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The effect of recent L1 exposure on Spanish attrition: An eye-tracking study

Gloria Chamorro

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Declaration

I hereby declare that this thesis is of my own composition, and that it contains no material previously submitted for the award of any other degree. The work reported in this thesis has been executed by myself, except where due acknowledgement is made in the text.

Gloria Chamorro

Abstract

Previous research has shown L1 attrition to be selective (Gürel 2004) and often restricted to structures at the interfaces between syntax and context/pragmatics, but not to occur with syntactic properties that do not involve such interfaces (*Interface Hypothesis*, Sorace & Filiaci 2006). This is supported by many studies exploring cross-linguistic influence effects in interface structures, such as the production and/or interpretation of null versus overt pronominal subjects, not only in L1 attriters (Tsimpli et al. 2004, Montrul 2004) but also in other bilingual groups with different language combinations, such as early bilinguals (Paradis & Navarro 2003, Sorace et al. 2009), and advanced late bilinguals (Belletti et al. 2007, Rothman 2009). The current hypothesis is that individual L1 attrition affects only the ability to process interface structures but not knowledge representations themselves (Sorace 2011).

In this thesis, we first compared a well-studied syntax-pragmatics interface phenomenon (pronominal subjects in Spanish) with a non-interface structure (the Spanish personal preposition *a,* also known as Differential Object Marking, DOM). In Spanish, the distribution of null and overt subject pronouns is pragmatically constrained, whereas the presence of the preposition just depends on the animacy and specificity of the direct object. Participants included a group of attrited speakers of L1 Spanish who had been living in the UK for a minimum of 5 years, and a group of Spanish monolinguals. Using a naturalness judgment task and eye tracking while reading, participants were presented with anaphoric sentences in which number cues matched or mismatched predicted antecedent preferences (i.e. null pronoun: subject

preference; overt pronoun: object preference). The DOM study also used a mismatch paradigm, crossing preposition presence (*al* vs. *el*) with animacy, where an animate object requires the prepositional form *al* and an inanimate object requires the article *el*. Offline ratings revealed equal mismatch sensitivity for both groups of participants with both structures. However, eye-tracking measures showed that monolinguals were reliably more sensitive than attriters to the pronoun mismatch, while both groups showed equal on-line sensitivity to the DOM mismatch, which reveals that attrition affects interface structures, but not non-interface structures.

Second, we investigated the effects of recent (re)exposure to L1 input on attrition. A second group of attriters carried out the same experiment after having been exposed exclusively to Spanish in a monolingual Spanish-speaking environment for a minimum of a week. Their eye-tracking results patterned with the monolingual group. This novel manipulation shows that attrition effects decrease as a result of L1 exposure, which reveals that bilinguals are sensitive to input changes and that attrition affects online sensitivity rather than causing a permanent change in speakers' L1 grammatical representations.

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CHAPTER 1

Introduction

1.1 Background and scope of the thesis

The present thesis focuses on first language attrition, which refers to those changes that take place in certain aspects of a speaker's L1 as the result of the acquisition of an L2 at an adult age when the L1 acquisition process has been completed.

First language attrition and to a greater extent bilingual first language acquisition and adult second language acquisition have been widely explored in relation to many factors, such as the stages in which they take place, the contexts in which they occur and the factors affecting them. More recent research has focused on the effect of the *Interface Hypothesis* (Sorace & Filiaci 2006), which postulates that structures that involve an interface between syntax and other cognitive domain, such as syntax-semantics or syntax-pragmatics, will be more difficult to be completely acquired than structures that do not involve such interface. The current hypothesis is that individual L1 attrition affects only the ability to process interface structures but not knowledge representations themselves (Sorace 2011).

The prediction made by the Interface Hypothesis has been supported by many studies exploring cross-linguistic influence effects at the mentioned interfaces in different bilingual groups, which addressed aspects such as the effects of semantic or discourse factors in the acquisition of word order (Hertel 2003, Montrul 2004a,

Belletti et al. 2007, Lozano 2006, Hopp 2009, Wilson 2009), or the influence of pragmatics in the acquisition of null versus overt pronominal subjects and objects (Paradis & Navarro 2003, Tsimpli et al. 2004, Serratrice et al. 2004, Montrul 2004b, Belletti et al. 2007, Argyri & Sorace 2007, Sorace et al. 2009, Lozano 2009, Rothman 2009, Serratrice et al. 2011).

