in L2 development displays a \(\text{wh}\) base generated in Spec/CP position that binds the empty PP. The Op moves -pied-piping the empty PP- to check its \(\text{wh}\)-features. This Op lands in a FocusP position, already proposed for English sentences such as “Who the hell would buy that book?” (Den Dikken and Giannakidou 2000). “This allows L2 learners of English to utilize a familiar strategy, the pied-piping of XP elements, albeit covert, before they are ready to obligatory strand” (Klein 2001, p.61).

Crucially, Dekydtspotter et al. (1998) and Klein (2001) based their analyses on economy principles: both seem to assume that having or moving an empty preposition is less costly than having an overt one, either because there is no movement in the construction or because there is only covert movement.

3.3.4. Null-Prep: Other Accounts

Dekydtspotter et al. (1998) and Klein (2001)’s analyses makes several predictions for second language acquisition. First, Klein predicts that Null-Prep may only appear when learning English or other Scandinavian language that allows preposition stranding. But the Null-Prep phenomenon has also been attested in L2 French (Jourdain 1996), in relative clauses in the L2 acquisition of Spanish and in Spanish heritage speakers, (Perpiñán, 2008), so the role of English structure may
not be relevant. These Null-Prep manifestations in other languages suggest at least two different interpretations: on the one hand, one can argue, as in Perpiñán (2008), that the Null-Prep phenomenon is a natural language property that systematically appears in developing grammars as a default construction, before pied-piping and/or preposition stranding are acquired; or, on the other hand, as Dekydtporter et al. and Klein (2001) proposed, the Null-Prep phenomenon can be seen as the result of applying economy principles to language computation. I believe that these two explanations need not be mutually exclusive. It is reasonable to think that language acquirers resort to this natural linguistic strategy as a means to reduce the cognitive load when processing complex constructions.

Another possible explanation for the phenomenon is that these Spanish L2 learners are not avoiding preposition stranding, as Klein (2001) proposed for the ESL learners in her study, but simply transferring the P-Stranding feature from their L1, English. In Perpiñán (2008), both, Spanish heritage speakers and Spanish L2 learners have English as their dominant language. English is a language that tends to strand the preposition when forming oblique relative clauses and questions, therefore, it is still a plausible explanation that these speakers resort to Null-Prep as a consequence of first transferring P-stranding from their dominant language and later avoiding this highly marked configuration by deleting the preposition.

The purpose of the present study is to further explore the Null-Prep phenomenon in L2 learners. To begin with, we need to tease apart the role of the L1 from other factors such as computational load or universal tendencies. For this reason, it is necessary to consider not only Spanish L2 learners whose native language is English, but also native speakers from a language that does not allow preposition stranding, such as Arabic. Furthermore, if we were to accept economy explanations such as the computational or processing burden that Pied-Piping seems to
involve in L2 learners, we also need to consider other type of data besides production, such as psycholinguistics data that better reflect the real-time parsing of linguistic structures.

The remaining part of this study develops my working hypotheses and presents new data that bring new light to our general understanding of the Null-Prep phenomenon and the production and processing of oblique relative clauses. The experimental part of this dissertation is organized as follows: chapter 4 provides original data on production of relative clauses from two different tasks, an oral and a written task. Chapter 5 presents on-line data from a speeded grammaticality judgment task. Chapter 6, offers data from an on-line sentence comprehension task. Finally, chapter 7 discusses the new data from in this experimental study within the theoretical framework depicted in chapters 1-3 and discusses the theoretical implications for second language acquisition.
CHAPTER 4: PRODUCTION OF RELATIVE CLAUSES

4.1. Introduction: Research Questions

The present study is concerned with L2 grammatical knowledge and L2 language processing. In particular, whether there are fundamental differences between native and non-native linguistic representations, and between native and non-native language processing. If differences in the linguistic representations are found, then it is important to ask whether these differences are the result of the impossibility for L2 learners to access the entirety of Universal Grammar. On the other hand, if differences in the processing of certain linguistic constructions are found, then we need to first establish whether those differences are the outcome of an incomplete grammatical representation (a competence problem), or whether there is an essential problem with L2 processing that does not allow L2 learners to use the same processing strategies that native speakers usually employ.

Since the present study investigates the acquisition of a second language from a linguistic perspective, the focus of this dissertation is on one particular construction that presents crosslinguistic variation: the oblique relative clause. As reviewed in the previous chapter, the acquisition of oblique relative clauses, and specifically the Null-Prep phenomenon, has been primarily investigated in L2 English, but in order to be able to make claims about this phenomenon as a developmental difficulty that systematically appears in the acquisition of oblique relative clauses, then it needs to be investigated in languages other than English. Moreover, in order to reveal whether the Null-Prep phenomenon is contingent upon the specific target language or the learners’ L1 backgrounds, then different L1 groups of learners acquiring the same L2 should be compared.
With the purpose of exploring the first general research question about the nature of grammatical representations in L2 learners, a series of tests that elicited grammaticality judgments and oral production of oblique relative clauses were conducted in two types of learners of Spanish: Arabic and English native speakers. By looking at two different learners’ populations, we can tease apart what comes directly from their L1 and what comes from other sources (i.e. Universal Grammar, Processing Impairment, etc.). The results of the production task are reported in chapter 4 next. The production (chapter 4) and grammaticality judgment data (chapter 5) would serve us as a baseline to determine the learners’ linguistic competence. The specific research questions on L2 processing and the hypotheses on that matter will be presented later in chapter 5, in the appropriate context. As for the processing data, there were two types of processing tests, an on-line self-paced grammaticality judgment task (chapter 5) and an on-line self-paced sentence comprehension task (chapter 6). Both tests measured, among other things, how long it takes a participant to read each word in a particular sentence.

**4.2. On Grammatical Representations: Learnability Issues and Hypotheses**

The learnability issues that come into play when (re)constructing a grammar to accommodate Spanish Oblique Relative Clauses are the following: English and Arabic speakers need to realize that Spanish only accepts one option for constructing Oblique RCs, i.e. Pied-Piping. Assuming that the learners already have Pied-Piping in place, although it may not be the most productive option their grammars, they will not need to acquire a new structure. Therefore, the L2 learners’ main task is to notice that Preposition Stranding and Resumption are not licit options in Spanish.

Given the description of the three languages presented in chapter 2, Spanish could be characterized as a subset of English and Arabic with respect to prepositional relative clauses.
Does this imply that English and Arabic learners will easily acquire Spanish prepositional relative clauses? Will L2 learners be able to reduce the alternatives of their native grammars and realize that other options in Spanish are ungrammatical? And if so, what is the role of the learners’ native language (L1)? In this particular case, the L1 can be both a facilitator and an impediment for SLA. It is a facilitator because the learners’ native language already provides them with the right grammar. But it can also be an obstacle because the learners’ native language provides them with a grammar bigger than the target one. Taking into account all this theoretical background, the following hypotheses were formulated:

- **Hypothesis 1**: Assuming the Full Transfer / Full Access Hypothesis (FT/FAH, Schwartz & Sprouse, 1994, 1996), if the L1 is fully transferred into the L2 grammar, then we should not expect L2 learners to have major problems constructing oblique relative clauses through Pied-Piping because this strategy does not need to be learned.

- **Hypothesis 2**: Also, assuming the FT/FAH, we could expect residual ungrammatical transfer, such as Preposition Stranding in English L2 learners’ grammars, and Resumption in Arabic L2 learners’ grammars, especially at early stages of development.

In this chapter, the details of the current study are laid out, and novel data on the production of direct object and oblique relative clauses in L2 Spanish are presented.
4.3. Method

In order to address the research questions stated above, a series of experiments that aimed to provide data from different grammatical abilities were designed. All participants completed the same experiments in the following order:

1- Screening Tests: a consent form (in English or Spanish), a language background questionnaire, and a proficiency task.

2- Experimental tests:
   1- An on-line self-paced reading task with comprehension questions, reported in chapter 6 below.
   2- An on-line self-paced grammaticality judgment task, reported in chapter 5.
   3- An oral production task, reported in this chapter.

On-line experiments were crucially completed before the off-line tasks, as in Phillips (2006), so the more metalinguistic off-line tasks would not affect the outcome of the on-line tasks. The extent to which on-line tasks may have affected the outcome of the off-line tasks is uncertain.

The time completion for all the experiment (including “distracter tasks” not reported here) was between 1.5 hours to 2 hours. The screening test was performed on a different day, usually a week or two before the experimental testing, in a classroom setting. The experimental tests were conducted individually with the researcher in a quiet room. Most of the subjects participated in the experiment for monetary compensation.

4.3.1. Participants

20 native Spanish speakers and 116 Spanish learners (L1 English or L1 Arabic) participated in this study. The English-speaking learners \(n = 81\) were college students enrolled at the
University of Illinois or at Know College at the time of testing (mean age = 21.9). They were all born and raised in the US, and they were recruited either at a U of I intermediate or advanced Spanish course or at a Study Abroad Program in Barcelona, Spain. Students who used a different language at home (Korean, Polish, Spanish, etc.) and who knew other second languages (as reported on the background questionnaire) were excluded from the data analysis.

The Arabic speakers ($n = 35$) were all native speakers of the colloquial Moroccan Arabic variety, *darija*. Native speakers of other languages such as Berber were excluded from the experiment. The Arabic speakers were students of intermediate or advanced Spanish courses either at the Instituto Cervantes or at the language academy “Dar Loughat” at Tetouan, Morocco. Most of them were college students although there were also some civil servants or professionals in the pool (mean age = 25.6). Since it is impossible to find educated participants in Morocco that have not studied French or in French, these subjects are, potentially, L3 speakers of Spanish. However, most of them reported that their knowledge of French was limited and that they felt more comfortable speaking in Spanish than in French. For internal political reasons, Spanish is usually in higher regard than French in North Morocco. As I was told by the locals, Morocco southerners tend to identify themselves more with French as a second language, whereas northerners do it with Spanish, particularly in places such as Tetouan, which used to be a Spanish Protectorate. The complex linguistic situation of Morocco and other sociolinguistic considerations may definitely have an impact on the learners’ linguistic system. However, it goes beyond the scope of this dissertation to address these issues in more detail.

Finally, the control group consisted of native speakers of Spanish ($n = 20$), 8 males and 12 females, from different dialectal varieties: one Argentinean, one Colombian, one Costa Rican, one Mexican, one Venezuelan and fifteen speakers of Castillian Spanish. Their mean age at the
time of testing was 32.25. They were all college graduates, except for two of them. The structures under consideration do not exhibit dialectal variation in Spanish, so having native speakers from different Spanish-speaking varieties should not be an issue.

4.3.2. Proficiency Test and Participants Screening

All participants took a proficiency test, which consisted of a slightly modified version of the standardized grammar section of the superior level of the Diploma de Español como Lengua Extranjera (DELE), created by the Instituto Cervantes; and part of the Michigan vocabulary test (see Appendix A). The maximum score for these two sections combined were 40 points, 21 points (one per item) in the grammar section and 19 in the vocabulary one. The grammar section was slightly modified as to also check that all the participants knew that the 6 experimental verbs required a PP complement. These items are included in the proficiency measure. The verbs and the corresponding obligatory prepositions employed in this study are shown in Table 4.1.

Table 4.1: Prepositional verbs under investigation

<table>
<thead>
<tr>
<th>DE</th>
<th>EN</th>
<th>CON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hablar de</td>
<td>Pensar en</td>
<td>Soñar con</td>
</tr>
<tr>
<td>‘to talk about’</td>
<td>‘to think about’</td>
<td>‘to dream about’</td>
</tr>
<tr>
<td>Depender de</td>
<td>Confiar en</td>
<td>Contar con</td>
</tr>
<tr>
<td>‘to depend on’</td>
<td>‘to rely on’</td>
<td>‘to count on’</td>
</tr>
</tbody>
</table>

To avoid any confusion and to ease the learner’s task, only verbs that did not require a pronoun were included (most prepositional verbs in Spanish are also pronominal verbs, such as darse cuenta de ‘realize’, or reírse de ‘laugh’, etc.), and that also required a preposition in
English and Arabic. Thus, the 6 prepositional verbs under study are also prepositional verbs in English and in Arabic. It was assumed that by choosing only verbs that shared the same subcategorization properties in the three languages, albeit sometimes with different prepositions, the learner’s task would be alleviated, since it is generally known that prepositions are hard for second language speakers\textsuperscript{22}. The verbs in Table 4.1 have been used in all the remaining experimental tasks, so it was critical that participants did not realize that these prepositional verbs were targeted. Hiding these 6 items in the proficiency test ensured that the participants took at least the first on-line test in a naïve way. These 6 items of the proficiency test were excluding items, so only learners that knew the correct preposition were invited to continue with the experiment. But since it was almost impossible to find this type of learner, learners that missed one or two prepositions out of the six, as long as they knew that the verb needed a preposition were also accepted, following Klein’s (1993) methodology\textsuperscript{23}. In fact, Klein did not exclude any subject; instead, she only considered the items for which the non-native learners showed knowledge of subcategorization, which turned out to be a little less than half the data collected. So, the important fact in both studies is that learners knew that those verbs required a PP complement. In this study, subjects who chose a null preposition (Ø) in any of the 6 crucial items were automatically discarded from the pool of possible participants. This prevented from discarding further data once the participants completed the remaining tasks. However, after the

\textsuperscript{22} A pre-test was previously piloted where participants had to correct ungrammatical declarative sentences in which the 6 experimental verbs lacked the obligatory preposition. This was similar to the main experimental task that Klein (1993) used. This test turned out to be extremely difficult for the L2 learners, even for the ones with very high proficiency scores. As a result, knowledge of verbal subcategorization had to be tested in a less complex way, with a multiple choice task.

\textsuperscript{23} Klein reported judging as “correct” the declaratives sentences that her non-native speakers corrected by “insertion of a preposition” (p. 88, my emphasis). The same with the correction of ungrammatical questions and relative clauses, in which she states that “if the correction included insertion of a preposition, then it showed that a subject had acquired pied-piping or preposition stranding so this was scored as correct.” (Klein 1993, p. 89).
first scrutiny, only a total of 22 English L2 learners of Spanish and 22 Arabic L2 learners of Spanish (38% of the initial pool\textsuperscript{24}) met the requirements to continue with the completion of the experiments. Later, two more subjects were removed because of their extremely slow reading times in the processing tasks. From now on, all the data reported will correspond to these 42 L2 learners who passed the screening task, and 20 native speakers who satisfactorily completed the entire study. Table 4.2 displays the responses in percentages and raw numbers of the retained participants in the six target items of the proficiency test.

The English learners were the participants who had most difficulty choosing the required preposition for each verb. In fact, in this pre-task we can already see a clear L1 transfer effect, especially in verbs such as \textit{depender} and \textit{soñar} in which almost half the English speakers learning Spanish opted for the literal translation of the English prepositions \textit{on} or \textit{of/about}\textsuperscript{25}.

\textsuperscript{24} Although these data do not seem to be a lot, notice that any subject that missed as few as just one subcategorization frame was explicitly excluded. Unlike Klein, with this strict screening methodology it is guaranteed that there will be no empty cells in the rest of the experiments, a crucial fact for the on-line data since these data require their own additional trimming. Recall that Klein (1993) reported correct L2 subcategorization in less than 50\% of the cases. Still, she included all the subjects and made sure not to analyze or count as null-prep the cases in which the subject did not know the correct subcategorization. This made her exclude verbs such as \textit{apply for} or \textit{complain about} more than 70\% of the sentences produced.

\textsuperscript{25} I realize that the fact that some participants did not know the exact required preposition can be interpreted as an experimental flaw when assessing the validity of the results. However, this need not be problematic for the objectives of this investigation. This study is not about the L2 learners’ knowledge of subcategorization frames; rather, the focus is on the structures that L2 learners construct with prepositional verbs and how they interpret and process these structures. In the results, the specific preposition used to construct a relative clause is not taken into consideration. Instead, the focus is on the structure the L2 learners constructed, be it Pied-Piping, Resumption, Preposition Stranding or Null Preposition. Whether the construction is done with or without the right preposition is irrelevant for the research questions. What it is crucial is that learners know that those verbs need a preposition. In fact, I have noticed variability in the selection of these functional categories, some learners that chose the right preposition in this task, use an incorrect one later one, or vice versa. This optionality can be the result of the complexity of mapping form and meaning in the case of prepositions. It is especially difficult for L2 learners to memorize prepositions, possibly because of their almost empty content. In any case, this is a different locus of investigation that clearly deserves further research.
Table 4.2: Percentage and raw numbers (in parenthesis) of accuracy in preposition selection in the 6 target items of the proficiency test.

<table>
<thead>
<tr>
<th>Verbs</th>
<th>Prepositions</th>
<th>Control ($n = 20$)</th>
<th>L2 English ($n = 21$)</th>
<th>L2 Arabic ($n = 21$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hablar</td>
<td><em>de</em></td>
<td>100 (20)</td>
<td>95.2 (20)</td>
<td>100 (21)</td>
</tr>
<tr>
<td>“to talk”</td>
<td><em>en</em></td>
<td>0</td>
<td>4.8 (1)</td>
<td>0</td>
</tr>
<tr>
<td>Depender</td>
<td><em>de</em></td>
<td>100 (20)</td>
<td>52.4 (11)</td>
<td>95.2 (20)</td>
</tr>
<tr>
<td>“to depend”</td>
<td><em>en</em></td>
<td>0</td>
<td>47.6 (10)</td>
<td>4.8 (1)</td>
</tr>
<tr>
<td>Soñar</td>
<td><em>con</em></td>
<td>100 (20)</td>
<td>61.9 (13)</td>
<td>81 (17)</td>
</tr>
<tr>
<td>“to dream”</td>
<td><em>de</em></td>
<td>0</td>
<td>38.1 (8)</td>
<td>19 (4)</td>
</tr>
<tr>
<td>Pensar</td>
<td><em>en</em></td>
<td>100 (20)</td>
<td>90.5 (19)</td>
<td>90.5 (19)</td>
</tr>
<tr>
<td>“to think”</td>
<td><em>de</em></td>
<td>0</td>
<td>9.5(2)</td>
<td>9.5(2)</td>
</tr>
<tr>
<td>Contar</td>
<td><em>con</em></td>
<td>100 (20)</td>
<td>61.9 (13)</td>
<td>81 (17)</td>
</tr>
<tr>
<td>“to count”</td>
<td><em>en</em></td>
<td>0</td>
<td>38.1 (8)</td>
<td>19 (4)</td>
</tr>
<tr>
<td>Confiar</td>
<td><em>en</em></td>
<td>100 (20)</td>
<td>100 (21)</td>
<td>100 (21)</td>
</tr>
<tr>
<td>“to rely”</td>
<td><em>que</em></td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The participants’ proficiency scores were submitted to a one-way ANOVA, and as expected, the results of the ANOVA indicated a significant effect by group $F(2,59) = 28.74, p < .001$. A post-hoc Tukey HSD test revealed that the only different group was the control group ($p < .001$), whose mean score was 39.6, (SD .681), with a 99% rate of accuracy. The Arabic (mean score =

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26 Here, the options were a preposition, a complementizer or zero. The results reported here for verb “confiar” are 100% because the participants who answered otherwise are already excluded, which made this item more restrictive than the other ones.
25.67, SD = 8.79, 64% accuracy) and English learners of Spanish (mean score = 26.05, SD = 7.32, 65% accuracy) did not differ significantly ($p = .98$). The distribution of the proficiency scores by group is showed in Figure 4.1.

![Figure 4.1: Means and standard deviations of the proficiency test by group](image)

As the box plots in Figure 4.1 show, the L2 groups are normally distributed, although the Arabic learners have a slightly wider distribution. It is part of the experimental design to have represented certain range of proficiency levels, from intermediate to advanced, so that we can sketch, if needed, developmental advantages as the level of Spanish improves. Instead of arbitrarily dividing the L2 learners into proficiency groups, the data will be analyzed through correlations and analysis of covariance taking into account the proficiency score when relevant.
4.4. Experiment 1: Production of Relative Clauses

4.4.1. Stimuli and Procedure

The purpose of this task was to test the learners’ grammatical knowledge on prepositional relative clauses. Hypothesis 1 predicted that English and Arabic speaking learners of Spanish should not have major problems in constructing oblique RCs through Pied-Piping because this strategy already existed in their native languages. So, if the Full Transfer /Full Access Hypothesis is assumed, Pied-Piping would be fully transferred into the interlanguage grammar, and L2 learners would be forming relative clauses in a target manner. However, as hypothesis 2 predicted, FT/FAH also predicted certain amount of ungrammatical L1 transfer (resumption or preposition stranding).

Participants were presented with a series of images on a computer screen along with some information describing each image. The information was written on the screen and read out loud by the experimenter. After that, the next slide consisted of a selection of the previous image with a question to answer. The beginning of each sentence was provided to make sure that the extracted constituent for each sentence was the expected one. In order to tap a more implicit response, the participants were instructed to complete the sentence as fast as possible with the information they were given. All responses were recorded with a Sony IC digital recorder through a headphone microphone set that they wore during the entirety of the oral experiment. Later, the recordings were transcribed and coded according to the structure produced. Frequencies and raw numbers (in parentheses) are presented for each structure found. However, in order to compute non-parametric statistics on these categorical data, sentences were coded as
“correct” or “target-like” vs. “incorrect” or “non-target-like”\textsuperscript{27}. Hence, the baseline for comparison is not the native speakers’ production but the expected construction for each group.

There were a total of 12 experimental situations, 6 eliciting prepositional relative clauses with the same 6 experimental verbs that we discussed before, and 6 direct object relative clauses with transitive verbs. Participants constructed a total of 744 oral sentences for this experiment. Direct object RCs were included to check whether L2 learners understood the task. One example of each situation type and a practice situation were provided before the experiment started. An example is shown in (4.1) below. The complete stimuli set is included in Appendix B.

\textbf{(4.1) Situation exemplifying a prepositional relative clause context.}

\begin{itemize}
\item[a.] Slide 1 introducing the situation
\item[b.] Slide 2 eliciting a prepositional RC
\end{itemize}

\begin{tabular}{|l|}
\hline
\begin{minipage}{0.4\textwidth}
\textbf{Ejemplo}\\
Los compañeros se ríen del chico.
\end{minipage}
\begin{minipage}{0.4\textwidth}
\textbf{Ejemplo}\\
¿Quién es este chico?\\
Este es el chico… del que se ríen los compañeros
\end{minipage}
\hline
\end{tabular}

‘The classmates REFL laugh at-the boy.’

‘Who is this boy?’

This is the boy… at-the that REFL laugh the classmates.

\textsuperscript{27} Production data, either naturalistic or experimental are counts, so we need to analyze them as categorical variables. Since this type of data is not continuous (unlike reaction times, for example) and usually are not normally distributed, we cannot rely on parametric assumptions (normal distribution that assumes that the variances in each condition are fairly similar). “Trying to calculate the mean of a categorical variable is completely meaningless because the numeric values we attach to different categories are arbitrary, and the mean of those numeric values will depend on how many members each category has. Therefore, when we’ve measured only categorical variables, we analyse frequencies. That is, we analyse the number of things that fall into each combination of categories.” (Field 2005: 682). For this reason, production data are analyzed with non-parametrical tests. However, I realize that this is not what is usually done in the SLA field, in which ANOVAs and $t$-test are mostly used for this type of data.
‘This is the boy at whom the classmates laugh.’

(4.2) Situation exemplifying a direct object relative clause context.

a. Slide 1 introducing the situation  b. Slide 2 eliciting a DO RC

Example (4.1) targeted a prepositional relative clause, and the situation in (4.2) aimed to elicit a direct object relative clause. The fragment of the sentence in blue italics is the part that the participants had to complete. As said before, all the information was presented in oral and in written format so we can ensure that non-native speakers would not have problems recalling the information they needed to construct the relative clauses. At the same time, having the right use of the verb (i.e. with its required preposition) in front of the participants can confirm that the cases of Null-Prep are not due to lack of subcategorization knowledge.
4.4.2. Results

A total of 744 sentences were generated in task 2, 12 per subject. These were coded according to their structure, and frequencies and raw numbers are presented for each structure found. Since the objective of this task was to create a spontaneous context to generate relative clauses, in the event of a correction, only the first structure that the participant produced was included in the analysis. It must be said, though, that corrections of a full sentence were quite scarce. To compute non-parametric statistics (Chi squares) on these categorical data, the sentences produced were recoded as “correct” (or “target-like”) vs. “incorrect” (or “non-target-like” or “not expected”). Hence, the baseline for comparison is not the native’ production but the target construction.

4.4.2.1. Direct Object Relative Clause Context

Direct object relative clauses were included as a baseline, to ensure that learners were able to produce relative clauses orally. Participants produced a total of 372 sentences in the DO context, 302 target-like. Table 4.3 shows the frequencies and raw numbers for each construction found in this environment.

<table>
<thead>
<tr>
<th>Group</th>
<th>DO</th>
<th>PiP</th>
<th>Passive</th>
<th>Clitic</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natives</td>
<td>94.2 (113)</td>
<td>2.5 (3)</td>
<td>3.3 (4)</td>
<td>0</td>
<td>0</td>
<td>100 (120)</td>
</tr>
<tr>
<td>L2 English</td>
<td>81.7 (103)</td>
<td>15.1 (19)</td>
<td>0</td>
<td>0</td>
<td>3.2 (4)</td>
<td>100 (126)</td>
</tr>
<tr>
<td>L2 Arabic</td>
<td>68.3 (86)</td>
<td>1.6 (2)</td>
<td>14.3 (18)</td>
<td>13.5 (17)</td>
<td>2.4 (3)</td>
<td>100 (126)</td>
</tr>
</tbody>
</table>
Whereas the control group behaved as expected, with few instances deviating from the target structure, the experimental groups presented more variability and the accuracy count differed significantly by group (Native, L2 English or L2 Arabic group) $\chi^2 (2) = 27.06, p < .001$. According to the odds ration, natives were 3.6 times more likely to be accurate than English-speakers learners and 7.5 times more likely to be accurate than Arabic speakers. In fact, the two experimental groups also differed between them ($\chi^2 (1) = 6.116, p = .013$) and the English group was twice as likely as the Arabic group to be target-like. Nonetheless, the most common construction that both L2 learners groups produced was still the target construction (DO RC), suggesting that they understood the task.

Overall, the main difference between the control and the experimental groups, besides the percentages, is that native speakers always kept the intended meaning of the sentence and they always produced grammatical sentences. All groups, even the control group, produced some instances of unexpected pied-piping, such as in (4.3).

(4.3)  a. El periódico del cual la mujer está leyendo. (Native # 65)

   ‘The newspaper from-the which the woman is reading.’

b. Estas son las cajas en que el chico está cargando. (L2 Eng. # 3)

   ‘These are the boxes in which the boy is loading.’ Intended meaning: These are the boxes that the boy is loading”

c. Estos son los libros de que ordena la bibliotecaria. (L2 Engl. # 7)

   ‘These are the books of that orders the librarian.’ Intended meaning: These are the books that the librarian orders.
With respect to the passive sentences produced by the Arabic group, group results indicated that these speakers tend to use a relatively high percentage of passive sentences, but in reality these figures are biased by only 3 speakers who systematically produced relative clauses with a passive construction, syntactically converting the extracted object into a subject, as in (4.4). These sentences were hard to code since agreement or the copula was not always the correct one for a passive sentence; also, because they could have been coded together with subject RC. However, they were kept separated since these ones were constructed with the verb “to be” (ser/estar). Then, all sentences formed with *ser or *estar + verb, which included the agent complement, (introduced by the preposition por ‘by’ or para ‘for’) were coded as passives.

(4.4)  a. *Estos son los dibujos que está pintando por el niño. (L2 Ar. # 30)

   ‘These are the drawings that is painting by the boy’

   b. *Estas son los dibujos que son pintan para el niño. (L2 Ar. # 37)

   ‘These are the drawings that are paint-3p. for the boy’

   c. Los libros que son ordenados por la bibliotecaria. (Native # 73)

   d. ‘The books that are ordered by the librarian’

This individual bias also exists in the case of relative clauses formed with a resumptive clitic, such as the ones in (4.5). In the Arabic group, 15 out of the 17 sentences with resumptives were produced by 3 speakers.

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28 *Ser and *estar (‘to be’), and *por and *para (‘for/ by/to’) are two constant sources of mistakes for second language learners of Spanish. That is why, even when the preposition or the auxiliary verb is not the right one to form a passive sentence in Spanish, it is still considered and coded as a passive.
(4.5) a. *Estos son los libros que la bibliotecaria \textbf{los} ordena. (L2 Ar. # 42)

‘These are the books that the librarian CL-acc orders’

b. *Estos son la platos que el hombre le lava, \textbf{le} lavan. (L2 Ar. # 44)

‘These are the dishes that the man CL washes, CL-dat wash’

4.4.2.2. Prepositional Relative Clause Context

Accuracy rates dropped dramatically in the case of oral prepositional relative clauses, especially in the case of the experimental groups. A total of 372 sentences were produced for this context, and only 222 were target-like. The descriptive statistics are in Table 4.4.

Table 4.4: Frequency and constructions produced in oral prepositional relative clauses, percentages and raw numbers

<table>
<thead>
<tr>
<th>Group</th>
<th>PiP</th>
<th>Null Prep</th>
<th>Subject RC</th>
<th>Resumptive Pronoun</th>
<th>Prep Stranding</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natives</td>
<td>89.2</td>
<td>4.2</td>
<td>4.2</td>
<td>.8</td>
<td>0</td>
<td>1.6</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>(107)</td>
<td>(5)</td>
<td>(5)</td>
<td>(1)</td>
<td>(2)</td>
<td>(2)</td>
<td>(120)</td>
</tr>
<tr>
<td>L2 English</td>
<td>56.3</td>
<td>19.8</td>
<td>2.4</td>
<td>3.2</td>
<td>11.1</td>
<td>7.2</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>(71)</td>
<td>(25)</td>
<td>(3)</td>
<td>(4)</td>
<td>(14)</td>
<td>(9)</td>
<td>(126)</td>
</tr>
<tr>
<td>L2 Arabic</td>
<td>34.9</td>
<td>16.7</td>
<td>19.8</td>
<td>14.3</td>
<td>.8</td>
<td>13.5 (17)</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>(44)</td>
<td>(21)</td>
<td>(25)</td>
<td>(18)</td>
<td>(1)</td>
<td>(2)</td>
<td>(126)</td>
</tr>
</tbody>
</table>

The control group formed 89.2% of the sentences through Pied-Piping. This result, although not perfect, still displays a robust preference. English speakers were target-like a little more than half of the time, and the Arabic speakers produced Pied-Piping only 35% of the time, showing very low accuracy rates. Nonetheless, PiP was in all groups the construction more frequently used.
The statistical analysis shows a strong association between accuracy and group ($\chi^2(2) = 76.04, p < .001$). Native speakers are 6.38 times more likely to be target-like than the English group, whereas the Arabic group is 15.32 times more likely to form a sentence with a non-target construction than the control group. Also, the Arabic group is 2.4 times less likely to use Pied-Piping than the English group. The Arabic speakers notably avoided prepositional relative clauses and instead increased the production of subject relative clauses, which is assumed a less marked construction. These instances of subject relative clauses are different from the passive ones we saw in (4.4) because in these cases the participants changed the intended meaning of the sentence. Here, the thematic roles were exchanged and there was no auxiliary verb. There are some examples of these subject relative clauses in (4.6).

(4.6)  

a. Este es el profesor que habla con la niña y el niño (L2 Ar. # 45)

‘This is the professor that talks-3s with the girl and the boy’.

Expected response: This is the professor about whom the girl and the boy talks.

b. Esta es la cuidadora que hace la tarta para la niña (L2 Ar. # 37)

‘This is the babysitter that makes the cake for the girl’

Expected response: This is the babysitter on whom the girl counts to make the cake.

In any case, it is noteworthy that the target Pied-Piping is the most productive construction in all the groups tested. Furthermore, the appearance of pied-piping positively correlates with proficiency. As the Kendalls’ τ correlations showed, as proficiency increases, the production of Pied-Piping also moderately increases in both L2 learners groups (L2 learners English group, $\tau = .528, p$ (one-tailed) = .001; L2 Arabic group: $\tau = .419, p$ (one-tailed) = .008).
Interestingly, the three groups also produced sentences omitting the obligatory preposition\textsuperscript{29}. According to our initial hypotheses, this result was not expected and will be discussed more in depth in the discussion section. The English-speaking learners produced Null-Prep 19.8\% of the time, surpassing the amount of preposition stranding that they produced (11.1 \%). Also, the Arabic speakers produced more Null-Prep (16.7\%) than sentences with resumptive pronouns (14.3).

We discussed earlier than some of the non-target results were biased by two or three speakers that only produced resumption or passive, for this reason it is important to check the individual distribution of the Null-Prep instances. Figure 4.2 shows the distribution of the number of sentences with Null-Prep by proficiency score in the English-speaking learners, which has a small but statistically significant correlation ($\tau = -.383$, $p$ (one-tailed) = .015). Notice that not a single subject produced all sentences with Null-Prep; rather, we found more subjects producing 1-3 instances of Null-Prep together with other structures, target or non-target-like.

![Figure 4.2: Distribution of Null-Prep by proficiency in the L2 English group](image)

\textsuperscript{29} Even three native speakers diverged from the target and also constructed some sentences with Null-Prep. My intuition is that this native Null-Prep use would be a little higher in an uncontrolled oral situation, since this type of sentences could sometimes be heard on radio or TV.
With respect to the L2 Arabic group, the correlation between Null-Prep and their proficiency score is not significant ($\tau = -.113$, $p$ (one-tailed) = .260) and we can find instances of Null-Prep even in the highest proficiencies. And as in the case of the English speakers, there is not a single subject producing only Null-Prep. Figure 4.3 represents the distribution of Null-Prep in the oral task in the L2 Arabic speakers according to their proficiency score.

![Figure 4.3: Distribution of Null-Prep by proficiency in the L2 Arabic group](image)

It must be added that 3.2% of the L2 English group and 4% of the L2 Arabic group oral sentences (coded as “other” for ease of exposition) were constructed with resumptive clitics, either accusative or dative, as in the examples in (4.5). Theoretically speaking, these cases could also count as cases of Null-Prep because they do not present the obligatory preposition, but I did not code them together because strictly speaking they are also cases of resumption. Pronominal resumption can also be a pervasive phenomenon in acquisition of relative clauses, as reported in other L1 and L2 studies. However, the English learners in this study do not seem to produce many pronominal copies in the RCs they form. In fact, there are several sentences with reflexive
pronouns, such as the ones in examples in (4.7b,c). It is likely these learners thought that these verbs required a reflexive pronoun as most of the Spanish prepositional verbs do.

(4.7) a. *Esta chica es la secretaria que los compañeros de oficina la piensan. (L2 Ara. # 44)

   ‘This girl is the secretary that the colleagues of office CL think-3p’

b. *Esta es la enfermera que la chica se depende. (L2 Engl. # 3)

   ‘This is the nurse that the girl REFL depends’

c. Esta es la secretaria que los compañeros se piensan constantemente. (L2 Engl. # 13)

   ‘This is the secretary that the colleagues REFL think-3p constantly’

4.5 Summary and Conclusions

Overall, we can conclude that Spanish L2 learners, independently from their L1 background, have difficulties constructing prepositional relative clauses, compared to their production of direct object relative clauses. The production data presented above showed that L2 learners produced a fair amount of sentences inaccurately, displaying L1 transfer in the form of resumption for Arabic speakers, and preposition stranding in the case of English speakers. These results seem to confirm the Full Transfer part of the FT/FAH, as predicted in Hypothesis 2. Nevertheless, pied-piping was still the structure most used in all contexts, which could show Full Access, as well as Full Transfer because English and Arabic also have pied-piping in their grammars. In any case, we can conclude that most of these learners’ grammars are not fully complete or developed, partially disconfirming Hypothesis 1, which predicted no major problems in the acquisition of oblique relative clauses given its similarities with the learners’ L1s. However, none of the theories about second language acquisition reviewed in the previous
chapters can give a full explanation of this outcome. On the one hand, if we hypothesize that the incompleteness of these L2 learners’ grammars is the result of the impossibility of accessing UG after a certain period of time, then we would expect them to have an interlanguage grammar identical to their L1 grammar. Whereas it is true that the grammars of some L2 learners present typical L1 traits, such as preposition stranding or resumption, not all of them do. Looking at individual results, we find that 9 out of 21 English-speaking learners of Spanish and 4 out of 21 of the Arabic-speaking learners systematically produced pied-piping, proving that full convergence with the target grammar is possible. However, there is not an empirical way to distinguish whether that full convergence is the result of accessing UG or whether it is an instance of (a reduced) L1.

One thing that neither the Full Transfer / Full Access Hypothesis or the Fundamental Difference Hypothesis can explain is the appearance of Null-Prep. That is why Klein (1993) proposed that this construction was the instance of a wild grammar, something outside UG. However, we know that there are certain languages that allow null prepositions, at least in relative clauses. In fact, even native speakers produced them in the oral context. For these reasons, I am considering Null-Prep a possible option within UG, regardless of its ungrammaticality in general Spanish. Finally, these production data showed that the appearance of Null-Prep is not conditioned to the P-Stranding property of English or the lack of knowledge of wh-movement. Both groups, Arabic and English-speaking learners of Spanish, produced Null-Prep in a very comparable way, proving that the Null-Prep is not directed related to preposition stranding or English. At the same time, we assume that these learners come to the acquisition of Spanish with a fully acquired wh-movement property which can be transferred from their native languages into their L2. Interestingly, the amount of Null-Prep produced by both groups is also
very similar to or even higher than the amount of non-target constructions produced as a result of L1 transfer (i.e.: Preposition Stranding in the English speaking group, and Resumption in the Arabic speaking group). Therefore, it can be concluded that the Null-Prep phenomenon is a systematic interlanguage property that occurs in developmental L2 systems, independently from L1 effects.

The correlations between the distribution of Null-Prep and the learners’ proficiency scores further indicated that the Null-Prep phenomenon is hardly related to the Spanish level of the learners. Whereas in the English group, the production of Null-Prep was somehow correlated with the proficiency score of the learners (as the proficiency increased, the appearance of Null-Prep decreased); in the Arabic speaking group, there is not such a correlation, and Null-Prep can be found even in more proficient learners. Overall, the distribution of Null-Prep seems to indicate that this phenomenon is characteristic of second language learners in intermediate levels.

Finally, it cannot be ignored that, after describing the production data and attesting the Null-Prep in L2 Spanish, there is still no compelling explanation for the phenomenon. It is clear now that the P-Stranding property of English and/or incomplete knowledge of \textit{wh}-movement are not the main reasons why this construction appears. Dekydtspotter, Sprouse and Anderson, (1998) on the other hand, proposed that the Null-Prep phenomenon was the result applying economy principles to the derivation of the construction. So, they proposed that L2 learners who produced Null-Prep were only using the operation Merge instead of Merge and Move, and that this could be “explained in terms of online accommodation of the stimulus” (Dekydtspotter et al., 1998: 356). To find out whether the Null-Prep phenomenon is the result of online accommodation of the stimulus, a series of online experiments were conducted.
The following chapter presents the online grammaticality judgment task, a test that provides two types of data: intuitional or grammatical, on the one hand; and real-time processing data, on the other hand.
5.1. Introduction: Research Questions

In chapter 4 we have seen that production of prepositional relative clauses generally causes problems for non-native speakers. Thus, the L2 learners produced a variety of forms when trying to form an oblique RC, and these forms were target and non-target-like. On the other hand, native speakers overwhelmingly produced the target Pied-Piping construction. However, it is important to recall that even though the L2 learners generated a considerable amount of sentences with L1 transfer (either resumption or preposition stranding), and the ungrammatical Null-Prep, they mostly produced the target structure, i.e.: Pied-Piping. And in fact, several non-native speakers did converge with the target language, at least at the production level. In fact, we know that these L2 learners are intermediate learners, who are still developing their second language. At this point, we could ask whether L2 learners develop their second language fundamentally differently than L1 learners. That is, are L2 interlanguage grammars built differently than L1 interlanguage grammars?

Recent studies have suggested that the fundamental difference between L1 acquisition and L2 acquisition may lie merely on processing resources. For instance, Slabakova (2009b), after evaluating the results of 20 years of SLA research within the Fundamental Difference Hypothesis (FDH), concluded that “the difference in linguistic achievement between children and adult language learners, then, appears to be gradual and quantitative, but not qualitative, and may be fundamental only in processing.” (Slabakova 2009b:170). Similarly, Clahsen & Felser, (2006) put forward the Shallow Structure Hypothesis, which proposes that L2 learners have a (fundamentally) different processing, a shallower one, based on lexical connections but not on deep syntactic structure. The difference between Slabakova’s proposal and Clahsen & Felser’s
one is that the latter is proposed on the grounds of an already fundamentally different grammar, with inescapable L2 grammatical impairment; whereas Slabakova’s proposal implies that grammatical convergence is possible, albeit processing may never converge. These issues are directly connected with the second main research question of this study, about the relationship between L2 grammar and real-time use of the language. So, in order to further explore these two issues, i.e.: the differences between native and non-native grammars on the one hand, and the relationship between grammar and processing on the other, two psycholinguistic experiments were conducted.

Recall that in the production study presented in chapter 4, participants had to generate direct object and prepositional relative clauses. Although revealing, these production data only provided information about what is possible in the speakers’ grammars, but crucially not about what is impossible or unacceptable in their grammars. That is why a grammaticality judgment task with grammatical and ungrammatical sentences was added. The intuitional data that this type of test provides are commonly assumed to be a good indicator of the overall speaker’s grammatical competence. In addition, this task was implemented on-line, in a self-paced reading manner, so not only does it make available the participant’s grammaticality judgments from the sentences they read, but also the time in milliseconds that they spent reading each word and making each judgment. Under the assumption that ungrammatical sentences take longer to process than grammatical ones, reaction times can also offer a more subtle and unconscious approach to reveal the learner’s grammatical knowledge.

As mentioned before, in this dissertation there are two main on-line experiments: the self-paced grammaticality judgment test, which is presented in this chapter; and the self-paced
sentence comprehension test, which will be discussed in the following chapter. Next, I will present the main hypotheses for the speeded grammaticality judgment task.

5.2. Hypotheses

The aim of this experiment was two fold. On the one hand, it sought to test whether the constructions mostly found in the production of prepositional relative clauses in some of the pilot studies (Perpiñán 2007, 2008) and again found in the production task of this investigation are equally accepted by all groups of participants. On the other hand, this experiment was conducted on-line so it can measure in milliseconds the processing of these sentences and investigate whether these non-target constructions are the result of processing deficits in the L2 learners.