This research will specifically explore two issues in relation to L1 attrition. First, it will investigate the kind of structures that are more likely to undergo this phenomenon, addressing the effects of attrition in a structure at the syntax-pragmatics interface, such as pronominal subjects, in comparison with a non-interface structure, such as personal *a*, in speakers of Spanish L1 with a prolonged exposure to English L2, in order to investigate whether attrition effects are restricted to only structures involving interfaces. Following the predictions made under the Interface Hypothesis, attrition effects will be expected with the interface structure, that is, with pronouns, whereas personal *a* is expected to show no indeterminacy.

Secondly, this study will explore whether attrition constitutes permanent changes in speakers' L1 grammatical representations or just a lack of online sensitivity when processing these structures in real time. Following the Activation Threshold Hypothesis (Paradis 1993), which predicts that L1 attrition will occur when an element in the L1 is disused and it has a corresponding "competing" element in the L2 that is used more frequently, a second group of attriters will be tested after being recently exposed exclusively to their L1, Spanish, to see whether attrition can decrease or disappear after a prolonged exposure to the L1. This issue is a novel and an important one because it directly tackles the cognitive effects that attrition has in the bilinguals' L1 and the effects of input and exposure in the maintenance of their L1. If results show less or no attrition after L1 exposure, this will suggest that bilinguals are sensitive to input changes and that attrition effects are due to an online insensitivity in real time rather than to a permanent change in the attriters' L1 grammatical representations.

1.2 Research questions

Considering the mentioned phenomena under investigation, the following research questions will be addressed:

(i) Following the Interface Hypothesis (Sorace & Filiaci 2006), will attriters show indeterminacy with an interface structure but not with a non-interface structure?

(ii) If they do, does attrition affect online sensitivity when processing these structures in real time or is it due to permanent changes in attriters' L1 grammatical representations?

(iii) Following the Activation Threshold Hypothesis (Paradis 1993) and the Interface Hypothesis (Sorace 2011), does attrition decrease or disappear due to frequency and recency of (re)exposure to the L1?

1.3 Experiments

In order to explore the previous research questions, three different groups were recruited to be tested: a group of native Spanish speakers living in the UK for a minimum of five years (attriters), a group with the same characteristics as the attriters who were exposed exclusively to Spanish for a minimum of a week (exposed), and a control group of native Spanish speakers who had just arrived to the UK (monolinguals). The term "monolinguals" will be used in the present study to refer to the control group of Spanish speakers, who have very little knowledge of English. However, considering that English is currently a mandatory subject in Spanish education, we assume that most of the participants will have had some previous contact with the language. Each of these three groups carried out two

different tasks in a single experimental session: an offline naturalness task and an online eye-tracking experiment.

Two structures were included for comparison in each one of the tasks, one at the syntax-semantics/pragmatics interface and a non-interface structure:

- Interface structure: Overt versus null subject pronouns in intra-sentential anaphora in which the number feature is manipulated to either agree or disagree with the pronoun information. (Experiments 1A and 1B)

- Non-interface structure: The Spanish personal preposition *a* with animate versus inanimate direct objects. (Experiments 1C and 1D)

Both structures under investigation were presented together in a single experiment, so each of the sections presented in Chapters 5 and 6 as Experiments 1A, 1B, 1C and 1D are part of the same experiment and were carried out simultaneously by each participant in a single session. The session was designed to be carried out as a single task, in which participants had to read the sentence that was shown in the computer screen (a sentence containing a pronoun, a sentence containing personal preposition or a filler), which was used as the online eye-tracking-while-reading data, and then rate each sentence in terms of its naturalness, which was used as the off-line judgment data. However, since the data were analysed separately (online and offline tasks for each of the two structures) they will be reported as four independent experiments.

1.4 Organization of the thesis

The present thesis will be structured as follows:

- Chapter 2 will describe the distribution and interpretation of pronominal subjects in Spanish and English, introducing theories of anaphora resolution and research on pronoun processing.
- Chapter 3 will introduce personal *a* and its distribution in Spanish in comparison with English, together with the few studies previously carried out on this structure.
- In Chapter 4, I will present previous research on L2 acquisition and L1 attrition, especially in relation to structures at the syntax-pragmatics interface.
- Chapter 5 will present the study and the experiments carried out on pronouns together with the results obtained.
- Chapter 6 will present the experiments on the Spanish personal preposition *a* and their results.
- Finally, Chapter 7 will provide a discussion on the findings and conclusions obtained from this investigation, and its impact for future research.