The results of the production study showed that L2 learners produced the target pied-piping and other non-target constructions, particularly null preposition, preposition stranding and resumptive pronoun. Some of these structures come from the influence of the learners’ native language, but others, such as Null-Prep, do not have a clear source. Besides, very few native speakers produced non-target constructions in the elicited production task, in an experimental setting, but this does not necessarily entail that those constructions are impossible or unacceptable in their grammars.

For instance, we know that resumptive relative clauses are relatively common in colloquial Spanish (Lope Blanch, 1986; Suñer, 1998) and, to a lesser extent, we could also find Null-Prep when the target preposition is already mentioned in the discourse (Alcina & Blecua, 1975; Trujillo, 1990). However, native speakers hardly created this type of sentences in the production studies. In that sense, this test was also designed to corroborate whether non-standard relative
constructions reported in the L1 and L2 literature are actually acceptable in our speakers’ grammars.

According to these facts, the following hypotheses were predicted for the on-line self-paced grammaticality judgment task:

- **Hypothesis 1 on Grammatical Representation**: If L2 learners had a different grammatical representation of Spanish oblique relative clauses than native speakers, then they should rate grammatical and ungrammatical sentences alike.

- **Hypothesis 2 on Processing**: Also, if L2 learners had a different representation of Spanish oblique relative clauses, that is, a certain degree of grammatical impairment, then we will expect them to process these sentences differently than native speakers, (Clahsen & Felser, 2006).

- **Hypothesis 3 on Processing**: If, on the other hand, participants have a target-like representation and know that the required preposition must be pied-piped in Spanish, then, the sentences that lack the pied-piped preposition (consequently perceived as ungrammatical) will take longer (in milliseconds) to process than their grammatical counterparts. That is, L2 learners would present a native-like pattern.

### 5.3. Method

#### 5.3.1. Stimuli

There were a total of eighty-four items followed by a yes/no grammaticality judgment question. Half of the sentences were grammatical, and half ungrammatical. For ease of
exposition, in this subsection I will report only the results of the four relevant conditions related to the previous oral task study (Pied-Piping, Resumptive Pronoun, Null-Prep and Preposition Stranding). I will report the results of other 3 experimental conditions (18 items about Subjacency constraints) later in section 5.5. The remaining forty-two sentences were distracters and were not relative clauses. The sentences were pseudorandomized so that no sentence from the same condition would appear consecutively. All subjects read the same items but in different orders, so order effects would be cancelled out. Most psycholinguistic experiments present the target items in different lists, so each participant reads a different set of the stimuli. This methodology avoids carry over effects, but does not allow studying individual grammars. In this experiment only one list was included in order to be able to analyze individual results if needed.

The experimental design was as follows: there was one variable, “structure”, with four levels, 6 items per level (4 x 6 = 24 items). The twenty-four experimental items were: grammatical pied-piping, (5.1); non-standard relative clause with a resumptive pronoun (coded as grammatical, 5.2); ungrammatical null preposition (5.3); and ungrammatical preposition stranding (5.4). The prepositional verbs used in the relative clauses were the same ones that we investigated in the production data: depender (de), ‘to depend on’; hablar (de), ‘to talk about’; pensar (en), ‘to think about’; confiar (en), ‘to rely on, to confide in’; soñar (con), ‘to dream about’; contar (con), ‘to count on’. All oblique arguments were [+human]. The list of stimuli is included in Appendix C.

(5.1) Pied-Piping

a. El profesor estudió a la mujer de la que la niña dependía de verdad económicamente.

The professor studied DOM the woman of the that the girl depended of true economically
‘The Professor studied the woman on whom the girl really depended economically’

b. Esta frase, ¿está bien? Y

(5.2) Resumption

a. ¿La turista observó a la chica que la pianista dependía de ella económicamente.

The tourist observed DOM the girl that the pianist depended of her economically

b. Esta frase, ¿está bien? Y

(5.3) Null-Prep

a. ??El vendedor engañó a la chica que la clienta dependía de verdad económicamente.

The seller lied DOM the girl that the client depended of true economically

b. Esta frase, ¿está bien? N

(5.4) Preposition Stranding

a. *La vendedora miró a la mujer que el hombre dependía de económicamente.

The seller looked at the woman that the man depended of economically

b. Esta frase, ¿suena bien? N

Since the resumptive and the preposition stranding conditions required having a preposition after the embedded verb, the other two conditions (PiP and Null-Prep) included an extra prepositional expression so that all sentences had similar sentence length. Common prepositional Spanish expressions such as (en serio, ‘seriously’; en secreto, ‘secretly’; en realidad, ‘really; con cariño, ‘affectively’; con frecuencia, ‘frequently’; de corazón, ‘wholeheartedly’; de verdad,
were introduced between the verb and the final adverb. Notice that these prepositional expressions were used so that they would match the missing obligatory preposition. These in-between words were also added to avoid that the possible spillover effects of the verb (or the preposition) would overlap with the typical wrap-up effects of the last word of the sentence. Spillover is the effect one can find in the immediately following region as the result of the text-integration process (Rayner & Duffy, 1986).

In other words, we know that crucial regions in the sentence tend to be read slower than other regions. However, it could be the case that this delay is not shown in that particular region but in the following one, due to a misalignment between the processing, the reading and the pressing of the keyboard. Fortunately, the effects of this experiment are shown quite robustly in the verb region, so it was not needed to analyze in detail the regions in which spillover effects could be expected.

5.3.2. Procedure

Participants (the same ones as in the previous experiment) had to read eighty-four sentences in a self-paced non-cumulative word-by-word display on a computer monitor (on a Macbook). The reason to conduct the grammaticality judgment task in a self-paced, word-by-word manner was to allow us to pinpoint particular problematic areas, --such as the complementizer region, or the article region--., when processing these sentences.

The segments initially appeared as a row of dashes, and participants pressed the space bar on the keyboard to reveal each subsequent word of the sentence. At the end of each sentence, participants had to answer the questions either “Esta frase, ¿está bien?” ‘This sentence, is it ok?’; or “Esta frase, ¿suele bien?” ‘This sentence, does it sound good?’, and then answer as
quickly as possible pressing the keys “F” for yes and “J” for no. These keys were shown in a different color on the keyboard. Participants received immediate feedback if they responded differently than expected: “¡Oh, lo siento!” (Oops, I’m sorry). This feedback was mainly included to encourage participants to stay focused on what they were reading. Nevertheless, all participants were instructed to follow their intuition when judging the sentences, regardless of the feedback prompted. In fact, they were warned that the computer was not always right and that it was legitimate not to agree with the computer’s feedback.

5.4. Results

5.4.1. On-line Grammaticality Judgment Task: Accuracy

The Y/N responses to the GJT are measured in proportions, from 0 to 1, where 0 indicates that in that particular sentence, the participant’s judgment does not match the expected response, and 1 means a match between the judgment of the participant and the expected response. For instance, if a participant believed that sentences with Null-Prep were grammatical, then she will score “0” in that condition; also, if a participant judged sentences with resumption as ungrammatical, the proportion of correct responses for that condition would also be “0”, because the resumptive condition was coded as grammatical. So, these data are closely tied to the way the sentences were coded. Later, these data will be transformed according to the acceptability rates, which will be easier to interpret (Figure 5.2). But the original data are also displayed here because the way the stimuli were presented could have influenced the participants’ answers since there were given some feedback after each response. For instance, if a participant rejected a sentence with a resumptive pronoun, (s)he immediately received negative feedback saying: “oh, lo siento” (‘Oops, I’m sorry’). And even though participants were
instructed to follow their initial intuitions and warned that the computer could be wrong, we do not know to which extent this feedback could have modified the participants’ responses. For this reason, the original, untransformed data, although it is a little difficult to read, are also presented here.

The only possible responses in this experiment were “yes” or “no”, so there are relevant implications about the inaccurate answers: for instance, the low percentage of accurate responses in rejecting ungrammatical structures implies that those participants mainly believed that those structures were grammatical. The mean proportion of accurate responses by structure and group are represented in figure 5.1 below.

![Figure 5.1: Proportion of accurate answers and standard error per structure and group in the speeded GJT.](image)

Figure 5.1: Proportion of accurate answers and standard error per structure and group in the speeded GJT.

The first noteworthy result is that native speakers are not performing at ceiling, not even in the unambiguous constructions such as Pied-Piping or Preposition Stranding, although native speakers are close to 100% for Preposition Stranding. In general, we cannot expect the same
clear-cut results in an on-line grammaticality judgment task (GJT) than in an untimed task. The processing load of reading, memorizing and integrating meaning on-line makes comprehension and grammaticality judgments more difficult than in untimed tests. Indeed, lower accuracy scores than the ones found in this experiment in native speakers were also reported in other on-line processing experiments such as Hsiao & Gibson (2003) or Juffs (2005), so we can safely conclude that these results are not the consequence of poor experimental design but simply of the type of task used. Besides, in the on-line GJT there are other factors such as word segmentation, memory or disruptions that play a significant role in quick decision making. In addition, although some sentences, particularly the ones with Pied-Piping, were undoubtedly grammatical, sometimes these did not sound completely natural, mainly because of the two adverbial expressions included at the end of each sentence.

Going back to the results of the on-line GJT, the low proportion of correct responses in the resumptive structure is due to the fact that this structure was coded as grammatical, and it turns out that most of the native speakers considered relative clauses with resumptive pronouns mainly unacceptable, unlike the Arabic speakers. For this reason, and for ease of exposition, I have transformed the data so that instead of accuracy results relative to the coding of the particular condition, we have acceptability rates which are easier to understand. In this new scale, 1 means acceptable and 0 means unacceptable.
In Figure 5.2 we can see that natives distinguished between grammatical and ungrammatical sentences, although the judgments from resumptive and null-prep conditions are not as clear-cut. However, the two L2 groups have weaker intuitions in all conditions, as the statistical analyses indicate. In order to carry out parametrical tests with this categorical data (proportions of yes/no answers), all data points were submitted to an Arcsine-root transformation and a repeated measures ANOVA on the transformed (normalized) data was computed. The analysis showed a significant main effect by structure $F(3, 177) = 18.437, p < .001$; (although the planned contrasts showed no difference between the resumptive and the Null-Prep conditions $F(1, 59) = .331, p = .567$); and a significant interaction of structure x group $F(6, 177), p < .001$. The post-hoc between-subjects comparisons indicated that there is no significant difference between the two L2 learners groups ($p > 1$), but that the native group was different from both of the experimental groups ($p < .05$). If we separate the data per groups and carry out within-subjects analyses, only
the native speakers \( F(3, 57) = 34.236, p < .001 \) presented the main effect of structure; the English speaking learners \( F(3, 60) = 1.610, p = .196 \) and Arabic group \( F(3, 60) = 1.800, p = .157 \) did not, suggesting, as Figure 2 clearly shows, that L2 learners did not distinguish among structures.

In conclusion, only native speakers correctly rejected the ungrammatical constructions (Null-Prep and Preposition Stranding) and undoubtedly accepted the grammatical PiP. Non-native speakers, on the other hand, did not have robust intuitions about these relativization constructions. These results seem to indicate that L2 learners have an incomplete grammatical knowledge of prepositional relative clauses, a different grammatical representation than native speakers have, and as a result, there were no significant differences between grammatical and ungrammatical constructions, as Hypothesis 1 predicted.

Furthermore, we could hypothesize that proficiency is a reliable predictor of the accuracy of the GJT. For this reason, a series of nonparametric correlations between accuracy rates and proficiency per construction and group \( (4 \times 3) \) were carried out. According to the results, there is no significant correlation in any group or construction between the proportion of correct judgments and the proficiency score of the participants\(^{30}\). So, the statistical analysis indicates that there is not a reliable relationship between proficiency and accuracy: as proficiency score increases, the on-line grammaticality judgments do not significantly improve or are more target-like. The lack of any significant correlation between accuracy in the GJT and the proficiency scores moderately supports the current analysis by groups without arbitrarily specifying level of proficiencies, and further indicates that the participants were primarily intermediate learners.

\(^{30}\) All Kendall’s tau correlations were \( p > .05 \). Preposition Stranding in the Arabic group was marginally significant, \( p = .052, R = .430, R^2 = .185 \); and Null Prep in the English group was also marginally significant \( p = .084, R = .205, R^2 = .042 \).
Additional comparisons between the on-line grammaticality judgment task results and the production results were carried out and it was found that these results are generally consistent. For instance, in the case of the English-speaking group, the L2 learners who did not fully master pied-piping in the production task, also accepted Null-Prep in the on-line GJT as a grammatical option, but so did also the learners who produced pied-piping in the oral task. Similarly, Arabic-speaking learners who did not master pied-piping in the production task, overwhelmingly accepted resumptive constructions as grammatical, but so did the Arabic learners who produced pied-piping. In conclusion, there is no significant interaction between the learners that did produce PiP and the ones that did not produce it with respect to their responses in the GJT. This means that the results in the speeded GJT are generally consistent with the results found in the production experiment, with the difference that even learners that had a more target-like production, also accepted ungrammatical constructions in the on-line GJT.

The time each subject spent on giving their judgment (i.e. answering the question “Is this sentence OK?) was also measured and submitted to statistical analysis. Two analyses were carried out, one for only correct responses and one for correct and incorrect responses. In both analyses, the outcome of the mixed-design repeated measures ANOVAs did not show any effect or interaction per structure or group, or per grammaticality in any group. All possible comparisons within and between subjects were $p > .1$, indicating that all participants were equally fast at judging the grammaticality of the sentences in all conditions. In fact, these results indicate that the actual grammatical judgment was already decided before reaching the final question. For this reason it is crucial to measure the reaction times in other regions within the sentence, the topic of the next two sections.
5.4.2. On-Line Grammaticality Judgment Task: Reaction Times

5.4.2.1. Introduction

As explained in the procedure section, the stimuli that participants judged were read word by word, with the moving window technique. In this section, reaction times for the critical regions in each structure are reported. For convenience, an example of each condition included in the task is repeated below. The slashes signalize the segmentation that participants saw on the computer screen. The length of the stimuli was controlled so that each sentence would fit in just one line on the screen.

Pied-Piping: Grammatical, Standard

(5.5) El profesor / estudió / a la mujer / de / la / que / la niña / dependía / de / verdad / económicamente.

Preposition Stranding: Ungrammatical

(5.6) *La vendedora / miró / a la mujer / que / el hombre / dependía / de / económicamente.

Resumptive Pronoun: Grammatical, Non-standard

(5.7) ?La turista / observó / a la chica / que / la pianista / dependía / de / ella / económicamente.

Null Prep: Ungrammatical (or Non-standard)

(5.8) *El vendedor / engañó / a la chica / que / la clienta / dependía / de / verdad / económicamente.

To adjust for differences in participant’s reading rates and in word length across conditions, residual times were considered for each participant. This was done by calculating a regression
equation between the word length and the reading time, using all distracters and target items except practice items (Ferreira & Clifton, 1986). At each region, the reading time predicted by the participant’s regression equation was subtracted from the actual measured raw reading time, and this was the residual reading time. This measurement controls for word length differences and crucially for individual differences, something very important when measuring non-native speakers. So, this normalized data would allow us to compare words with different length, or learners with overall different paces that should not affect the results. In residual data, negative numbers represent faster reading times than expected and positive numbers represent slower reading times than expected for a region of that length. Furthermore, Lingalyzer, the program used to collect and analyze the on-line data, also computed the z-scores for the raw and the residual reading times. The z-score is the difference between the actual reading time and the mean reading time, divided by the standard deviation. The z-scores are separately calculated for each pairing of experiment, condition and region. In this case, z-scores were calculated for the 4 sets of relative clauses. Z-scores are useful to trim the data: all data points above 3 and under -1 z-scores of the raw data (2.943% of the total) were discarded. For the statistical analysis, the residual data of all target sentences were used, regardless of how the acceptability question was answered, as in Gibson et al. (2005). This should not be a problem because the questions answered (grammaticality judgments) are somehow independent from how the sentences were read. Typically, in this type of studies only sentences with correct responses are further analyzed. However, in those studies the questions prompted after the target sentences are very simple comprehension questions, and are included only to encourage participants to keep paying attention to what they read. Here, the questions are relevant for our investigation and it does not

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31 In fact, a considerable volume of psycholinguistics experiments only include comprehension questions in only a third of the stimuli presented.
make much sense to discard lots of data just because the learners’ judgment on those sentences was not target-like.

5.4.2.2. Last Word Reading Results: Reaction Times

The first region analyzed is the last word of the sentence. In this case it was always an adverb ending in –mente (-ly); in the examples provided, that is “económicamente”. In general, final regions of sentences are read more slowly than the preceding regions. Besides, the last words to process in a sentence usually present the biggest wrap-up effects. Wrap-up effects in reading typically reflect the increased processing associated with clause integration (Just & Carpenter, 1980). So, by analyzing the last word of the sentence, we are measuring how long it took each participant to fully integrate the meaning of all the words of the sentence they read. Participants recognized the adverb as the last word because it was followed by a period.

Since the last region was equivalent across all four conditions, we do not expect significant differences unless the structure of the sentence affects the final integration of the regions for sentence meaning. Figure 5.3 shows the mean residual reaction times and standard errors for the last word of the target sentences.
The trimmed residual data corresponding to the last word of the sentence were submitted to a repeated measures ANOVA. Overall, results showed a main effect for structure ($F(2.738, 180.712) = 9.641, p = .001$), and the between-subjects analysis showed a main effect for group ($F(3, 66) = 4.333, p = .008$). The within subjects analysis shows that structure produced a significant effect in the native group ($F(1.588, 30.163) = 6.727, p = .006$) and the Arabic group ($F(3, 57) = 4.349, p = .008$), but not in the English group ($F(3, 60) = 1.666, p = 1.666$), as the standard error bars in Figure 5.3 indicate. A further series of repeated contrasts of structures within subjects were carried out, and results showed that native speakers behaved differently in all structures ($\text{PiP} \neq \text{Res} \neq \text{Null} \neq \text{PiP} \neq \text{PS} \neq \text{Res}, p < .05$), except for the two truly ungrammatical ones that did not differ ($\text{Null} = \text{PS}, p > .05$). The ungrammatical ones, as expected, took significantly slower to read. In that sense, native speakers present an observable contrast between the ungrammatical structures (Null Prep and PS), with longer RTs; and the rest

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32 Mauchly’s test indicated that the assumption of sphericity was violated ($\chi^2(5) = 11.341, p = .045$), therefore I am reporting the corrected degrees of freedom values using the Greenhouse-Geisser estimates of sphericity ($\varepsilon = .913$).
of structures (PiP and Resumptives), with shorter RTs. In addition, the last word of PiP condition, the undoubtedly grammatical structure, was read significantly faster than the last word of the relative clause with a resumptive pronoun. This difference reinforces the idea that these two structures do not have a similar status in our native speakers’ grammars, as the accuracy results indicated. In that sense, the RTs of the last word confirm the native’s accuracy results: PiP is the preferred structure, Null-Prep and Preposition Stranding are completely ungrammatical, and the relative clause with the resumptive pronoun is neither completely ungrammatical, nor completely grammatically correct.

On the other hand, English speakers were generally faster than natives, which may explain their overall lack of accuracy. There was no main effect for structure for the English group, and therefore, had similar RTs in all constructions (PiP = Res = Null = PS = Res, PS = PiP, p > .05), except for PiP and Null (PiP ≠ Null, p < .05). This lack of contrasts parallels the findings of the accuracy results and strengthens the general idea that English speakers have very weak intuitions about the grammaticality of these relativization structures.

Finally, Arabic speakers’ results showed that PiP had significantly shorter RTs than the rest of structures (PiP ≠ Res; PiP ≠ Null; PiP ≠ PS, p < .05), suggesting that they recognized this structure as grammatical. Null-Prep RTs patterned with Resumption and Preposition Stranding RTs (Res = Null = PS, p > .05). Hence, Arabic speakers seem to be distinguishing between grammatical and ungrammatical structures in their RTs, but paradoxically we did not find this distinction in the accuracy or production results. Recall that the Arabic speaker’s accuracy results showed that resumption structure patterned with the pied-piping structure and they produced a

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33 Another possible explanation for the faster L2 learners’ results could be that the distracters for this experiment could have been more difficult for them than the relative clauses; for instance, half of the distracters were sentences with ser and estar, a typical problem for L2 learners. Evidently, these distracters sentences were not included in this analysis of the data.
noticeable number of relative clauses with resumption. The RTs, on the other hand, indicate that the resumption structure pattern with the ungrammatical structures. Actually, the Arabic group and the native speakers have exactly the same tendency in their RTs, the main difference being that the Arabic group was faster in all conditions. This is shown in Figure 5.3, where natives’ results are slower than expected (hence the positive RTs), whereas the Arabic speakers have the same tendency but in negative RTs, because they were faster than predicted for these regions in all conditions.

With respect to the reaction times in the last word of the sentence, we could conclude that hypothesis 2 was partially confirmed: on the one hand, English speakers had different tendencies in their RTs compared to the ones found in the native speaker’s RTs. In this sense, we could argue that English-speaking learners of Spanish have an incomplete representation of Spanish oblique relative clauses, and as a result, they have different processing results (cf. shallow structure hypothesis, Clahsen & Felser, 2006). On the other hand, Arabic speakers learning Spanish have similar tendencies to the ones found in the control group, suggesting processing convergence, despite their non-target grammaticality judgments and production.

5.4.2.3. Verb Region Reading Results: Reaction Times

The next region analyzed is the region that contains the embedded verb, the most important position of the sentence since thematic roles are fully distributed once the reader reaches this point. This is region 8 for the pied-piping structure, and region 6 for the remaining structures. In this region we find all the verbs under investigation: depender, hablar, pensar, confiar, contar, and soñar in the past imperfect form, 3rd person singular. There is one sentence per verb (6) and condition (4), 24 in total. This is the first point in the sentence in which the ungrammaticality can
be perceived. In other words, when reaching the verb, the participant can already detect that the
required pied-piped preposition is missing in the Null-Prep, Preposition Stranding and
Resumptive constructions. Therefore, if participants are aware of this ungrammaticality, we will
expect to find longer RTs in these conditions compared to the PiP condition, as predicted by
Hypothesis 3. However, if a participant has in her grammar the Null-Prep or Resumption as a
grammatical option, then the required preposition will not be necessarily missed at this point and
therefore we would not expect to find differences in the RTs between grammatical and
ungrammatical constructions. Also, since at this point of the sentences only the PiP structure was
different from the rest of the structures, we do not expect to find differences among the verb
regions of the Resumptive, Prep. Stranding and Null-Prep relative clauses unless something
unrelated to the experimental design significantly affects the results.

The residual data was submitted to a series of repeated measures ANOVA and showed a
main effect for structure ($F(2.504, 145.241) = 11.568, p < .001$), and this main effect held for all
three groups, with no interaction of structure x group ($p = .801$), which means that the variable
“group” did not affect the main effect of structure; and there was no significant main effect of the
variable group, because all groups performed similarly. As expected, all groups performed
significantly differently in the verb region in the PiP structure compared to the rest of the
structures. Figure 5.4 shows this main effect.
Overall, all planned contrasts with the Pied-Piping structure were significant ($p < .05$), and all contrasts among the other structures were not significant ($p > .05$). Overall, these differences also hold within the three groups, which clearly indicate the special status of the PiP constructions compared to the rest of structures. The most significant planned contrasts are displayed in table 5.1 below.

Table 5.1. Within-subjects contrasts, verb region RTs (probability values)

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<tr>
<td>Native group:</td>
<td>*$p = .007$</td>
<td>*$p = .006$</td>
<td>*$p &lt; .001$</td>
<td>$p = .951$</td>
<td>$p = .244$</td>
</tr>
<tr>
<td>English group:</td>
<td>*$p = .009$</td>
<td>*$p = .006$</td>
<td>*$p = .021$</td>
<td>$p = .523$</td>
<td>$p = .916$</td>
</tr>
<tr>
<td>Arabic group:</td>
<td>*$p = .011$</td>
<td>$p = .104$</td>
<td>*$p = .006$</td>
<td>$p = .347$</td>
<td>*$p = .029$</td>
</tr>
</tbody>
</table>
In summary, all groups read the verb in the PiP condition significantly faster, and the remaining verb regions were read significantly slower, as predicted by Hypothesis 3. This is an expected result in the sense that ungrammatical sentences typically take longer to process than grammatical ones; but it is unexpected if we consider that these participants did not distinguish grammatical from ungrammatical sentences in the grammaticality judgment task. Consequently, we could argue that the PiP condition has the shortest RTs because the lack of the pied-piped preposition in the other conditions was correctly perceived as a violation of the subcategorization properties of the verb. And, in general, this could be generalized for native and non-native speakers, regardless of the L1, proficiency or accuracy in sentence production.

A different interpretation could be that the appearance of the pied-piped preposition facilitated the integration of the filler, and as a result, the verb in the PiP condition was read faster. These two possibilities, not mutually exclusive, will be considered later in the discussion chapter together with the speakers’ judgments and their production data. In any case, it is important to remark that the pied-piped preposition was appropriately processed by all the subjects. This fact seems to disconfirm the idea that Null-Prep is the result of applying economy principles to language computation and processing, as proposed by Dekydtspotter et al., (1998).

One of the tenets for the economy explanation was to propose that Null-Prep relative clauses, as the resumptive ones, were interpreted through binding and not through movement (Dekydtspotter et al. 1998). To find out whether this is actually the case, subjacency violations were included in the on-line self-paced grammaticality judgment test. The reasoning for the need of these structures, the stimuli and the results are explained in the next section.
5.5. Island Configurations

5.5.1. Rationale

Although wh-movement is potentially unlimited, in other words, it can be capriciously long, extraction from an island (an opaque domain) is not allowed. Therefore, island configurations are usually a test for syntactic movement: if an extraction requires syntactic movement, then, that construction will be ungrammatical if it is extracted from an island. If, on the contrary, a constituent is apparently extracted from an island and the derivation is not ruled out, then it is assumed that there was no movement involved. In that case, we would say that there was not an extraction per se, but that the constituent was base-generated. Including this type of island configurations in this investigation could tell us about the availability of *wh*-movement in the participants. Given these facts, the following hypothesis is proposed:

- **Hypothesis 4:** Finally, if participants are forming and processing relative clauses as a movement construction, then we will find that relative clauses formed as an extraction from an island will be judged as ungrammatical. If, on the other hand, they interpret relative clauses through binding and not movement, then these participants will accept extractions out of an island.

This is relevant for the phenomenon under investigation because there have been proposals to explain the Null-Prep phenomenon either as a non-movement construction, or as the result of not mastering *wh*-movement. Therefore, if participants in this experiment accept a Null-Prep relative clause whose head has been extracted from an island, then we would conclude that the relative clause was not formed by moving one head, but by binding it. This also has implications for
economy considerations, another explanation proposed for the Null-Prep phenomenon. It is generally assumed that an operation that requires Merge and Move is going to be more costly than if it only requires Merge. Therefore, if relative clauses are interpreted through binding, which only requires the operation Merge, these will be more economical than if they require Merge and Move.

5.5.2. Stimuli

There were 3 three types of island configurations, according to the type of relative clause formed with the extracted constituent. Participants needed to make, as fast as possible, a judgment about the grammaticality of the sentence. The head of the relative clause was extracted from a strong island, specifically a conditional clause. The relative clause was formed either through Pied-Piping, Null-Prep or Resumption. There were 6 items per condition, one item per each experimental verb (depender, hablar, pensar, contar, soñar, confiar), 18 island-type sentences. To avoid confusion, the pseudorandomization ensured that no island sentence of any type would appear right after another island sentence. Also, and since these were long distance extractions, I made sure that the extracted constituent could not be interpreted as an argument of the antecedent of the conditional clause. For this reason, I only included intransitive verbs in this position such as dormir (“to sleep”), callar (“to shut up”), or respirar (“to breath”).

The control structure was the Pied-Piping island configuration (5.9). There is no disagreement with respect to the ungrammaticality of this construction since Pied-Piped relative clauses involve wh-movement.
(5.9) Pied-Piping Island Configuration

*El hombre, en el que Marta sería feliz t.i si Pedro no pensara t.i continuamente es muy alegre.
The man on the that Marta be.COND happy if Pedro not think.PAST.SUB continuously is very cheerful.
‘The man of whom Marta would be happy if Pedro didn’t think continuously is very cheerful.’

- Question prompted: *Esta frase, ¿está bien?* Expected response N.

On the other hand, it is generally assumed that resumptive relative clauses do not engage movement and are interpreted through A-bar binding. For this reason, resumptive island configurations were coded as grammatical (5.10). In fact, the appearance of resumptive pronouns in island configurations is typically described as a last resort mechanism to rescue the derivation from the ungrammaticality.

(5.10) Resumptive Island Configuration

La mujer, que Juan respiraría mejor si Pedro no soñara frecuentemente con ella, es inteligente.
The woman that Juan breath.COND cond. better if Pedro not dream.PAST.SUB frequently with her is very intelligent
‘The woman that Juan would breath better if Pedro did not dream about her frequently is very intelligent.’

- Question prompted: *Esta frase, ¿está bien?* Expected response Y.
As for the case of the Null-Prep island configuration, the decision whether this sentence was grammatical or ungrammatical was more difficult. As we have seen, there have been proposals for and against movement accounts for this construction. Finally, I decided to follow my intuitions as a native speaker and I coded the condition as ungrammatical.

(5.11) Null-Prep Island Configuration

*La mujer, que Marcos dormiría mejor si Pedro no dependiera económicamente es muy fuerte.

‘The woman that Marcos would sleep better if Pedro did not depend economically is very strong.’

- Question prompted: *Esta frase, ¿está bien?* Expected response N.

5.5.3. Accuracy Results

As in the case of the accuracy results with the different types of relative clauses, the proportion of accurate responses depends on how those sentences were coded. Recall that participants in this test had to always answer the same question: “Esta frase, ¿está bien?” (This sentence, is it OK?), and had to answer as fast as possible. Results are measured in averaged proportions, from 0 to 1, where 1 indicates that the response given matches the codification made for that condition (correct response), and 0 indicates that the response given does not match the expected response (incorrect response).
We will look first at the results of the ungrammatical constructions (PiP and Null-Prep Islands). The results in Figure 5.5 reveal that native speakers rejected these violations, as expected. This result entails that Null-Prep relative clauses are interpreted through movement. The two experimental groups, as usual, do not have very robust intuitions about the grammaticality of the constructions, but they tend to correctly reject them, implying that these constructions also entail movement for the L2 learners.

![Figure 5.5: Accuracy results for ungrammatical island configurations in speeded GJT (1= accurate rejection of the structure, 0 = incorrect acceptance of the structure).](image)

With respect to the Resumptive Island configurations, assumed to be rescued by the presence of the resumptive pronoun (Ross, 1967; Shlonsky, 1992; Suñer, 1998), the results indicated otherwise: not only native speakers did reject Null-Prep and PiP island configurations, as expected, but also disliked the island violations with resumptive pronouns.
The fact that resumptive pronouns could not rescue island violations in sentence comprehension was also found by Heestand, Xiang & Polinsky (in press) and casts doubt on the general assumption that resumption is exempt from island constraints.

The data was Arcsine transformed, that is, the proportions of accuracy responses were converted into a form that can be analyzed by analysis of variance and conducted a repeated measures ANOVA. The results indicated a main effect for structure ($F(1.760, 102.083) = 32.603, p < .001$) and a significant interaction of structure and group ($F(3.520, 102.083) = 11.389, p < .001$). The analysis per groups further showed that the English group did not show any significant difference between the percentages of any structure. Planned contrasts showed that native speakers’ percentages were different not only between Null-Prep and Resumptives and Pied-Piping and Resumptives ($p < .001$), but also between Pied-Piping islands and Null-Prep islands ($p = .002$), because they found the Null-Prep island sentences significantly worse than their Pied-Piping counterparts. With regards to the resumptive island results, we need to be

Figure 5.6: Accuracy results for grammatical island configuration in speeded GJT (1= accurate acceptance of the structure, 0 = incorrect rejection of the structure).
cautious when interpreting the statistical results because native speakers were behaving unexpectedly, so these statistical differences may well indicate that resumptive island configurations are as ungrammatical as Pied-Piped or Null-Prep islands sentences for native speakers. In the case of Arabic speakers, they do not present any difference between Pied-Piping and Null-Prep, but these two conditions differed from the Resumptive Islands \( (p = .015) \), because they also found this structure mostly ungrammatical.

The between-subjects ANOVA indicated that native speakers differed from the two experimental groups in the Null-Prep and the Resumptive conditions (comparisons were \( p < .010 \)). Native speakers judged Null-Prep and Resumptive islands significantly less acceptable than the experimental groups, showing more robust intuitions in their responses. These results are clearer in Fig. 5.7, in which the accuracy responses are transformed into grammatical acceptance. So, Figure 5.7 below presents the averaged acceptability rates of the island configurations where 1 means completely acceptable and 0 means that the construction is unacceptable.

![Figure 5.7: Acceptability rates for Island configurations in speeded GJT](image-url)
The Arabic and English speakers did not present any significant difference in the way they answered to the Null-Prep island condition ($p = 1$). As for the PiP, the Arabic speakers behaved like the Native speakers, and differently from the English speakers (Natives ≠ English) = Arabic. In Figure 12 we can also see that, especially for the native speakers, these island configurations are all ungrammatical. Generally, the PiP island is the most accepted or considered less ungrammatical, contrary to what was expected. It is important that we take these results within the context of the task, because this was a timed experiment and the sentences were presented in a moving window fashion. So, participants did not have the time or the physical possibility to go back and reprocess what they read, as it would happen with a traditional paper and pencil GJT. Island sentences are difficult to judge, and require certain training and time, exactly what these participants did not have. The goal of a speeded GJT was to get the first, more unconscious intuition about the structure. This would go with a generative view of language that considers that real time construction of grammar sometimes loses grammar accuracy (Chomsky & Lasnik, 1993; Townsend & Bever, 2001), and against a view in which real-time processing can capture fine-grained distinctions (Phillips, 2003, 2006). However, this is not the only experiment that has not found this island sensitivity of the parser. For instance, Clifton and Frazier (1989) showed acceptance of gaps inside an island using speeded grammaticality tasks. Also, it must be acknowledged that these sentences do not make much sense, regardless of their grammatical status. In other words, these sentences are quite implausible, and we know that plausibility is a very relevant factor when interpreting sentences in real time (Pickering & Traxler, 1998; Pickering, Traxler & Croker, 2000; Traxler & Pickering, 1996).
There are two possible explanations for these results. The first one is to assume, contrary to what is traditionally assumed, that since native speakers judged all these sentences ungrammatical, they tried to interpret them through movement. And this would be true not only for relative clauses with Pied-Piping and Null-Prep, but also for relative clauses with resumptive pronouns. In other words, the resumptive pronoun does not rescue the derivation and does not induce an interpretation through binding. The other explanation for these results is simply to assume that since the expected contrasts were not found, perhaps due to a task effect, then these results are inconclusive. Further off-line testing would be needed to tease apart the task effect from the grammaticality intuitions. Besides, there are several studies which have found that self-embedded sentences, such as the ones used in this experiment, are very hard to process due to memory capacity. This is so because the reader needs to hold in memory for a long time what has been read but also integrate new entities into the discourse (Lewis, 1996). Consequently, non-local dependencies are usually problematic not only for L2 learners (Dallas & Kaan, 2008) but also for monolingual native speakers (Gibson, 1998).

5.6. Summary and Conclusions

Overall, results of the speeded grammaticality test seem to indicate that native and non-native speakers adequately processed the Pied-Piped preposition. This was reflected in shorter reading times for the PiP condition compared to the reaction times of other comparable relative constructions, as predicted by Hypothesis 3. The shorter RTs in the PiP were attested in the verb region as well as in the last word of the sentence. Unexpectedly, we did not find significant differences concerning the processing of these structures between native and non-native speakers, against Hypothesis 2. So, the fact that L2 learners’ grammar was not native-like or
fully completed did not affect the way the target sentences were processed, showing full convergence at the processing level, but not at the representation level.

To a certain extent, we got contradictory results in this task. On the one hand, reading times seem to indicate that non-native speakers adequately perceived PiP as grammatical, and the rest of the structures (Resumptive, Null-Prep and Preposition Stranding) as ungrammatical. This was reflected in longer reading times for the ungrammatical sentences, and shorter reading times for the grammatical counterpart. On the other hand, the grammaticality judgments indicated that non-native speakers mostly considered Null-Prep to be grammatical. The L2 Arabic group also judged the sentences with resumptive pronouns as grammatical, showing a strong L1 effect. The implications of these results and this apparent inconsistency between the so-called grammatical results and the processing results will be discussed in depth in the discussion section. Now, we can safely conclude that non-native speakers did not show processing differences compared to the native speakers’ results.

We could also argue that the reason why we found an asymmetry between the PiP condition vs. the rest of the structures is because the pied-piped preposition facilitates the integration of the verbal and sentential meaning, producing shorter RTs in the critical regions. In fact, these two explanations need not be mutually exclusive. It is very plausible that the reason why all participants slowed down in the verb area in the PiP condition is the result of both effects but, in order for the pied-piped preposition to produce longer RTs in the verb area, it needs to be fully perceived. So, even if we assume that the only reason why the non-native speakers have similar RT effects to the native speakers’ is because of the pied-piped preposition, and not because they considered the remaining sentences ungrammatical, non-native speakers still needed to fully process the preposition to later show the effects.
CHAPTER 6: SELF-PACED READING COMPREHENSION TASK

6.1. Introduction: Rationale

This chapter further explores the general research question of how grammatical knowledge and language processing relate in second language grammars by paying attention to processing during reading comprehension. That is, it investigates how second language learners comprehend and interpret oblique relative clauses in real-time. Particularly, the objective of this new on-line experiment is to explore how the pied-piped preposition affects the overall meaning of the relative clause.

One of the main reasons why the Null-Prep phenomenon is generally considered ungrammatical is because it violates the principle of recoverability of deletion. As such, the lack of the preposition is a potential source of problems for interpretation. In fact, Null-Prep occurs typically on subcategorized elements, in prepositional phrases where the preposition has very weak lexical meaning and then the meaning of the verb phrase can be reconstructed. Yet, authors such as Tarallo (1983) studying relativization strategies in Brazilian Portuguese consider that the Null-Prep relative clause (the PP-chopping relative in his terminology), despite its frequency in Brazilian Portuguese, “involves loss of information” (Tarallo, 1983:222).

Furthermore, Klein (1993) explained the appearance of Null-Prep in L2 grammars as the result of a defective UG: L2 learners produced Null-Prep because there was a part of UG missing; and the reason why L2 learners present problems is because there is a “lack of access to innate linguistic and learning principles available to the L1 learners but not longer accessible in adult L2 acquisition.” (Klein, 1993:252).

Therefore, the first reason behind this experiment is to check whether L2 learners delete the preposition beyond recoverability, that is, to the detriment of interpretation, indicating an
interlanguage grammar not guided by UG principles; or whether L2 learners delete-up-to-recoverability, following the assumed universal principle of Recoverability of Deletion (Chomsky, 1981), and thus obeying UG principles and constructing an interlanguage grammar within the UG constraints.

Moreover, the time that the participants spent while comprehending the sentences will also be measured. That is, the time it took the participants to understand the overall meaning of the sentence and answer the comprehension questions. This information is relevant because there are certain theoretical proposals that argue that the differences between native and non-native grammars are only quantitative and not qualitative, and that these qualitative differences become apparent mainly in processing (Slavakova, 2009). Therefore, if native speakers and L2 learners’ grammars are qualitatively different, then we will find similar tendencies but with significantly different reaction times. Given these premises, the following hypotheses are predicted.

### 6.2. Hypotheses

- **Hypothesis 1:** Overall, if L2 learners had an incomplete representation of Spanish oblique relative clauses, that shortfall could be reflected in poorer processing comprehension compared to the native speakers. Therefore, it would be expected that L2 learners will have significant lower accuracy results than the native speakers in sentence comprehension questions.

- **Hypothesis 2a:** If L2 grammars are not guided by Universal Grammar, then, there will be interlanguage grammars which violate universal principles such as deletion-up-to-recoverability. If interlanguage grammars do not follow universal principles, then we could find L2 learners that accepted Null-Prep in the GJT, but that at the same time are
not accurate at comprehending this structure, because deletion of the preposition was
done beyond recoverability.

- **Hypothesis 2b:** If, on the other hand, Null-Prep is part of the speaker’s grammar, and that
  grammar is constructed following UG, then Null-Prep should not cause interpretability
  problems; that is, deletion in those cases would have been done under recoverability,
similarly to the cases analyzed by Larson (1987).

- **Hypothesis 3:** If native and non-native grammars only differ in quantitative terms, but not
  in qualitative terms, then we could expect to find similar tendencies in interpreting
  relative clauses, but possibly with different reaction times in sentences that both types of
  speakers interpreted correctly. If this is the case then, we expect to find longer reading
  times (as measured in ms.) by L2 learners as compared to the native speakers.

### 6.3. Method

#### 6.3.1. Stimuli

There were a total of ninety-six sentence items followed by a yes/no comprehension
question. Forty-eight of these sentences contained target relative clauses: oblique relative clauses
with Pied-Piping (18 items: 12 with a prepositional argument, 6 with a prepositional adjunct),
and resumption (6 items); direct object relative clauses with gap (12 items) and with resumption
(6 items), and relative clauses with Null-Prep (6 items). Besides, there were other twenty-four
unrelated embedded subject relative clauses included as distracters and other purposes (mood
selection and mood interpretation) that will not be considered here. The remaining twenty-four
sentences did not contain relative clauses and were true fillers. For ease of exposition, I will
report the results of a subset of the relative clauses\textsuperscript{34}. The sentences were pseudorandomized so that no item from the same condition would appear consecutively. Next, I present an item example of each target condition and a sample comprehension question. The comprehension questions were counterbalanced for Y/N (3 “Yes” and 3 “No” responses in each condition), to avoid possible biases for one response.

(6.1) Pied-Piping

a. El profesor / estudió / a la mujer / de/ la/ que/ la niña/ dependía/ de/ verdad económicamente.

The professor studied DOM the woman of the who the girl depended of true economically.

‘The Professor studied the woman on whom the girl really depended economically’

b. ¿La niña dependía de una mujer? (Y)

‘Did the girl depend on a woman?’

(6.2) Resumption

a. La turista/ observó / a la chica / que / la pianista / dependía / de ella / económicamente

The tourist observed DOM the girl that the pianist depended on her economically

b. ¿La chica dependía de la pianista? N

‘Did the girl depend on the pianist?’