CHAPTER 2

Pronominal subjects in null and non-null subject languages

2.1 Introduction

There is a vast amount of research on L2 acquisition that investigates the production and interpretation of structures that require the integration of syntax and other cognitive domains, such as pronominal subjects, which is a structure at the syntax-pragmatics interface. As it will be presented in Chapter 4, much of this research focuses on the acquisition and processing of pronouns in null-subject languages like Italian or Spanish.

Null subject languages, also known as pro-drop languages, are those that allow the subject of a finite sentence to be phonetically empty. Therefore, these pro-drop languages, such as Spanish, Italian or Japanese, allow for two different types of pronouns to occur: a null pronoun, also known as *pro*, and an overt pronoun, which is phonetically realized. On the other hand, non-null subject languages, such as English, German or Dutch, allow null subjects to occur only in very limited contexts.

In this chapter, I will analyze the differences between null and non-null subject languages in relation to the distribution of subject pronouns, which is one of the structures included in my study, as well as the differences between null and overt pronouns and how their interpretation differs depending on the linguistic context.

2.2 Null versus non-null subject languages

Null subject languages are characterized by allowing the subject position of a finite clause to be phonetically empty. Therefore, whereas pro-drop languages allow for either a null or an overt subject to appear as the subject of a sentence, as (2.1a) illustrates for Spanish, in non-null subject languages the use of a null subject is usually ungrammatical, as (2.1b) shows for English. Moreover, the Null Subject Parameter (Rizzi 1982, 1986; Borer, 1989) establishes other properties associated with null-subject languages apart from allowing empty pronouns: the possibility for subject-verb inversion and the lack of *that*-trace effects.

(2.1) a. Pedro/*pro* salió del restaurante.

b. Peter/**pro* left the restaurant.

The proposal of an empty category was first made by Chomsky (1982), who proposed the Extended Projection Principle (EPP), according to which the subject position in a sentence must be always filled. Therefore, in those instances in which the subject of a sentence is not phonetically realized, the EPP predicts that the syntactic category is filled with a null subject (i.e. *pro*), which is phonetically empty.

The availability for some languages to allow for null subjects, while others do not allow them has often been associated with morphological features. Most null subject languages, such as Italian or Spanish, have a rich verbal agreement, which allows the speaker to recover the information about person and number, so that inflection licenses null subjects (Rizzi 1982, 1986; Borer, 1989). On the other hand, in most non-null subject languages, like English, the verbal agreement does not indicate person and number, so the speaker needs the subject to communicate that information. As Table 2.1 illustrates for the verb *to sing* in the indicative present simple, while Spanish shows a different verbal agreement for every person, in English all persons are exactly the same except for the third person singular.

	Spanish	**English**
1st person sing.	cant*o*	sing
2nd person sing.	cant*as*	sing
3rd person sing.	cant*a*	sing*s*
1st person plural	cant*amos*	sing
2nd person plural	cant*áis*	sing
3rd person plural	cant*an*	sing

Table 2.1. Indicative present paradigm in Spanish and English.

This relationship between rich verbal morphology and null subject license has not been shown to hold for all null-subject languages, such as Chinese, in the same way that not all non-null subject languages show a "poor" inflectional morphology, as is it the case of German (Huang 2000). Nevertheless, what is really relevant for the present study is the fact that Spanish is a null subject language, and allows for null and overt subjects to occur, whereas English is a non null-subject language and the use of null subjects is very restricted.

There are two well-known cases in which English allows subject drop: VP coordination and "diary style". In the case of VP coordination, a null subject is allowed to occur in coordinated clauses in which the subject of the coordinated clause is the same as that of the main clause, as in (2.2). Or if two antecedents are presented in a coordinated sentence, an overt pronoun will be interpreted as referring to the object, and a null pronoun will be interpreted as referring to the subject, as in (2.3). On the other hand, "diary style" refers to the kind of structures used in diaries, postcards, emails, text messages, etc., which usually have null subjects, as (2.4) illustrates, with the standard interpretation being 1st person singular. There is also

another case mentioned in Quirk et al. (1985) that refers to subject drop in informal speech, which is interpreted as non-referential 3rd person singular, as in (2.5).

(2.2) John went to the store and (he) bought some wine.

(2.3) $John_i$ met with $Paul_j$ and he_j/pro_i bought some wine.

(2.4) (I) Just arrived in Istanbul, (I) went directly to the hotel.

(2.5) (It) Must be freezing outside.

The next section will introduce how null and overt pronouns in pro-drop and non-pro-drop languages are distributed syntactically, in relation to features such as topic and focus.