\textsuperscript{34} There were two equivalent versions of the PiP and DO relative clauses, one with optional (and preferred) subject-verb inversion and one without the inversion. Since all subjects, natives and L2 learners alike had worse comprehension results in the relative clauses with subject-verb inversion, only the results from the relative clauses without the inversion will be reported.
a. El vendedor/ engañó/a la mujer /que/ la clienta/ dependía / de/ verdad/ económicamente.

The seller lied DOM the woman that the customer depended of true economically

‘The seller lied to the woman that the customer really depended economically.’

b. ¿La clienta dependía de la mujer? Y

‘Did the customer depend on the woman?’

All the sentences in (6.1-6.3) above contained the same 6 experimental prepositional verbs that we considered in the previous tasks: depender (de), ‘to depend on’; hablar (de), ‘to talk about’; pensar (en), ‘to think about’; confiar (en), ‘to rely on’; soñar (con), ‘to dream about’; contar (con), ‘to count on’.

Additionally, filler relative clauses with prepositional adjuncts were included as a baseline to check the overall comprehension of relative clauses in this experiment. These prepositional relative clauses had verbs that do not subcategorize for prepositional arguments, but were presented with an optional prepositional adjunct. These are the verbs and the adjuncts used for these conditions: correr (con alguien) ‘to run (with somebody), bailar (para alguien) ‘to dance (for somebody)’, dibujar (con alguien) ‘to draw (with somebody)’, pasear (con alguien) ‘to walk (with somebody)’, luchar (contra alguien) ‘to fight (against somebody)’, and trabajar (para alguien) ‘to work (for somebody)’. The comprehension questions posed in this condition were easier than the rest of the questions in the target relative clauses so they can serve as an

35 The yes/no comprehension questions on the target sentences asked about the thematic role assignment regarding the relative clause in the form: “Did X do (Verb) to Y?”, where X and Y were both arguments of the relative clause, either the agent of the action or the extracted patient. In the case of the comprehension questions in the non argumental prepositional relative clauses (oblique adjunct), the question had the same structure but there was one constituent (either X or Y) that was external to the relative clause (the subject of the matrix sentence), compare (6.1) to (6.4). For this reason, these questions were a little easier to answer.
independent measure to check whether participants were paying attention to the meaning of the sentences.

(6.4) Pied-Piping of an Adjunct

a. El médico/ visitó / a la chica / con / la/ que / la ganadora/ corrió/ con/ mucho/ entusiasmo.

   The doctor visited DOM the girl with the that the winner ran with lots       enthusiasm

   ‘The doctor visited the girl with whom the winner ran enthusiastically.’

b. ¿El médico corrió con la chica? N

   ‘Did the doctor run with the girl?’

6.3.2. Procedure

Participants read ninety-six sentences in a self-paced non-cumulative word-by-word display on a computer monitor. The segments initially appeared as a row of dashes, and participants pressed the space bar on the keyboard to reveal each subsequent word of the sentence. At the end of each sentence, participants had to answer a question about the meaning of the sentence they just read, specifically about the thematic role assignment in the sentence.

It must be said that these questions were quite difficult, even for native speakers. Participants were instructed to answer as quickly as possible by pressing the keys “F” for yes and “J” for no. Also, participants received immediate feedback if they responded incorrectly (¡Oh, lo siento!), and no feedback if they answered as expected.

All constituents in the target sentences, whether subjects, oblique, or direct objects were human arguments, usually members of professional occupations or stereotypical males or females. Thus, the variable “animacy” was kept constant across arguments and therefore
controlled for. Thus, any element in the sentence can potentially realize any thematic role since they were all plausible agents or patients for the semantics of the sentence. Also, since relative clauses with subject-verb inversion are not included in this analysis, there should not be word order conflicting cues for the data compared here. Actually, all sentences had the same structure: the internal argument of the embedded verb is the direct object of the matrix verb, and the subject of the embedded clause is placed before the verb. Moreover, all constituents competing for theta-role assignment were gender--either masculine or feminine--, and number--always singular--matched. So, if the subject of the relative clause was masculine singular, the extracted element of the (object or oblique) relative clause was also masculine singular. For instance, in a sentence such as *The man studied the actress on whom the girl depended economically*, with a question such as *Did the actress depend on the girl?* (N), the two potential agents of the embedded verb are matched for gender and number (in this case, both are feminine and singular). This assures that the only information participants can use to relate constituents with their thematic roles is case marking, which in Spanish is signaled by the use of prepositions. Thus, participants need to pay close attention to prepositions in order to be able to answer these comprehension questions.

In Spanish only pronouns are marked for case. Most oblique pronouns in Spanish have the same strong form as the nominative pronoun. The absence of the preposition usually indicates that the nominal constituent must be in nominative case, and therefore is the subject (and usually the agent) of the sentence, except for human direct objects which require the preposition “a”, a phenomenon known as Differential Object Marking (DOM)\textsuperscript{36}. In the sentences under

\textsuperscript{36} DOM in Spanish is a complicated issue that goes beyond the scope of this dissertation. Its appearance is related to animacy, specificity and definiteness; however, its exact distribution is still to be determined. Also, there is certain debate in Spanish literature to determine the status of this “a”, either as a preposition, and therefore a lexical or
investigation, this preposition appears at the beginning of each extracted element, because they are always the direct object of the matrix clause. DOM is obligatory in declarative sentences, but it is generally elided when the animate direct object is relativized. This implies that the differential object marker “a” is not commonly pied-piped, especially when the relative clause is embedded in the animate direct object of the matrix question, as it is in the stimuli that participants read. This is so because this direct object (the antecedent of the RC) already carries the “a” in the matrix clause. Compare the preferred *Vi a la chica que Juan conoció* ‘I saw DOM the girl that Juan met’ vs. the not so common *?Vi a la chica a la que Juan conoció*. This is precisely the case of the examples I used for the experiments, so I made certain that direct object extractions were not constructed through Pied-Piping and would not be confused with the oblique relativization constructions, the ones that we are analyzing here. Also, for the oblique sentences, only prepositional verbs that did not require the preposition a were used.

After all these details, we can easily see why Null-Prep can create a serious problem for interpretation because if the preposition is not recovered, crucial information as for theta-role assignment would be lost. Therefore, if participants needed the preposition in order to interpret the sentences, as expected, then they will present an asymmetry between the comprehension of the conditions with the obligatory preposition (higher comprehension accuracy rates) and the conditions without the preposition (lower comprehension accuracy rates).

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37 The prepositionless constituent in these examples, “Juan”, the agent, cannot be misinterpreted as the patient (animate direct object) even when it is presented after the verb (with subject-verb inversion) because if it were the direct object, then it would obligatorily need the DOM, compare *Vi a la chica que conoció *(a) Juan ‘I saw DOM the girl that met DOM John’ vs. *Vi a la chica que conoció Juan ‘I saw DOM the girl that John met’. The difference between these two sentences in English is only a question of word order. However, in Spanish word order is not a reliable cue for theta-role assignment and the DOM is needed. Word order in Spanish can also be relevant, especially for focus/topic issues, but for scope limitations I cannot get into details of word order and inversion in relative clauses.
6.4. Results

6.4.1. Processing Comprehension: Accuracy

After reading in a word-by-word fashion the target sentence, the participants had to answer, as quickly as possible, the comprehension question prompted on the computer screen. The answer was either “yes” or “no”, and in the case of the sentences we are analyzing in this study, the question was about who did the action to whom, that is, thematic assignment within the constituents in the embedded sentence. Any reader can just have seen in the examples (6.1-6.4) that the questions were rather difficult, especially if taken into account that participants had to answer as fast as possible. For this reason, not a single participant scored 100% correct, and only two of them scored on average above 90%, a native speaker and an English-speaking learner.

![Overall proportion of correct responses and SE in comprehension questions.](image)

Figure 6.1: Overall proportion of correct responses and SE in comprehension questions.

To have an overall idea of the participants’ performance in these structures, the mean proportions of total correct responses are displayed in Figure 1. The first remarkable result is the similar accuracy rate between the native speakers and the English-speaking learners. Basically,
we can observe that native speakers are not generally better than the English group, as the statistical analysis corroborates. The Arabic speakers, on the other hand, behaved differently than the native group\textsuperscript{38}. But overall, the two experimental groups do quite well compared to the natives’ results. These results partially disconfirm Hypothesis 1 which proposed that if the L2 learners had an incomplete acquisition, their comprehension accuracy results would be significantly lower than the native’s ones.

In order to carry out parametric tests on these categorical data, the averaged proportions of correct responses per structure and person were arcsine transformed. The total mean of all the transformed correct responses (all conditions) was submitted to a one-way ANOVA and revealed an overall main effect for group ($F (2, 59) = 8.294, p < .001$). The Post Hoc Tukey test indicated that the Arabic group caused this difference since the native and the English group did not differ between themselves ($p > .1$), and these two groups behaved significantly different from the Arabic group ($p < .05$).

To evaluate the results by structures, a repeated measures ANOVA showed that there is also a main effect for structure, ($F (3, 177) = 3.381, p = .020$); however, the within-subjects analysis indicated that this main effect held only in the native group ($F (3, 57) = 3.384, p = .024$), but not in the Arabic group ($F (3, 60) = 1.119, p = .349$), or the English group ($F (3, 60) = .265, p = .850$). This effect is clearly displayed in Figure 6.2, where it can be seen that native speakers were significantly better at the pied-piped structures, whereas the experimental groups have very similar results in all constructions. The planned-contrasts per groups only found one significant difference, and that is between the PiP Adjunct condition (the control structure) and the Null-Prep condition in the native group ($p = .008$), and two marginally significant contrasts also in the

\textsuperscript{38} The fact that most of the embedded sentences in this experiment do not present subject-verb inversion, and that Arabic is a VSO language might have affected the overall accuracy in this group.
native group between PiP and Null-Prep ($p = .056$), and between PiP and the Resumptive condition ($p = .065$). None of the contrasts in any of the experimental groups reached significance at the $\alpha = .1$ level\(^{39}\).

![Proportion of correct responses per structure and group.](image)

Figure 6.2: Proportion of correct responses per structure and group.

These results suggest that, at least for the native speakers, constituents carrying a preposition seem to be easier to interpret than prepositionless constituents, at least when assigning thematic roles. The L2 learners, on the other hand, were not better (or worse) at interpreting sentences

\(^{39}\) As in the previous analyses in which we added proficiency as a factor, results turn out to be uncertain. In this case, we found a significant relationship between the correct responses in the Pied-Piping argumental condition and the English learners, $r = .558$, $p$ (one-tailed) = .004, so as proficiency increases, so does the number of correct responses. However, this condition was not significant in the Arabic speakers, $p > .1$, showing no significant improvement as proficiency increased. On the other hand, the opposite results were found in the case of non-argumental Pied-Piping: there is a significant relationship between the proficiency of the Arabic speaker and the performance in this condition, $r = .515$, $p = .008$, but this relationship was only marginally significant in the case of the English learners: $r = .362$, $p = .054$. Also, there is a significant correlation between the English speakers and the correct responses in the oblique relative clauses that use resumptive pronouns, $r = .396$, $p = .038$, but not in the case of Arabic speakers. Overall, proficiency seems to be a better predictor of target-like performance for the English speakers than for the Arabic speakers, and in general, comprehension improves as proficiency increases. However, and as said before, since we cannot find a general tendency in the performance and the level of Spanish of the L2 learners, the factor “proficiency” appears to be somehow inconclusive.
with the obligatory preposition, suggesting that the preposition for them does not have a decisive
task in the overall comprehension of the sentence. As for Hypothesis 2, these results indicate that
if these learners produced or accepted relative clauses without the obligatory preposition in the
previous tasks (chapter 4 and 5), this does not seem to be done beyond recoverability, because
the preposition does not have a crucial or distinctive meaning for these speakers. This finding
implies that the L2 learners’ grammars followed the universal principle of deletion-up-to-
recoverability, and then were guided by UG, because the deletion of the preposition did not
significantly affect the overall comprehension of the sentence. On the other hand, native speakers
did show certain comprehension asymmetry between the sentences with and without preposition:
they understood better the sentences that had a preposition, indicating that for them, the lack of
preposition had an effect in the overall comprehension of the sentences, and this could explain
why they did not produce or accepted sentences without the obligatory preposition.

The other noteworthy result is that the supposedly control structure, the adjunct PiP relative
clauses, which had somehow easier comprehension questions (these were about the external
argument), did not significantly improve the learners’ results, or the native’s Pied-Piping results.

To sum up, whereas the L2 learners did not present particular problems when it comes to the
interpretation of relative clauses without the obligatory preposition, native speakers had better
comprehension results in sentences with a pied-piped preposition, which are the grammatical
sentences. Next, we will explore the issue of how long it took the participants to reach the correct
interpretations.
6.4.2. Processing Comprehension Questions: Reaction Times

The time in milliseconds that took each participant to give the correct response for each question was submitted to a repeated measures ANOVA. Since accuracy results are very comparable among the three groups, and the accuracy rates are relatively high, only correct responses were included in this analysis. The averaged raw data in milliseconds is presented in Figure 6.3.

![Figure 6.3: Mean RTs (in ms.) for comprehension questions, correct responses only.](image)

Overall results indicated a weak main effect for structure ($F(3, 177) = 2.836, p = .040$), and a main effect for group ($F(2, 59) = 6.311, p = .003$), and no interaction between structure and group ($p > .1$). The within subjects analysis per groups further indicated that the weak main effect for structure comes from the native group, which is the only one that presented the effect
for structure \((F(1.878, 35.678) = 3.460, p = .045)\)\(^{40}\). The planned contrasts within the native group showed that the structures that significantly differed were only the Resumptive condition vs. the Pied-Piped Adjunct \((F(1, 19) = 6.057, p = .024)\), and Resumptive vs. the argumental Pied-Piping condition \((F(1, 19) = 6.253, p = .022)\). The remaining contrasts were all non-significant, as well as the effect of structure in the two experimental groups. Furthermore, the main effect of group is produced by the Arabic group, whose reaction times significantly differed from the other two groups’ RTs \((p = .001)\), but the results between the native group and the English group did not differ significantly \((p = .565)\).

All in all, we can conclude that English-speaking learners and native speakers are very similar in the way they answered the comprehension questions, displaying not only very similar accuracy rates, but also very similar reaction times, taking them around 2.5 seconds to respond. The main difference between the English speaking group and the native group, then, is that the English group, as well as the Arabic group, did not exhibit the asymmetry between pied-piping constructions and non-pied-piping constructions.

On the other hand, the Arabic group had lower accuracy rates and longer reaction times in all structures. The Arabic group took around 3.5 seconds to interpret and correctly answer the comprehension questions. Yet, this difference does not constitute a qualitative difference among the groups, as Slabakova (2009b) predicted. This delay when responding the comprehension questions could be due to the fact that Arabic has a different writing system and a different basic word order than Spanish and English.

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\(^{40}\) Mauchly’s test indicated that the assumption of sphericity had been violated for the main effect of structure in the native group, \(\chi^2(5) = 16.503, p < .006\), therefore degrees of freedom were corrected using Geenhouse-Geisser estimates of sphericity.
6.5. Summary and Conclusions

The sentence reading comprehension task results indicated that native speakers were not significantly better or faster than the English speakers at interpreting relative clauses, but they were better and faster than Arabic speakers. This result might be influenced by the fact that the relative clauses analyzed here were non-inverted relative clauses, so they followed the declarative SV basic word order of Spanish, which is the only word order available in English. One could think that the reason why Arabic speakers, whose native language word order is VSO, are not performing that well with SV embedded sentences is because they are not tested on their preferred word order; and as a result, they cannot readily use L1 word order cues for assigning thematic roles. However, all groups, including the native group and the Arabic group, had worse accuracy results in inverted (VS) relative clauses (these data and analysis are not included here). This result is unexpected given the fact that for both, Spanish and Arabic speakers, the VS word order in relative clauses would be the preferred one. Thus, after all, L1 word order might not be the most determining factor for interpretation in time pressure conditions.

The data that seem to point towards a qualitative difference between native and non-native speakers is the pied-piped preposition effect. For native speakers, relative clauses with the pied-piped preposition, which are the only sentences completely grammatical, were easier to interpret, and presented significantly better accuracy results than the other structures. However, the results of the non-native speakers, English and Arabic speaking learners alike, did not show any effect as for the presence of the preposition, indicating that this preposition, whether pied-piped, or introducing the resumptive pronoun, did not make any significant contribution toward the overall meaning of the sentence.
Finally, another L1 factor that does not seem to impact in sentence comprehension is the resumption vs. gap strategy. Arabic speakers, whose native language allows relative clauses through resumption, were not significantly better at interpreting sentences with resumption compared to their results in the relative clauses formed through gap. The same holds for the English group, which was not better with gap relative clauses than in resumptive ones. So, in this respect, the L1 does not seem to help or be detrimental for comprehending relative clauses.
CHAPTER 7: DISCUSSION AND CONCLUSIONS

7.1. Introduction

The goal of this dissertation has been to investigate the nature of interlanguage grammars on the one hand, and the relationship between L2 grammar representations and their use in real-time, on the other. Specifically, it investigated the production, acceptability, real-time processing, and comprehension of oblique relative clauses in Spanish as a non-native language in two different groups of intermediate learners: native speakers of English and native speakers of Moroccan Arabic. The main research question of this study was whether L2 interlanguage grammars were constructed differently than native grammars, and if there were different, whether the differences lay on the grammatical representation or on the processing abilities of the second language learners.

Spanish oblique relative clauses move the obligatory preposition right before the relative pronoun, a strategy called Pied-Piping that English and Arabic have as well. Moreover, English also uses Preposition Stranding, and Arabic can employ Resumption to construct oblique relative clauses. Therefore, the process of acquiring Spanish oblique relative clauses by English and Arabic speakers ought not to be very complicated given the similarities among the three languages, i.e. the use of pied-piping. The acquisition process, then, is mainly a situation of unlearning: L2 learners need to reduce the options of their native grammars in order to correctly construct the target grammar.

To investigate this issue, three different experiments were conducted: an oral production experiment, and two on-line self-paced reading tasks: a grammaticality judgment task and a comprehension question task.
This final chapter discusses the general findings of the three experiments within the theoretical framework set at the introductory chapters, and lays out their contribution to the fields of theoretical SLA, L2 psycholinguistics, second language teaching, and linguistics in general. Also, it discusses the limitations of the study and its pedagogical implications.

7.2. Summary and Discussion of the Results

According to the results of this study, the acquisition of oblique relative clauses in Spanish is a problematic area for second language learners, regardless of their native language. Even when the learners’ native languages share the main properties of the target language, i.e. pied-piping, there is still room for divergence, especially in production and grammatical intuitions. Interestingly, however, L2 learners can, and do, converge at the level of sentence processing and comprehension, showing similar patterns of processing as natives with oblique relative clauses. Hence, the results of this dissertation indicate that even when there may be dissimilar L2 grammatical representations, as shown in the production and GJT task, there can be convergence at the processing and interpretative level (the comprehension system).

This is a relevant finding because most of the recent L2 processing studies emphasize the differences that exist between native and non-native language processing. This study shows that, even when there might be divergent grammatical representations, L2 learners can employ the same processing strategies as native speakers do, demonstrating, on the one hand, that L2 learners obey universal processing principles such as the Minimal Chan Principle (De Vincenzi, 1991) or the Active Filler Hypothesis (Clifton and Frazier, 1989; Frazier, 1987), and that grammatical parameters do not directly predispose the processor (Gibson et. al, 1996). Moreover, it shows that both, L1 grammar and L1 processing strategies can be transferable into the L2, as

Additionally, this study also attested the Null-Prep phenomenon and demonstrated that it is by no means the result of a “wild” grammar, as previously proposed (Klein, 1993, 1995). In fact, the Null-Prep phenomenon is an important piece of evidence that reveals how interlanguage grammars are constrained by Universal Grammar. This study proposes that the Null-Prep is a systematic developmental stage by which language acquirers go through in the process of mastering pied-piping. Also, this stage is hypothesized to be eventually overcome with experience, particularly with formal and explicit practice with the language. Furthermore, this study also proposes that Null-Prep is not the result of applying economy principles to the language, (contra Dekydtspotter et al., 1998), but instead, as the result of applying universal principles to the language acquisition process such as deletion-up-to-recoverability.

### 7.2.1. Experiment 1: Production Data

The main purpose of the oral production data in this study was to compare native and non-native grammatical representations and describe the type of differences that can be found between native and non-native grammars. This would allow us to establish whether those differences are insurmountable, or unrecoverable, as the Fundamental Difference Hypothesis (Bley-Vroman, 1990, 2009), and the Failed Functional Hypothesis (Hawkins & Chan, 1997) proposed, or whether these differences are developmental and therefore temporary.

Production data, by definition, implies learned material (Carroll, 1998), especially in an oral task, in which participants have very little time to resort to metalinguistic or explicit knowledge.
Oral results are generally assumed to be a reliable representation of systematic and consistent grammatical knowledge (R. Ellis, 2005, 2008), and even though they are performance data, as any linguistic data we can investigate, oral production data can be used as an indicator of the learner’s general grammatical competence.

There were two types of structures elicited, Direct Object Relative Clauses, which were included as a control structure to check that participants understood the task and could actually form relative clauses, and the target Oblique RCs. Results showed that whereas the L2 learners had accuracy results of around 70-80% in the Direct Object Relative Clause context, which are relatively good for oral production, those accuracy rates dropped significantly in the prepositional context, which presented accuracy rates as low as 35% in the case of the Arabic speakers, and around 55% in the case of the English speaking learners. These results already indicate that while it is true that L2 learners know how to construct relative clauses in Spanish, they fall quite short at placing the obligatory preposition in the right position. And this is true regardless of the fact that their native languages, English and Arabic, already provide the learners with the right grammar, one in which pied-piping can be deployed. Table 7.1 summarizes the relevant findings for the oral production task.

Table 7.1.: Summary of the results, oral production task.

<table>
<thead>
<tr>
<th></th>
<th>Pied-Piping</th>
<th>Null-Prep</th>
<th>Resumptive</th>
<th>Prep. Stranding</th>
<th>Subject RC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native group</td>
<td>√</td>
<td>?</td>
<td>*</td>
<td>*</td>
<td>?</td>
</tr>
<tr>
<td>English learners</td>
<td>√</td>
<td>√</td>
<td>*</td>
<td>√</td>
<td>*</td>
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<tr>
<td>Arabic learners</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>*</td>
<td>√</td>
</tr>
</tbody>
</table>
Then, assuming a Full Transfer account of language acquisition, in which the entirety of the L1 transfers into the L2, one could expect to have had more accurate results, because there is nothing new to be learned in the target language, except for some restrictions. In this case, the target language is a subset of the learners’ native languages, which can create a learnability problem for the L2 learners. According to the subset principle (Berwick, 1985, Manzini & Wexler, 1987), originally proposed for L1 acquisition, children would only hypothesize the narrowest grammar. Yet, this is not always true: we know that children overgeneralize structures such as some violations of the principle B, known as the “delay in principle B” (Wexler & Chien, 1985), or some ungrammatical argument structures (Bowerman, 1983). Crucially, these overgeneralized structures are not found in the input, but still, children produce them. In the case of the L2 learners under study, they overproduced structures that are present in their native languages, such as preposition stranding and resumption, clearly displaying L1 transfer; but they also produced structures that are not present in the input, such as the Null-Prep structure. Then, we need to investigate where these structures absent in the input are coming from.

As far as L2 acquisition is concerned, the results indicate that L1 transfer is more prominent than the subset principle, because L2 learners do not hypothesize a narrow grammar, supporting the Full Transfer/ Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996). In fact, it seems that the subset principle does not always apply in L2 acquisition, or that L2 transfer effects can cancel the subset principle (White, 1989). Taken as a whole, we can assume that L2 learners are not exactly conservative learners, as they tend to hypothesize a bigger grammar than the one permitted, at least at beginning and intermediate levels.

For instance, ungrammatical L1 transfer was not the only or even the largest source of inaccurate results in the production data, as other forms that do not come from the L1 (or the
L2) were also produced in abundance. Specifically, both experimental groups omitted the obligatory preposition around 20% of the time, and the Arabic group frequently produced Subject RCs instead of the targeted Oblique ones. Clearly, these results cannot be accounted for by the Subset Principle or the Full Transfer part of the Full Transfer / Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996); but, can they be accounted for by the Full Access part? In fact, we need to explore whether these structures are part of UG. In other words, is the guidance of UG what makes the L2 learners produce these non-target structures, or is it the lack of UG-restriction? These two more prominent non-target results, the production of subject relative clauses and the ungrammatical Null-Prep have different explanations, so they will be discussed separately below.

As seen in chapter 3, the acquisition of relative clauses has mainly been studied within typological considerations, such as the Noun Phrase Accessibility Hierarchy (Keenan & Comrie, 1977) or the Markedness theory (Bardovi-Harlig, 1987; Liceras, 1986; Mazurkewich, 1984). Although the Markedness Theory was somehow linked to generative linguistics by distinguishing between core and periphery grammars, this proposal is no longer tenable. On the other hand, typological generalizations such as the one proposed by the Accessibility Hierarchy are still legitimate observations of the languages of the world. However, the link between the NPAH and UG is not always easy to make. Is there a rule or a universal principle that makes the subject have a special status within the sentence that could explain why Arabic speakers produced subject relative clauses instead of oblique relative clauses? Is there a universal principle that explains why Direct Object relative clauses seem to be easier than the Oblique ones?
In 1981, Chomsky proposed the Extended Projection Principle (EPP), which states that a subject is always obligatory in a sentence, clearly assigning special properties to the subject. Still, the EPP does not explain the implicational character of the NPAH: If a language has direct object relative clauses, why does it also have subject RCs? And if it constructs genitive RCs, why does it also allow indirect object relative clauses? There have been several attempts to link language typology with formal linguistics (Newmeyer, 2004, 2005, 2008; Polinsky & Kluender, 2007; Polinsky, in press), but usually these are typically recognitions for the need to build bridges between the two disciplines. As for the case of the relative clauses, Polinsky (in press) specifically notes the Accessibility Hierarchy as a puzzle: “while empirically robust, (the Accessibility Hierarchy) evades a true explanation in the most ironic way” (p. 13). And although psycholinguistic and L2 acquisition studies seem to find robust evidence for the psychological validity of the NPAH (see references in chapter 3), this generalization cannot be tested within the premises of UG or a specific hypothesis such as the Full Transfer / Full Access Hypothesis because they are framed within different linguistic conceptions. Accordingly, I conclude that, whereas the presence of subject relative clauses are a moot question in the UG-guidance of interlanguage grammars, we can firmly corroborate that interlanguage grammars do follow typological considerations as any other natural languages of the world do. The fact that the L2 learners were significantly better at constructing direct object RCs than oblique RCs in the production experiment serves as additional data supporting this claim and the prediction made by the NPAH (Keenan & Comrie, 1977). These conclusions, although not directly linked to UG theory, still speak to the general research question of whether native and non-native grammars are subject to different set of laws, and in this sense, the conclusion is that these grammars are alike.
Regarding the Null-Prep, Klein (1993) originally proposed that this phenomenon was the result of a defective UG in L2 acquisition, an example of a “wild” grammar. However, the Null-Prep phenomenon, or a comparable phenomenon, can also be attested in L1 acquisition (Hildebrand, 1987). In a more recent study, Guasti & Cardinaletti (2003) explored the acquisition of relative clauses by French and Italian children, ages 4;5 to 10;00. Their production results resembled the ones found in this experiment: subject relative clauses were produced not only when targeted, but also instead of other types of RCs; resumptive pronouns were found in relative clauses other than subject and DO positions; and relatives that needed a preposition and a relative pronoun (pied-piping) such as Indirect Object, genitive or locative relative clauses were generally introduced only by the complementizer che/que and recurrently followed by a resumptive pronoun,\textsuperscript{41} instead of being introduced by Pied-Piping as in standard Italian and French. These results led Guasti and Cardinaletti to conclude that PiP relatives are learnt later in life, during schooling, through explicit teaching; and proposed that in Romance languages there are two types of relative clauses: the conventional ones, with pied-piping and relative pronouns, and the non-standard relatives that mostly employ the complementizer. Guasti & Cardinaletti assumed that both type of relatives implied movement, and that children used the same mechanisms than adults when constructing relative clauses, regardless of the apparent differences.

Thus, if similar results were found in L1 acquisition, we can no longer describe the L2 learners’ behavior as the result of having a “wild” grammar not restraint by UG. Certainly, the

\textsuperscript{41} Recall that Spanish, unlike French or Italian, does not have clitic pronouns for oblique positions such as locatives, genitives or other positions that would require pied-piping (except for Indirect Objects). So, the appearance of a resumptive (clitic) pronoun in these cases in Spanish is not an option, and then if the preposition is not pronounced in Spanish, unlike in French or Italian, the result needs to be Null-Prep, unless a strong pronoun is used. A study on L1 acquisition of relative clauses in Spanish would be needed to further investigate whether Spanish-speaking children would use strong pronouns (introduced by a preposition) with the oblique relative clauses, or whether they would prefer Null-Prep as L2 learners do.
Null-Prep does not seem to come from the target input or the native language, but it does not seem to be an infrequent phenomenon in developing grammars.\(^{42}\) But before we reach a final conclusion about the acquisition of relative clauses and the Null-Prep phenomenon, let’s summarize the results from the remaining tasks.

7.2.2. Experiment 2: On-Line Grammaticality Judgment Task - Acceptability Rates

The on-line grammaticality judgment task (GJT) was included to compare native to non-native grammars and investigate whether they differ in these domains. More specifically, this task explored not only what it is possible in the interlanguage grammars, but also what it is impossible. The overall results of the on-line GJT showed that whereas native speakers had a strong contrast between grammatical and ungrammatical constructions, L2 learners did not have robust intuitions regarding these sentences and did not distinguish among structures. Yet, the tendencies slightly pointed towards the same results found in the production task.

In the case of the English-speaking learners, they preferred PiP as in the production task, followed by Null-Prep, which was the second most productive construction in this group, and then preposition stranding, and the resumptive strategy. The results are a little different in the Arabic speaking group: the most accepted structure is the resumptive pronoun construction, followed by PiP and Null-Prep constructions in equal proportions (around 60% of the times). The least accepted construction was preposition stranding, the only one not produced by this group in the previous task. Albeit these comparable tendencies, the statistical results for the overall accuracy rates in the on-line GJT indicated that neither experimental group distinguished

\(^{42}\) It is important to note that Klein (1993) attested Null-Prep in both, relative clauses and interrogatives, whereas Guasti & Cardinaletti (2003) or this study are focused only in relative clauses. However, I believe that the conclusions reached for relative clauses, can also apply to interrogatives or other structures such as cleft sentences or topicalizations.
among structures and accepted (or rejected) all conditions in a similar way. Table 7.2 summarizes the relevant findings.

Table 7.2: Summary of the results, on-line GJT (based on acceptability rates)

<table>
<thead>
<tr>
<th></th>
<th>Pied-Piping</th>
<th>Null-Prep</th>
<th>Resumptive</th>
<th>Prep. Stranding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native group</td>
<td>√</td>
<td>*</td>
<td>?</td>
<td>*</td>
</tr>
<tr>
<td>English learners</td>
<td>√</td>
<td>√</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Arabic learners</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>?</td>
</tr>
</tbody>
</table>

This task undoubtedly displays significant differences between native and non-native grammars. In fact, the on-line GJT results are rather inconclusive: the L2 learners seem to accept everything in a similar way, but they did not show this amount of indeterminacy in the production task. Of course, it is always easier to accept an ungrammatical structure than to reject it or even produce it, which may explain the high acceptance of ungrammatical structures. Therefore, we could ask whether these results are a mere task effect, or whether they really reflect the instability of interlanguage grammars. Is this an unmistakable proof of the “unreliable and nonconvergent” nature of L2 grammars, as Bley-Vroman (2009) argued, or is it the case that a timed GJT are not a suitable way to measure L2 intermediate learners’ grammatical competence?

R. Ellis (2005), in a study that investigated the issue of how to measure knowledge and type of learning, proposed that timed grammaticality judgment tasks are a good way to describe implicit knowledge.\textsuperscript{43} This means that in a timed GJT, independently from their central focus on

\textsuperscript{43} In fact, Ellis (2005) proposes that grammatical items in a timed GJT tap implicit knowledge whereas ungrammatical items tap implicit as well as explicit knowledge.
form, there is not much chance to access metalinguistic knowledge. This fact could certainly explain why the L2 learners do so poorly in this task: because they cannot access the explicit rules that they learnt in class which would inform them of how to construct oblique relative clauses in Spanish correctly. In fact, this reasoning goes hand in hand with Guasti and Cardinaletti’s explanation for the lack of Pied-Piping in the children’s grammar: Pied-Piping requires explicit teaching, or some type of metalinguistic knowledge to use it; otherwise, relatives with complementizers are preferred. But in any case, this reasoning cannot explain the Arabic learners’ results with respect to preposition stranding.

The paradox is that, in Ellis (2005), oral tasks are also hypothesized to draw on implicit knowledge. So, if both tasks, the timed GJT and the oral task tap implicit knowledge, these notable differences between the results of the oral task and the GJT should not be expected. Nonetheless, it must be said that Ellis used oral narration and oral imitation for his study, whereas in the present study, the oral task was a much more controlled task, eliciting only relative clauses, and the information was also in written form. Then, although still oral, it was a task mainly focused on form. These details may have favored the use of not only implicit, but also explicit knowledge.

Therefore, assuming that a timed grammaticality judgment task can be a good indicator of the implicit linguistic knowledge of a learner, and that implicit knowledge is a good reflection of grammatical competence, then this suggests that these L2 learners have an incomplete and indeterminate grammatical knowledge of Spanish oblique relative clauses, unlike native speakers. If the differences between native and non-native speakers came from L1 transfer and typological and/or universal considerations, this raises the question about the nature of these differences and what they imply for the use of that grammatical knowledge in real-time. Are
these differences representational, do they reside in the processing system, or both? Are these mistaken judgments the result of a lack of knowledge, or do learners basically know how prepositional relative clauses are in Spanish but they have difficulties when processing them in real-time? In order to answer these questions, we now consider reaction times data.

Up to now, we can conclude that the more time constrained the task is (and therefore more implicit knowledge is required), the less target-like the response, and the weaker the relationship between proficiency and accuracy results. Thus, it is possible to think that the oral task allowed more metalinguistic knowledge than the on-line grammaticality judgment task; and that in a timed task such as the on-line GJT in which the learners may not even realize what exact part of the sentence needs to be judged, this explicit knowledge of the grammar is minimized, if not severely reduced. It is an open question, then, which task best reflects linguistic competence, although both tasks are a sign of the significant differences between native and non-native speakers.

7.2.3. Experiment 2: On-Line Grammaticality Judgment Task – Reaction Times

There have been several proposals arguing that the reason why L2 learners differ from native speakers is because they have restricted processing capabilities, which results in quantitative differences, but not necessarily in qualitative differences (Slabakova, 2009). There are other proposals, such as the Shallow Structure Hypothesis (Clahsen & Felser, 2006), which argue for a permanently impaired L2 grammar, which results, among other things, in a shallow processing. The goal of this task was to confirm whether the differences found in the production and the grammaticality judgment task also have a correlate in real-time processing.
Interestingly, the results of the two crucial sentence regions (the verb region and the last word region in the target structures) showed no overall differences between the native speakers and the non-native speakers’ residual reaction times. There were no apparent differences in the other regions of the sentences, although a more detailed analysis of the remaining regions will be done in further studies. All subjects presented the same main effect: a slow-down in the non-pied-piping structures, which are the non-standard or ungrammatical sentences, and shorter reaction times in the verb region of the Pied-Piping structure.

In fact, these results are not so much the proof of a slow-down effect in ungrammatical structures, but one in which the grammatical structure, or the appearance of the pied-piped preposition, produces a decreased reading time or an acceleration. This is a parallel effect of what is usually found in processing studies of active fillers (Crain & Fodor, 1985; Frazier, 1987; Stowe, 1986, among many others), which typically corroborate what it is known as “the filled-gap effect”, but what we found in this case is a match or look ahead effect with shorter RTs. In other words, the pied-piped preposition allows the readers to predict and restrict the potential elements that can come next. Assuming that when processing language, the reader plans ahead the next coming words, then the presence of the preposition seems to reduce the potential upcoming subcategorizers. As a result, the displaced element gets incorporated faster when it reaches a somehow expected verb. The crucial point is that, even though the verbal items employed in the remaining conditions were exactly the same, this match effect was not found when the preposition was not pied-piped, that is, the parser cannot look ahead when it did not have a decisive clue of what to expect next. Interestingly, even when the reader finds the same verb in every condition, he only expects or recognizes the subcategorizing verb faster when the

44 Basically a mismatch or surprise effect when the gap is filled with an unexpected element that results in longer RTs, as in sentences such as My brother wanted to know who Ruth will bring us home at Christmas.
appropriate preposition introduced it. This fact further indicates that the conditions and items in the experiment are generally well counterbalanced.

Moreover, the match effect truly shows that the participants were aware of the arguments necessary to satisfy the verb requirements, and that participants were reading the sentences for meaning, rather than for form, which could explain the low accuracy rates in the grammatical judgments. Finally, these results show that non-native speakers also attempt to integrate a displaced constituent as early as possible with a potential subcategorizing verb, as predicted by the assumed universal principles such as the Minimal Closure Principle, the Minimal Chain Principle (De Vincenzi, 1991) or the Active Filler Hypothesis (Clifton and Frazier, 1989; Frazier, 1987), and as attested in other L2 studies such as Frenck-Mestre and Pynte (1997), Juffs (1998, 2005), Williams, Möbius & Kim (2001).

This finding is expected if we assume that these basic parsing mechanisms are universal, and therefore do not need to be learned. However, it is not clear whether the application of universal processing strategies is possible because they are in effect universal or because these transfer from the L1. For instance, according to the Shallow Structure Hypothesis, “the L2 parser will be unable to successfully apply even universal processing mechanisms (such as minimal attachment) if the L2 grammar fails to provide sufficient grammatical information” (Clahsen & Felser, 2006a, p. 120). The results of this study seem to contradict this position. What we found in the production and grammaticality judgment task indicated that the L2 learners had problems with the grammatical representation of the structures under study. Yet, they are able to integrate the displaced element as fast as possible, clearly displaying the use the universal processing mechanisms. Therefore, we need to conclude that the assumed universal processing mechanisms
are in effect universal, and they can apply even when the L2 grammar does not provide sufficient information.

What it is even more relevant is the fact that all subjects, regardless of their production or acceptability results, presented the same match effect. This clearly indicates that L2 processing can actually converge with native processing, and that problems in production can be overcome in comprehension. This does not automatically imply, however, that the L2 learners’ grammatical representations were entirely complete and target-like. In fact, the previous results indicated otherwise. However, the fact that pied-piping exists in the learners’ native grammars, and therefore, they already have the ability to process this construction in a native manner, may have helped build the native-like processing. This is an empirical question that the present study cannot address.

Several authors proposed that L1 processing can be transferred into the L2 (Carroll, 1998; Juffs, 2005; Pritchett, 1992), so it is reasonable to think that the ability to properly process the pied-piped preposition comes from the L1. The question, then, would be: why is it that L1 transfer does not seem to apply across the board in other linguistic domains? For instance, assuming the Full Transfer/Full Access hypothesis, we would expect all subjects to immediately accept all the pied-piping structures in the grammaticality judgment task, but that it is not the case. Therefore, although L1 transfer is undeniable, it is also true that it does not affect equally all linguistic domains, and that there are some modules more permeable than others. Next, we will explore the language interpretive domain with the results of the third and last experiment, the on-line reading comprehension task, and we will discuss the issue of selectivity of transfer and the modularity of the linguistic system.
7.2.4. Experiment 3: On-Line Reading Comprehension Task – Accuracy Results

The reading comprehension task results displayed no differences between the native speakers and the English-speaking learners. This piece of information already indicates that full convergence at the comprehension level is possible. On the other hand, the Arabic-speaking learners did show significant differences, with slightly lower accuracy rates across conditions.

As for the different structures studied, the experimental groups’ comprehension questions showed no differences in the comprehension accuracy scores in the reading of the pied-piping, Null-Prep, or resumptive relative clauses. This lack of structure effect suggests that the manifestation of the preposition (or lack of it), either pied-piped, with a resumptive pronoun, or null does not seem to affect the interpretation of these sentences for the L2 learners. Conversely, the appearance of the pied-piped preposition does have a positive effect on the native speakers group: native speakers understood better the sentences with the pied-piped preposition, which is a sign of two important findings. In the first place, this asymmetry between sentences with the pied-piped preposition on the one hand, and with the preposition and the resumptive pronoun or without the preposition on the other, is expected because the former are the only sentences fully grammatically correct; then it is reasonable to think that these would be easier to interpret. Secondly, this asymmetry also states that the preposition contributes to the overall meaning of the sentence for the native speakers, whereas this semantic contribution seems to be inexistent for the L2 learners.

Indeed, if the preposition does not make available any distinctive interpretation in the semantics of the L2 learners, its omission can be easily justified. In this sense, the preposition for the L2 learners seems to (temporarily) become a mere formal feature of that particular construction, a type of an uninterpretable feature that does not affect the logical form. In fact, in
formal Minimalist Theory, this uninterpretable feature would be eliminated before Spell-out because it does not contribute to meaning. But, why can these prepositions be ignored in L2 grammars but not in native grammars? Actually, we could also wonder whether these prepositions are full lexical items or whether they should be considered a functional category (Baker, 2003). One explanation could be that these prepositions are more like a lexical category in a native grammar, a compound lexical item that would consist of the verb and the preposition, which together almost form a unit; but in non-native grammars they seem to be treated more like a formal functional category, with no special meaning attached to them. This assumption would explain why so many learners did not provide the preposition in the screening test in the first place. Besides, if these prepositions are learned as functional categories, they are assumed to be learned with difficulty, as predicted by the Bottleneck Hypothesis, (Slabakova, 2009c). This hypothesis proposes that functional morphology is the hardest module to be learned in a second language, precisely because it reflects variation among languages; that is, the syntactic and semantic differences among languages reside in functional morphology. This hypothesis also predicts that syntax and semantics, on the other hand, do not present problems, (usually once the functional morphology is mastered), because they are universal.

Thus, if we consider these prepositions as a functional category in the non-native grammars, then they are part of the Functional Lexicon, need to be learned and associated with a lexical item, (the verb). The syntactic properties that this association entails in the second language also need to be learned. In fact, these associations are the main task of second language learning.