2.2.1 The topic/focus distinction in null versus non-null subject languages

As it was introduced before, pro-drop languages like Spanish syntactically allow both null and overt subjects, whereas non-null subject languages like English does not. However, the distribution of null and overt subjects is pragmatically constrained by the features *topic* and *focus*. Specifically, in Spanish a null subject will be used when the referent has been previously introduced (i.e. when it is a topic), whereas a subject will be overt if there is a change of referent or it introduces new information (i.e. when it is the focus).[1]

It is important to mention that word order also plays a role in the distribution of overt subjects in Spanish. Unlike English, where subjects always occur preverbally, in Spanish they are allowed to appear either in preverbal or in postverbal

[1] See Gundel and Fretheim (2004) for a detailed discussion on the difference between topic and focus.

position, which is also constrained by the features *topic* and *focus*. Therefore, as Table 2.2 shows, in Spanish, while unfocused (topic) subjects appear in preverbal position, a postverbal position will correspond to a focused or new subject (Zubizarreta 1996, Ordóñez and Treviño 1999).

	[-focus] / [-topic shift]	[+focus] / [+topic shift]
Spanish	**preverbal overt/null** subject ***Pedro/pro*** *salió*	**postverbal overt** subject *Salió* ***Pedro***
English	preverbal overt **unstressed** subject ***Peter*** *left*	preverbal overt **stressed** subject ***PETER*** *left*

Table 2.2. Subject position in focused vs. unfocused contexts in Spanish and English.

As Table 2.2 illustrates, in English, the distinction between focus and topic subjects is carried out via prosody, with focused subjects carrying prosodic stress (Zubizarreta and Nava 2011).

The distribution established for null and overt subjects can also be extended to pronominal subjects. That is, in pro-drop languages a null subject pronoun will be used when the referent has been previously introduced, whereas an overt subject pronoun will be used in focused contexts. For non-null subject languages, Luján (1985) establishes that the distinction between unstressed and stressed pronominal subjects is equivalent to the distinction between null and overt subject pronouns found in pro-drop languages. That is, null pronouns in Spanish would correspond to unstressed pronouns in English, whereas overt pronouns in Spanish would correspond to stressed pronouns in English.

Finally, it is important to point out that the choice of a null or an overt pronoun depends on the linguistic context and that it leads to interpretative differences. The next section will focus on how null and overt pronouns are

interpreted in null subject languages, and how this interpretation may differ between pro-drop languages.

2.3 Anaphora resolution in null-subject languages

In Section 2.2, some differences between null and non null-subject languages were discussed, particularly regarding their availability for null and overt subjects and pronouns, and what they convey pragmatically in relation to topic and focus features. In this section, I will introduce several hypotheses that have tried to account for the interpretation of these pronominals depending on the context in which they appear, which will show how anaphora resolution requires the integration of syntactic and pragmatic information.

Montalbetti (1984) proposed the Overt Pronoun Constraint (henceforth, OPC), by which he stated that overt pronouns cannot be interpreted as bound variables, unless a null pronoun is not allowed to occur in that particular case. That is, in (2.6a) the overt pronoun *ellos* "they" cannot be interpreted as be coreferential with the subject *muchos estudiantes* "many students" because, as (2.6b) shows, a null pronoun is allowed to occur in that instance, which would have a bound reading (i.e. coreferential with the subject of the main clause). Therefore, the overt pronoun in (2.6a) can only be interpreted as a free variable (i.e. a third person). Moreover, apart from the bound reading mentioned before, the null pronoun in (2.6b) could also have a free reading.

(2.6) a. Muchos estudiantes creen que **ellos** son inteligentes.

"Many students believe that they are intelligent."

b. Muchos estudiantes creen que ***pro*** son inteligentes.

"Many students believe that (they) are intelligent."

On the other hand, in order to account for the antecedent preferences of null and overt subject pronouns, Carminati (2002) proposed the Position of Antecedent Hypothesis (henceforth, PAH) for Italian intra-sentential anaphora. The PAH postulates that null pronouns prefer to be assigned to the antecedent in the highest SpecIP (generally the subject), as (2.7a) shows, whereas overt pronouns prefer to be assigned to an antecedent in a syntactic position that is lower than the SpecIP (generally the object), as illustrated in (2.7b).

(2.7) a. Quando Mario$_i$ ha telefonato a Giovanni$_j$, *pro*$_i$ aveva appena finito di mangiare.

"When Mario has telephoned Giovanni, (he) had just finished eating."

b. Quando Mario$_i$ ha telefonato a Giovanni$_j$, lui$_j$ aveva appena finito di mangiare.