The paradox is that these same verbs already require a preposition with a very comparable meaning, if they have any, in the L2 learners’ native languages. So, the explanation for the absence of the preposition cannot be that the features that are not instantiated in the L1 are not
acquirable in the L2, as proposed by the Failed Functional Features Hypothesis (Hawkins & Chan, 1997), because these same features are instantiated in the L1s of the learners. Rather, it seems that the difficulty remains in the associations between the verb and the preposition and their syntactic consequences, because these associations need to be relearned, or remapped, as proposed by the Reassembly Features Hypothesis (Lardiere, 2008, 2009; Slabakova, 2009a).

Finally, the on-line reading comprehension task also demonstrated that L2 learners, if they deleted a constituent, they did it as long as it is recoverable and understandable according to the context. This fact is not a trivial one since deletion-up-to-recoverability is assumed to be a universal principle and therefore it is a further piece of evidence confirming that interlanguage grammars are constrained by UG.

To summarize, this study has presented certain divergence between native and non-native grammars in production and in grammaticality judgments, but not in processing or comprehension. The divergence can come in the form of L1 transfer (i.e. Preposition Stranding for the English group, resumptive pronouns for the Arabic group), as would be predicted by the Full Transfer / Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996). However, there are others factors that condition the L2 grammatical representations that cannot be explained by L1 transfer or the target input. Particularly, the persistent Null-Prep phenomenon is not the result of L1 transfer because neither English, nor Arabic allow to delete obligatory prepositions in oblique relative clauses. We will explore more in depth the effect of L1 transfer and the Null-Prep phenomenon in the next sections.
7.3. L1 Transfer

7.3.1. Transfer of Grammatical Representations

L1 transfer in the form of preposition stranding or resumptive pronouns, depending on the L1, has been attested in this dissertation, in both, production and acceptability data. These results are generally consistent with the Full Transfer / Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996)\textsuperscript{45}. However, this hypothesis would also predict that pied-piping, which exists in both L1 languages, would also transfer from the L1 and would not need to be learned. It is an empirical question whether the cases of PiP that we have found in this study are the result of L1 transfer, or the result of interlanguage development towards the target grammar. We would need further research comparing other L2 learners’ groups, particularly from background languages that do not allow pied-piping, or that only allow pied-piping in the formation of oblique relative clauses.

In chapter 4 it was hypothesized that L2 learners whose native language presents pied-piping would not have major problems constructing relative clauses. However, this prediction was not born out since English and Arabic speaking learners seem to have persistent problems when forming and judging oblique relative clauses in Spanish. So, although it is true that L1 transfer plays a role in the development of interlanguage grammars, as predicted by the FT/FA hypothesis, it is also true that there are other considerations such as typological differences and productivity of the particular structure that also play a role in the nature of L1 transfer and then, in the interlanguage grammar. Nonetheless, the fact that we found moderate positive correlations between Pied-Piping and proficiency in the production data suggests that convergence in this domain could be possible at more advanced L2 proficiencies.

\textsuperscript{45} Note that these results could also be consistent with the Fundamental Difference Hypothesis (Bley-Vroman 1990, 2009). However, as discussed later, if we do not assume further restructuring of the interlanguage grammar beyond the L1 (by means of accessing UG), we cannot explain the Null-Prep phenomenon.
Furthermore, the two major forms of L1 transfer that we found in the data, i.e.: preposition stranding and resumption, are not alike. Whereas production rates of PS in the English-speaking learners were very similar to the production rates of resumption in the Arabic learners, the grammaticality judgment task showed very different tendencies between the two groups. The English group scored around chance level at rejecting (or accepting) preposition stranding, indicating variability and certain instability in their judgments. Only three subjects correctly rejected all instances of preposition stranding, and two accepted all sentences with preposition stranding. With respect to the Arabic group, the acceptance of resumptive pronouns in relative clauses is much more persistent; actually, this is the structure the Arabic group preferred, with higher acceptance rates than the grammatical PiP. At the individual level, we find that five subjects from the Arabic group rated all sentences with resumptive pronouns as grammatical, and only one participant rejected all instances of resumptive pronouns.

The distribution of the production of these two structures was also very different: whereas we only found preposition stranding in the English-speaking participants with lower proficiency levels, we found resumption at all levels of proficiency in the Arabic group, indicating that, in effect, there are structures that are more persistent and more difficult to unlearn than others. Regardless of the fact that resumptive relatives do exist in Spanish, but preposition stranding is never a possibility, this asymmetry between resumption and preposition stranding can be explained in terms of typology. As predicted by the Noun Phrase Accessibility Hierarchy (Keenan & Comrie, 1977), resumptive relative clauses are common and very productive in the languages of the world; whereas preposition stranding is rather infrequent. In fact, preposition stranding is restricted to a few languages (English and some Scandinavian languages), although it is quite productive in these languages. So, the fact that resumption is crosslinguistically
common and unmarked seems to make it more persistent in the interlanguage grammar of the Arabic speakers.

On the other hand, we would have expected that resumption would have helped the interpretation of the sentence, at least compared to the Null-Prep condition, but the results indicate otherwise. Resumptive pronouns slightly improved the comprehension rates in the Arabic group, but not for the other two groups. This fact goes in line with Suñer’s (1998) analysis of resumption, which proposes that resumption in RCs is not a last resort phenomenon as it can be in island configurations\(^{46}\). In fact, as discussed in chapter 2, Suñer believes that resumption is not related to interpretation (and the natives’ results seem to corroborate her analysis since pronouns did not improve comprehension). Then, Suñer proposes that resumptive pronouns must be inserted at PF and not at LF, because the appearance of the pronoun does not affect the semantics of the sentence.

7.3.2. Transfer of Processing Strategies

The processing results found in these experiments clearly illustrate at least one of the universal principles in sentence parsing: the *Minimal Chain Principle* (De Vincenzi, 1991). Native and non-native speakers tried to integrate the filler as soon as possible; that is, at the verb region, so they did not postulate unnecessary chain members or waited to interpret the extracted element. This type of parsing has been termed as “filler-driven” (Fodor, 1978): once a constituent has been identified as displaced, the parser looks for a possible gap at the first potential position. The search is finished usually at reaching the verb, given that the verb can satisfy the filler’s thematic needs. In the on-line grammaticality judgment task (chapter 5), this

\(^{46}\) Our results of island configurations did not indicate that resumptive pronouns rescue island violations, at least not in comprehension. For similar results, see Heestand, Xiang & Polinsky, (in press). This is an interesting topic that deserves further investigation.
principle was observed in the shorter reading times for the PiP condition compared to the other ones, in which the verb region could not easily assign a thematic-role to the displaced element. This *match* effect was found across groups.

If this interpretation of the data is the correct one, then we can conclude that both, native and non-native speakers detected the ungrammaticality of the non-Pied-Piping conditions. Consequently, they could not identify the verbs without the pied-piped obligatory preposition as potential thematic assigners for the displaced constituent. Also, if this is the right interpretation, this is the most puzzling issue about the data that these experiments have provided. On the one hand, we have seen that L2 learners from both experimental groups presented difficulties at the level of oral production and grammaticality judgments, which can be considered overall grammatical representation. So, if we were to assume some type of grammatical deficit, and at the same time we assume a standard account of language architecture such as that the grammar feeds the parser (Clahsen & Felser, 2006; Juffs, 1995; Pritchett, 1992), or even a more radical approach such as Phillips’ *PIG* (1996): parser is grammar, then, how can we explain that the syntactic parser assigned different (native-like) structures from the ones postulated by the grammatical competence (non-native-like)? How can the parser parse those sentences correctly (in a native-like manner) and detect that those prepositionless verbs could not be the thematic assigners of the extracted DP if they did not have that grammatical knowledge in place? In other words, how can we explain divergent grammatical results but convergent sentence processing?47

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47 We could also entertain the idea of performance deficits, similarly to the proposal put forward by the *Missing Surface Inflection Hypothesis* (Prévost & White, 2000). However, this would not solve the puzzle since we will eventually need to decide which task(s) or domain(s) better reflect linguistic competence. Typically, processing is considered performance, and grammaticality judgments are considered a reliable indicator of linguistic knowledge. There is certain disagreement with (oral) production, although according to Ellis (2005), oral production is a good measurement of implicit knowledge, and then, of competence. In any case, the linguist can only measure competence indirectly, through performance, and it is really up to the linguist to decide what amount of linguistic knowledge is accounted for by the performance data.
I believe the explanation to this conundrum lies at least in two facts: transfer of L1 processing strategies, and the *look-ahead* effect. It is undeniable that the reaction times indicated that the preposition was properly perceived and that its perception had a significant effect in the verb region that resulted in shorter reading times. In other words, the preposition preconditioned the parser when looking for a potential thematic assigner: this look-ahead effect helped the filler identify the suitable thematic assigner faster.

We know that Pied-Piping is a possible strategy in both L2s, English and Arabic. So, why should these L2 learners not employ their native comprehending mechanisms to process the pied-piping relative clauses in their second language? But the parser is supposed to build only structures that are compatible with the grammar; therefore, we need to argue that, at some level, these L2 learners need to have pied-piping in their L2 grammars to process and comprehend these sentences correctly. And it is likely that this pied-piping property is transferred from the L1. Further research should compare these results with data from L2 learners of Spanish whose native language does not allow pied-piping.

Recent research on the L2 acquisition of highly frequent words such as articles and clitics (Pierce & Ionin, in press; Rodgers, in press) has shown that short functional words are difficult to acquire because L2 learners do not even perceive them. Crucially, these studies explored categories that did not have lexical equivalents in the learners’ L1s (Korean and Chinese does not have articles; English does not have clitics). So, the fact that English and Arabic speakers did read properly short functional categories such as prepositions, even when they may not be completely aware of their obligatoriness, seems to indicate that the L1, which does have prepositions, helped recognize, perceive and finally process the preposition in the appropriate
place. It remains for further research if this pied-piping effect would also occur in an oral modality, in which the learners would need to perceive the preposition from the oral input.

Everything seems to imply that Pied-Piping needed to be somehow present in the non-native grammars, possibly through L1 transfer; otherwise the parser would not have been able to process it correctly. Processing accounts such as Carroll (1999), or Pritchett (1992) fully contemplate L1 processing transfer, so this option is a feasible explanation. The question would be, then, why, if Pied-Piping seems to be part of the grammar of the L2 learners and it is transferable at the processing level, did it not transfer at the production level? We will explore this issue in the next section.

7.3.3. Production vs. Processing vs. Comprehension

We have so far proposed that the similar patterns between native and non-native grammars in processing may be due to transfer of L1 processing strategies, but this transfer may not be fully available at other linguistic domains. This explanation is tenable assuming that each grammatical domain is independent, assuming a modular view of the language capacity. As a result these modules can have different developmental stages.

It is possible and very reasonable to think that production is delayed with respect to processing, in the same way that comprehension appears earlier than production in language acquisition. For instance, it is generally assumed that production, by definition, implies learned material. In our data, production is definitely less target-like than comprehension. Ferreira & Swets (2005) also found dissociation between the production system and the comprehension system with respect to resumptive pronouns in relative clause island contexts. They found that

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48 These authors include grammaticality judgments as part of the comprehension system, whereas I have distinguished between comprehension and intuitional data throughout the study.
the participants (native speakers) judged sentences as unacceptable but at the same time, they produced those sentences. And concluded that “the two systems do not consult the exact same database of grammatical rules, as indicated by the finding that the production system allows the island + resumptive structure to leak through, but the comprehension system tends to reject them” (Ferreira & Swets, 2005:276). It needs to be said that this result is somehow unexpected in native speakers because in psycholinguistic research, the production system is usually considered the supervisor of (or at least a more consciously controlled system) than the comprehension system. This relationship between production and comprehension, on the other hand, could be differently associated in L2 grammars.

In the present study, L2 learners failed to provide the obligatory preposition in production and accepted sentences without this preposition in certain constructions, showing an apparent incomplete grammatical representation that affected production, but apparently it did not affect comprehension. Also, the pied-piped preposition did not significantly improve the L2 correct answers in the comprehension questions, as it did for native speakers. However, according to the reaction times, they were still able to perceive and process the pied-piped preposition in a native-like manner, suggesting, as in the Ferreira and Swets study, that the same speakers can consult somewhat different databases for each linguistic module or domain. Thus, we can hypothesize that the L2 processing and comprehension domains were able to access some type of information that it was not yet available to the production module, something quite straightforward if we assume that semantics is universal and that parameterization mainly lies on reassembling features. It remains to be seen whether one particular module has priority over others, and whether one of them is the most reliable indicator of the speaker’s grammatical competence.
7.4. The Null-Prep Phenomenon

We know that the L1 transfer effects can be one of the biggest challenges to overcome when learning a second language. However, the Null-Prep phenomenon cannot be explained as L1 transfer because neither English nor Arabic present it. On the other hand, the Null-Prep phenomenon cannot be explained either as the result of the L2 input or as convergence with the target language because this structure is hardly found in standard Spanish, the variety that these L2 learners were exposed to. So, at first sight, Null-Prep could seem to be an instance of a fundamental difference between L2 grammars and native grammars. However, hypotheses that do not assign a particular role to UG, either proposing the existence of wild or rogue grammars (Thomas, 1991; Hamilton, 1998; Klein 1993, 1995), or assuming permanently doomed L2 grammatical representations, such as the Fundamental Difference Hypothesis (Bley-Vroman, 1990, 2009) cannot explain either how come the Null-Prep, which is a phenomenon that occurs in the natural languages in the world, also occurs in interlanguage grammars.

On the one hand, colloquial French (Bouchard, 1981), and Brazilian Portuguese (Tarallo, 1983; Kato, to appear; Kato & Nunes, 2007) are two Romance languages that do accept Null-Prep as an alternative option together with Pied-Piping relatives (7.1).

(7.1) a. Le gars (de) que(l) je te parle, il est correct.  
   The guy (to) that I Cl.2ps talk, he is ok
   ‘The guy that I talk to you (about) is correct’

b. A moça (com) que(m) conversei ontem já partiu.  
   The girl (to) that talked.1ps yesterday already left
   ‘The girl that I talked (to) yesterday already left’
In fact, Brazilian Portuguese displays Null-Prep not only in relative clauses, but also in D-linked wh-questions (7.2a), topicalization constructions (7.2b), and cleft sentences (7.2c). So, the question of whether Null-Prep is an instance of a *wild* grammar is out of the equation.

(7.2) a. (Com) que jornalista você conversou esta manhã?
   With what journalist you talked this morning?
   ‘(To) which journalist did you talk this morning?’
   
b. (Com) aquela moça eu conversei ontem.
   That girl I talked yesterday
   
c. Foi (com) essa professora que eu conversei ontem.
   Was (to) this teacher that I talked yesterday
   ‘It was (to) this teacher that I talked yesterday.’

If, on the other hand, we assume that interlanguage grammars are not guided by Universal Grammar then, we cannot explain that the L2 learners are using neither an L1 strategy, nor an L2 option, but a third alternative which is found in other natural languages. Moreover, the Null-Prep cannot be explained by frequency effects because it is not generally found in the input, a fact which lead to challenge general emergentist theories (N. Ellis, 1998, 2007; MacWhinney, 1999; O’Grady, 1999, 2001). Consequently, only if we assume that interlanguage grammars are one way or another guided by UG, can we explain the emergence of Null-Prep.

In fact, the Null-Prep phenomenon, or more precisely, the lack of Pied-Piping, has also been attested in the child’s acquisition of other Romance languages, in French (Labelle, 1990, 1996;
Guasti & Shlonsky, 1995) and in Italian (Guasti & Cardinalletti, 2003). In English, McDaniel, McKee and Berstein (1998) also reported that kids generally avoid pied-piping in production and in comprehension. So, the tendency to avoid Pied-Piping, and as a result producing Null-Prep, is not exclusive to second language learners. In Romance first language acquisition, these data, together with the use of resumptive pronouns in L1, have been shown as evidence for a nonmovement account of relative clauses, something similar to resumptive relatives, assuming a base generated operator in Spec,CP and A-bar binding of a null resumptive pronoun (Labelle, 1996). However, this nonmovement alternative is not so sound for L2 learners, especially if we take into account that these speakers already fully master wh-movement in their native languages, as the general rejection of the island violations suggested. Another alternative assuming wh-movement has also been proposed for L1 acquisition, in which there is a general-purpose empty operator (Guasti, 2002). Even though it does not explain the absence of PiP or the disappearance of the obligatory preposition, this analysis is appropriate for the grammar that these L2 learners already had. Therefore, I am going to assume that Null-Prep relatives have a based generated complementizer and an empty operator that moves from the argument position to Spec,CP, as in (7.3).

(7.3)  

\[
\begin{align*}
&\text{DP} \\
&\text{\textit{la} \textit{el} \textit{wi} \text{persona \textit{chico}}} \\
&\text{\textit{que} \text{TP}} \\
&\text{\textit{Juan confía \textit{ti}}} \\
\end{align*}
\]
The other question that needs to be considered is whether the preposition moves with the null-operator. Dekydtspotter et al. (1998) assumed argumental preposition incorporation into the verb, so the object *pro* could be licensed by the verb, following Baker (1988). They further justified their analysis with Jourdain’s (1996) L2 French data, who found an asymmetry between arguments and adjuncts with respect to Null-Prep. Unfortunately, the data presented in this dissertation cannot tease apart arguments from adjuncts with respect to the Null-Prep phenomenon, because the production data only considered arguments, but at least we can corroborate that the Null-Prep can be found in argumental positions. The following proposal is Dekydtspotter et al. (1998) analysis for verb incorporation:

\[
\begin{align*}
(7.4) & \quad \text{VP} \quad \text{eo} \quad \text{VP} \\
& \quad 3 \quad V \quad PP \quad V \quad PP \\
& \quad 2 \quad 2 \quad 3 \quad P \quad NP \quad V \quad P \quad P \quad NP \\
& \quad ec
\end{align*}
\]

On the other hand, Kato & Nunes (2007), and Kato (to appear) propose that the preposition is optional when they are inherent case assigners. So, the manifestation of the preposition is a lexical idiosyncratic matter, related to certain thematic roles. If the Brazilian Portuguese speaker chooses to have the preposition, (when it is an optional one), then the whole derivation would have the preposition. If, on the other hand, the preposition never enters into the derivation, and therefore there is a DP with an unvalued case, in order for the derivation to be well-formed, that caseless DP needs to move to an A-bar position in which the DP can be assigned default case. Kato (1999) proposed that the default case in Brazilian Portuguese is nominative. The same test
with strong pronouns can be done for Spanish: yo, me gusta la cerveza, so we can safely assume that default case in Spanish is also nominative.

Any of these two analyses, i.e. preposition incorporation or lexical optionality, would account for the Null-Prep data found in this dissertation, but taking into account the screening process for the experiments, in which less than half of the participants made the cut (the remaining participants had to be discarded because they did not know that those verbs needed a preposition), we can assume that subcategorization knowledge of prepositional verbs is quite unstable and difficult to master, even when the subcategorization frame is identical in the native language. And knowing that optionality is one of the distinctive traits of L2 languages, even at near-native stages, (Sorace, 1999, 2000, 2003), it is not difficult to hypothesize that almost meaningless prepositions could be an optional feature for these intermediate learners, especially in A-bar positions, where DPs can be licensed through default case. Furthermore, as the comprehension question results showed, the lack of a preposition did not significantly cause a worse interpretation of the sentence compared to its PiP counterpart, so it did not cause special recoverability problems. Therefore, these L2 learners who produced Null-Prep never selected the preposition from the Functional Lexicon and then, the preposition never entered into the derivation.

Further research should explore whether there are certain verbs which are more biased to have optional prepositions than others, and whether other A-bar positions such as questions or topicalizations also present optional preposition.

In summary, the proposal is that Null-Prep is an interlanguage stage, fully available on account of UG, which intermediate or even advanced second language learners, as well as first language learners, go through at some point or another in the development of oblique relative
clauses. This intermediate stage is the result of presenting optionality of the obligatory preposition in certain verbs, where the preposition is not crucial for the meaning of the sentence, and when the DP is going to be in an A-bar position. So, instead of getting the case from the preposition, it will get it by default. This optionality can eventually disappear, as the correlations between proficiency and pied-Piping, and proficiency and Null-Prep seem to indicate, especially in the English-speaking learners, displaying potential full convergence with the target grammar. Under this account, Null-Prep in interlanguage grammars is neither more economical, nor more costly than Pied-Piping, (see Dekydtspotter et al., 1998) since both constructions require the same derivation steps (Merge and Move). Finally, as the island results indicated, Null-Prep relatives, as well as PiP relatives, involve movement.

7.5. Pedagogical Implications

Traditionally, theoretical SLA research grounded in generative grammar is not concerned with the outcomes of second language classrooms, or with the success of certain instructional methodologies over others. As a discipline within the cognitive sciences, linguistics and psycholinguistics are interested in describing the human language capacity and ultimately the human mind. The process of acquiring a second language is considered a process of memorizing a new lexicon, restructuring the L1 by means of resetting parameters, and adopting new structures that UG makes available. In this approach, the impact of language instruction and input exposure is usually downplayed. And while it is true that certain principles are innate and do not need to be learned, such as deletion-up-to-recoverability or the minimal chain principle, there is no doubt that the acquisition of oblique relative clauses, in both the L1 and the L2, requires a considerable amount of input/time exposure to be learned, given the fact that oblique
relative clauses are not very common in the input. Moreover, as Guasti and Cardinaletti (2003) argued for L1 acquisition, pied-piping is a late-learned structure; and it needs exposure to a formal variety of the language and explicit teaching to be properly learned. Similarly, the non-native learners, even when their native languages already present pied-piping, need to be exposed to this type of structure and receive explicit instruction about it. Otherwise, as this dissertation has shown, other probably more natural or unmarked non-target forms such as Null-Prep, resumption or subject relatives are easily produced instead. Therefore, studies like this one can be useful for language teachers by pinpointing the most vulnerable or hard-to-master parts of grammatical competence.

For instance, this dissertation showed that oblique relative clauses, more than subject or direct object relative clauses, need special attention in the classroom. In fact, it is prepositions, an almost functional category, that need all the attention. One of the biggest problems that this study encountered was to find L2 learners with the right knowledge about the subcategorization frame of the prepositional verbs. Even when those verbs also required a preposition in the L2 learners’ native language, this was a difficult endeavor. It would be very beneficial for the learners that when new vocabulary is introduced in class, it is done not only with the meaning of the new lexical item but also with its syntactic requirements such as the subcategorization frame or the gender assigned to that word. This could make the acquisition process more difficult or costly at the beginning, but much more beneficial in the long run.

7.6. Conclusions

This dissertation has found that the acquisition of oblique relative clauses in Spanish is a problematic area for second language learners. We have seen that the L1 can play an important
role in the development of the interlanguage grammar, both, as a facilitator and as an obstacle. On the one hand, the L1 can temporarily prevent production and grammatical judgments from being completely target-like. On the other hand, the fact that pied-piping also existed in the native languages of the participants is hypothesized to have helped the learners perceive and process the preposition in the L2. Hence, L1 transfer is adopted, as hypothesized by the Full Transfer / Full Access Hypothesis, but this transfer may occur asymmetrically, at different moments and in different domains. Furthermore,

In addition, evidence for a UG-constrained interlanguage grammar is attested in the form of Null-Prep. This dissertation provided an account for Null-Prep relative clauses, a phenomenon that systematically appears in the development of oblique relative clauses. I proposed that Null-Prep is a natural language phenomenon that consists of optionality of the preposition in the derivation, and the possibility for a DP to get default case in an A-bar position, following Kato (to appear). Crucially, Null-Prep relative clauses involve movement. Optionality would be predicted on highly functional and therefore almost meaningless prepositions, but not on prepositions that would jeopardize the interpretation of the sentence. The comprehension results further corroborated that the appearance of the preposition does not put at risk the overall meaning of the sentence. This is a different approach to optionality than the one Sorace (2003) proposes, since she predicts that optionality would occur on interpretable features, in end-state grammars. However, this dissertation did not deal with ultimate attainment or end-state grammars, so the issues may be different with different populations.

Evidently, when considering the Null-Prep phenomenon as a UG-constraint interlanguage grammar, we also assume a Full Access to Universal Grammar, since Null-Prep is not instantiated in the L1 grammars of the learners, or the target input. The differences found
between native speakers and non-native speakers with respect to oblique relative clauses seem to lie more on the production and judgment of the constructions rather than on processing. The Shallow Structure Hypothesis (Clahsen & Felser, 2006) cannot entirely capture the asymmetries found in this study. This hypothesis proposed that L2 processing is shallow because L2 grammatical representations are incomplete. By shallow, they mean that L2 processing is unable to use syntactic detail in language comprehension, and as a result, they need to rely exclusively on lexical-semantic cues. The data presented here seems to indicate that even though there may be divergent grammatical representations, there is not a shallow processing because of that. Nonetheless, a caveat is in place because the data provided here do not allow differentiating between a verb-based and a structure-based gap-filling strategy in L2 learners. The data presented in this study can be explained by a lexical approach to language processing. That is, the match effect found in the processing experiment can be explained by both types of sentence processing: one using syntactic detail, or one using lexical-semantics cues to interpretation. In fact, the available data do not allow distinguishing between these two. In that sense, this study does not completely disconfirm the shallow structure hypothesis, but it does prove that L2 learners follow universal processing mechanisms.

Convergence in processing may be explained either proposing transfer of L1 processing strategies or because each grammatical domain has different developmental stages. So, although L2 learners fail to provide the obligatory preposition and accept sentences without this preposition in certain constructions, they are still able to process the preposition in a native-like manner either because they can transfer that property from their L1 or because this particular property has developed earlier in processing than in production.
Finally, these facts highlight the importance of taking into account different types of data, i.e. production, grammatical judgments, processing, etc. when we want to fully characterize the learner’s linguistic system.
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APPENDIX A: SCREENING TEST

Language background questionnaire (confidential)

Email address: ________________________________

1. Age: ___________________________ Sex: ________________________________
2. Place of Birth, City: ___________________________ Country: __________________
3. Occupation: _____________________________________________________________
4. What is/are you mother tongues? ____________________________________________
5. What language/s did you speak at home as a child? ______________________________
   If you were educated in different languages, were they simultaneous or was there a
   change of language in your education? At what age? Please, explain
   __________________________________________________________________________
   __________________________________________________________________________
6. At what age did you start studying Spanish? _________________________________
7. How many years have you studied Spanish? _________________________________
8. Spanish courses taken at High school: ________________________________________
9. Spanish courses taken at College: ____________________________________________
10. In which languages were you educated?
    Elementary school: _________________________________________________________
    High school: _______________________________________________________________
    University: _________________________________________________________________
11. Have you lived in another place besides the USA? _____, Where? _____________ For
    how long? __________________________________________________________________
12. Have you studied Spanish in a Spanish-speaking country? __________ For how long?
    __________________________________________________________________________
13. What other languages do you speak besides English and Spanish?
    __________________________________________________________________________
14. Comments you want to add:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
La Química y la vida

Nos rodea, se encuentra allí donde miremos, pero la mayoría no lo sabemos. Hogares, alimentos, nuestro propio cuerpo, allí ___1___ la Química, esa ciencia que habla ___2___ la composición íntima de las sustancias y sus transformaciones, a partir de ___3___ se crean productos artificiales. ___4___ en la antigüedad se la relacionaba con pócimas mágicas, piedras filosofales y elixires de la vida, en los últimos cincuenta años su poder no ha ___5___ de crecer. Hoy en día los productos químicos ___6___ estrechamente relacionados con la existencia del ser humano. ___7___ los beneficios que esta industria ha generado en la lucha contra las enfermedades, en gran parte, su imagen depende ___8___ la industria y su relación con el medio ambiente. Desde los años 80, en muchos países han proliferado colectivos que ___9___ producto químico con tóxico o contaminante, algo que debe evitarse ___10___ ser peligroso, lo que ha producido en ocasiones una verdadera quimiofobia. ___11___ personas que sueñan ___12___ el temor de que el continuo contacto con la Química en los alimentos, en la ropa y en el aire ___13___ ocasione problemas de salud. Esta desconfianza cuenta ___14___ el rechazo de determinados colectivos que erróneamente ___15___ que el uso de productos químicos equivale a un aumento de peligrosidad. Un uso racionalizado y un conocimiento preciso de las características de los productos químicos ___16___ han invadido nuestra vida parece ___17___ la solución. Es necesario entender que hay padres que cuando rechazan el uso de productos químicos sólo piensan ___18___ el futuro de sus hijos, pero por otra parte, debemos señalar qué ___19___ de verdad en muchos de los informes que circulan sobre los distintos materiales químicos y saber interpretarlos y ___20___ entre hechos científicos y mensajes alarmistas. Quizás deberíamos confiar más _________ los avances científicos.

1. a) es   b) está   c) hay
2. a) de   b) en   c) Ø
3. a) como   b) la cual   c) que
4. a) Si bien   b) Por cierto   c) Sin embargo
5. a) detenido   b) resultado   c) dejado
6. a) son   b) tienen   c) están
7. a) A pesar de   b) Por mucho que c) Aunque
8. a) Ø   b) en   c) de
9. a) se identifiquen b) identifican   c) identifiquen
10. a) para   b) por   c) con
11. a) Eran        b) Son       c) Están
12. a) con        b) Ø         c) de
13. a) las        b) se        c) les
14. a) con        b) en        c) Ø
15. a) crean      b) creen     c) cree
16. a) que        b) los que   c) los cuales
17. a) ser        b) estar     c) haber
18. a) Ø          b) de        c) en
19. a) hay        b) está      c) tiene
20. a) aportar    b) relacionar c) discernir
21. a) que        b) Ø        c) en

2- VOCABULARIO

22. Nos dijo mamá que era hora de comer y por eso _____________.
   a) fuimos a nadar   b) tomamos asiento  c) comenzamos a fumar  d) nos acostamos pronto
23. ¡Cuidado con ese cuchillo o vas a __________ el dedo!
   a) cortarte        b) torcerte    c) comerte        d) quemarte
24. Tuvo tanto miedo de caerse que se negó a __________ con nosotros.
   a) almorzar        b) charlar     c) cantar        d) patinar
25. Abrió la ventana y miró: en efecto, grandes lenguas de ______salían llameando de las casas.
   a) zorros         b) serpientes c) cuero        d) fuego
26. Compró ejemplares de todos los diarios pero en vano. No halló ____________ .
   a) los diez centavos b) el periódico perdido  c) la noticia que buscaba  d) los ejemplos
27. Por varias semanas acudieron colegas del difunto profesor a ________ el dolor de la viuda.
   a) aliviar        b) dulcificar  c) embromar    d) estorbar
28. Sus amigos pudieron haberlo salvado pero lo dejaron ____________.
   a) ganar        b) parecer      c) perecer     d) acabar
29. Al salir de la misa me sentía tan caritativo que no pude menos que ____________ a un pobre mendigo que había allí sentado.
30. Al lado de la Plaza de Armas había dos limosneros pidiendo _________.
   a) pedazos  b) paz    c) monedas  d) escopetas
31. Siempre maltratado por los niños, el perro no podía acostumbrarse a _____ de sus nuevos amos.
   a) las caricias  b) los engaños  c) las locuras  d) los golpes
32. ¿Dónde estará mi cartera? La dejé aquí mismo hace poco y parece que el necio de mi hermano ha vuelto a _________.
   a) dejármela  b) deshacérmla  c) escondérmla  d) acabármela
33. Permaneció un gran rato abstraído, los ojos clavados en el fogón y el pensamiento _____.
   a) en el bolsillo  b) en el fuego  c) lleno de alboroto  d) Dios sabe dónde
34. En vez de dirigir el tráfico estabas charlando, así que tú mismo ___________ del choque.
   a) sabes la gravedad b) eres testigo c) tuviste la culpa d) conociste a las víctimas
35. Posee esta tierra un clima tan propio para la agricultura como para _________.
   a) la construcción de trampas b) el fomento de motines c) el costo de la vida d) la cría de reses
36. Aficionado leal de obras teatrales, Juan se entristeció al saber __________ del gran actor.
   a) del fallecimiento b) del éxito c) de la buena suerte d) de la alabanza
37. Se reunieron a menudo para efectuar un tratado pero no pudieron ______________.
   a) desavenirse  b) echarlo a un lado  c) rechazarlo  d) llevarlo a cabo
38. Se negaron a embarcarse porque tenían miedo de ________________.
   a) los peces    b) los naufragios  c) los faros  d) la playas
39. La mujer no aprobó el cambio de domicilio pues no le gustaba ___________.
   a) el callejero  b) el puente  c) esa estación  d) aquel barrio
40. Era el único que tenía algo que comer pero se negó a ________________.
   a) hojearlo  b) ponérselo  c) conservarlo  d) repartirlo
Completa las oraciones con la información que tienes…

Ejemplo

Los compañeros se ríen del chico.
Ejemplo

¿Quién es este chico?

Este es el chico... del que se ríen los compañeros.

Slide 4

La chica está cortando verduras.

Slide 5

Ejemplo

¿Qué es esto?

Estas son las verduras... que está cortando la chica.
La actividad empieza aquí…

Para moverse, la chica depende de la enfermera.

¿Quién es esta mujer?

Esta es la enfermera ……
Slide 9

El chico carga cajas pesadas

Slide 10

¿Qué es esto?

Estas son las cajas pesadas...

Slide 11

Los compañeros de oficina piensan en la secretaría constantemente.
Slide 12

Los compañeros de oficina piensan en la chica constantemente.
¿Quién es esta chica?
Esta es la secretaria....

Slide 13

El niño pinta dibujos en el cuaderno.

Slide 14

El niño pinta dibujos en el cuaderno.
¿Qué es esto?
Estos son los dibujos...
El chico sueña con una vaca voladora.

¿Qué es esto?

Esta es la vaca voladora....

La bibliotecaria ordena los libros en la biblioteca.
La bibliotecaria ordena los libros en la biblioteca.

¿Qué es esto?

Estos son los libros...

Para hacer la tarta, la niña cuenta con la cuidadora.

¿Quién es esta mujer?

Esta es la cuidadora...
Slide 21

El hombre lava los platos con agua caliente.

Slide 22

El hombre lava los platos con agua caliente.

¿Qué es esto?

Estos son los platos...

Slide 23

La niña y el niño hablan del profesor en la clase.
La niña y el niño hablan del profesor en la clase.
¿Quién es este hombre?
Este es el profesor...

La mujer está leyendo el periódico.

¿Qué es esto?
Este es el periódico...
Para ganar, los niños confían en la entrenadora.

¿Quién es esta mujer?
Esta es la entrenadora...

Los señores observan el cuadro.
Los señores observan el cuadro.

¿Qué es esto?

Este es el cuadro...
APPENDIX C: ON-LINE GRAMMATICALITY JUDGMENT TASK

Pied-Piping

El profesor estudió a la mujer de la que la niña dependía de verdad económicamente. 
Esta frase, ¿está bien? Y

El director conoció a la actriz de la que la chica hablaba de corazón constantemente. 
Esta frase, ¿está bien? Y

La profesora escribió al escritor en el que el chico pensaba en serio continuamente. 
Esta frase, ¿está bien? Y

La policía escuchó a la abuela con la que la madre contaba con cariño frecuentemente. 
Esta frase, ¿está bien? Y

El dentista escribió al hombre con el que el médico soñaba con frecuencia repetidamente. 
Esta frase, ¿está bien? Y

La peluquera peinó al actor en el que el director confiaba en secreto indudablemente. 
Esta frase, ¿está bien? Y

Resumptive Pronoun

La turista observó a la chica que la pianista dependía de ella económicamente. 
Esta frase, ¿está bien? Y

El escritor invitó al ganador que el editor hablaba de él constantemente. 
Esta frase, ¿está bien? Y

El jugador conoció a la mujer que la actriz pensaba en ella continuamente. 
Esta frase, ¿está bien? Y

El médico saludó al abuelo que el maestro contaba con él repetidamente. 
Esta frase, ¿está bien? Y

El senador recibió a la actriz que la modelo soñaba con ella frecuentemente. 
Esta frase, ¿está bien? Y

La doctora visitó al muchacho que el director confiaba en él indudablemente. 
Esta frase, ¿está bien? Y
Null-Prep

El vendedor engañó a la chica que la clienta dependía de verdad económicamente.  
Esta frase, ¿está bien?  N

El escritor premió al profesor que el muchacho hablaba de verdad constantemente.  
Esta frase, ¿está bien?  N

El jugador conoció a la actriz que la cantante pensaba en realidad continuamente.  
Esta frase, ¿suena bien?  N

La médica observó a la maestra que la madre contaba con frecuencia repetidamente.  
Esta frase, ¿suena bien?  N

Preposition Stranding

La vendedora miró a la mujer que el hombre dependía de económicamente.  
Esta frase, ¿suena bien?  N

El escritor premió al profesor que la chica hablaba de constantemente.  
Esta frase, ¿suena bien?  N

El jugador conoció a la actriz que el chico pensaba en continuamente.  
Esta frase, ¿está bien?  N

La médica diagnosticó al maestro que el padre contaba con repetidamente.  
Esta frase, ¿está bien?  N

El fotógrafo observó a la hermana que la actriz soñaba con frecuentemente.  
Esta frase, ¿está bien?  N

El director visitó al muchacho que el vendedor confiaba en indudablemente.  
Esta frase, ¿está bien?  N
Island Configuration: Pied-Piping

La mujer que Marcos dormiría mejor si Pedro no dependiera económicamente es muy fuerte.
Esta frase, ¿está bien? N

La mujer que Pedro correría más si Marta no hablara constantemente es muy joven.
Esta frase, ¿está bien? N

El hombre que Marta sería feliz si Pedro no pensara continuamente es muy alegre.
Esta frase, ¿está bien? N

La mujer que Marta callaría más si Marcos no contara repetidamente es muy amable.
Esta frase, ¿está bien? N

La mujer que Juan respiraría mejor si Pedro no soñara frecuentemente es muy inteligente.
Esta frase, ¿está bien? N

El hombre que María llegaría antes si Miguel no confiara perdidamente es muy constante.
Esta frase, ¿está bien? N

Island Configuration: Resumptive Pronoun

La mujer que Marcos dormiría mejor si Pedro no dependiera económicamente de ella es muy fuerte.
Esta frase, ¿está bien? Y

La mujer que Pedro correría más si Marta no hablara constantemente de ella es muy joven.
Esta frase, ¿está bien? Y

El hombre que Marta sería feliz si Pedro no pensara continuamente en él es muy alegre.
Esta frase, ¿está bien? Y

La mujer que Marta callaría más si Marcos no contara repetidamente con ella es muy amable.
Esta frase, ¿está bien? Y

La mujer que Juan respiraría mejor si Pedro no soñara frecuentemente con ella es muy inteligente.
Esta frase, ¿está bien? Y

El hombre que María llegaría antes si Miguel no confiara perdidamente en él es muy constante.
Esta frase, ¿está bien? Y
La mujer que Marcos dormiría mejor si Pedro no dependiera económicamente es muy fuerte. Esta frase, ¿está bien? N

La mujer que Pedro correría más si Marta no hablara constantemente es muy joven. Esta frase, ¿está bien? N

El hombre que Marta sería feliz si Pedro no pensara continuamente es muy alegre. Esta frase, ¿está bien? N

La mujer que Marta callaría más si Marcos no contara repetidamente es muy amable. Esta frase, ¿está bien? N

La mujer que Juan respiraría mejor si Pedro no soñara frecuentemente es muy inteligente. Esta frase, ¿está bien? N

El hombre que María llegaría antes si Miguel no confiara perdidamente es muy constante. Esta frase, ¿está bien? N
APPENDIX D: ON-LINE READING COMPREHENSION TASK

Piep-Piping

El profesor estudió a la mujer de la que la niña dependía de verdad económicamente. ¿La niña dependía de una mujer? Y

El director conoció a la actriz de la que la chica hablaba de corazón constantemente. ¿La actriz hablaba de una chica? N

La profesora escribió al escritor en el que el chico pensaba en serio continuamente. ¿El chico pensaba en un escritor? Y

La policía escuchó a la abuela con la que la madre contaba con cariño frecuentemente. ¿La abuela contaba con la madre? N

El dentista escribió al hombre con el que el médico soñaba con frecuencia repetidamente. ¿El médico soñaba con un hombre? Y

La peluquera peinó al actor en el que el director confiaba en secreto indudablemente. ¿El actor confiaba en el director? N

Resumptive Pronoun

La turista observó a la chica que la pianista dependía de ella económicamente. ¿La chica dependía de una pianista? N

El escritor invitó al ganador que el editor hablaba de él constantemente. ¿El editor hablaba de un ganador? Y

El jugador conoció a la mujer que la actriz pensaba en ella continuamente. ¿La mujer pensaba en una actriz? N

El médico saludó al abuelo que el maestro contaba con él repetidamente. ¿El maestro contaba con el abuelo? Y

El senador recibió a la actriz que la hermana soñaba con ella frecuentemente. ¿La actriz soñaba con la hermana? N
La doctora visitó al muchacho que el director confiaba en él indudablemente. ¿El director confiaba en el muchacho? Y

**Null-Prep**

El vendedor engañó a la chica que la clienta dependía de verdad económicamente. ¿La chica dependía de la clienta? N

El escritor premió al profesor que el muchacho hablaba de verdad constantemente. ¿El muchacho hablaba de un profesor? Y

El jugador conoció a la actriz que la cantante pensaba en realidad continuamente. ¿La actriz pensaba en una cantante? N

La médica observó a la maestra que la madre contaba con frecuencia repetidamente. ¿La madre contaba con la maestra? Y

El fotógrafo fotografió al muchacho que el actor soñaba con cariño frecuentemente. ¿El muchacho soñaba con un actor? N

La secretaria observó al novio que el amigo confiaba en serio secretamente. ¿El amigo confiaba en el novio? Y

**Adjunct Pied-Piping**

El médico visitó a la chica con la que la ganadora corrió con mucho entusiasmo. ¿El médico corrió con la chica? N

La clienta engañó a la novia para la que la muchacha bailó para ganar dinero. ¿La muchacha bailó para la clienta? N

El artista conoció al maestro con el que el niño dibujó con colores excelentes. ¿El artista dibujó al niño? N

El policía observó al abuelo con el que el nieto paseó con mucha prisa. ¿El nieto paseó con el abuelo? Y

El director escribió a la maestra contra la que el chico luchó contra todo pronóstico. ¿El chico luchó contra la maestra? Y

El cliente recibió a la directora para la que la chica trabajó para ganar dinero. ¿La chica trabajó para la directora? Y