"When Mario has telephoned Giovanni, he had just finished eating."

The PAH was shown by Alonso-Ovalle et al. (2002) to hold for Spanish, whereas they claim that the OPC fails to predict the behavior of overt pronouns in Spanish. Alonso-Ovalle et al. carried out their study on Iberian Spanish using five questionnaire experiments, from which the first one was directly compared to Carminati's (2002) study. In this experiment, participants were presented with sentences like the ones in (2.8) and asked to choose the referent that the subject pronoun in the second sentence of each pair of sentences referred to (either the subject *Juan* or the object *Pedro*).

(2.8) a. Juan pegó a Pedro. *pro* está enfadado.

"Juan hit Pedro. (He) is angry."

b. Juan pegó a Pedro. Él está enfadado.

"Juan hit Pedro. He is angry."

The results revealed that when *pro* was the subject, as in (2.8a), 73.2% of the responses chose the subject of the previous sentence as the antecedent, but when participants were presented with an overt pronoun, as in (2.8b), 50.2% of the responses chose the subject of the first sentence as the referent, a difference that was highly significant ($p < .001$). Like for Italian, these results show that the PAH correctly predicts that the null pronoun prefers to be assigned to the subject antecedent also in Spanish, whereas the choice of antecedent for the overt pronoun was not so straightforward, which suggests that there might be other factors affecting pronoun resolution and the antecedent preference other than the difference between null and overt pronouns. Some of these factors, such as gender and number features, causality and plausibility, and recency and prominence, will be discussed in Sections 2.3.1, 2.3.2 and 2.3.3 respectively.

The results from Alonso-Ovalle et al. (2002) also suggest that there might be some differences among pro-drop languages in relation to the distribution of overt subject pronouns. Filiaci (2010) and Filiaci et al. (2010) tested Carminati's PAH to explore the possibility of existing differences among pro-drop languages in relation to the distribution of overt subject pronouns. They investigated whether Spanish monolinguals are more willing to accept a prominent antecedent (i.e. the subject) as the referent for an overt subject pronoun than Italian monolinguals, using sentences in which the pronominal subject could potentially refer to either the subject or the object referents, but it was semantically disambiguated at the end of the sentence, as in (2.9) for Italian and (2.10) for Spanish. They found that while for the null pronoun there are no cross-linguistic differences between Italian and Spanish speakers, with both groups preferring the subject as its antecedent, they seemed to differ in relation to overt pronouns: Italian speakers consistently prefer to assign a non-prominent

antecedent (i.e. the object referent) for overt subject pronouns, whereas Spanish speakers might assign either the prominent or the non-prominent antecedent.

(2.9) a. Dopo che Giovanni$_i$ ha criticato Franco$_j$ cosí ingiustamente, lui$_{i(/j)}$ si è scusato ripetutamente.

b. Dopo che Giovanni$_i$ ha criticato Franco$_j$ cosí ingiustamente, *pro*$_{i(/j)}$ si è scusato ripetutamente.

“After that John has criticised Franco so unjustly, (he) apologized repeatedly.”

c. Dopo che Giovanni$_i$ ha criticato Franco$_j$ cosí ingiustamente, lui$_{(i/)j}$ si è sentito offeso.

d. Dopo che Giovanni$_i$ ha criticato Franco$_j$ cosí ingiustamente, *pro*$_{(i/)j}$ si è sentito offeso.

“After that John has criticised Franco so unjustly, (he) felt offended.”

(2.10) a. Cuando Ana$_i$ visitó a María$_j$ en el hospital, ella$_{i(/j)}$ le llevó un ramo de rosas.

b. Cuando Ana$_i$ visitó a María$_j$ en el hospital, *pro*$_{i(/j)}$ le llevó un ramo de rosas.

“When Ana visited Mary in the hospital, (she) brought her a bunch of roses.”

c. Cuando Ana$_i$ visitó a María$_j$ en el hospital, ella$_{(i/)j}$ ya estaba fuera de peligro.

d. Cuando Ana$_i$ visitó a María$_j$ en el hospital, pro$_{(i/)j}$ ya estaba fuera de peligro.

“When Ana visited Mary in the hospital, (she) was already out of danger.”

As it will be discussed in Chapter 4, many studies on L2 acquisition have shown that bilingual children (Paradis & Navarro 2003, Serratrice et. al 2004, Argyri & Sorace 2007, Sorace et al. 2009), near-native speakers (Belletti et. al 2007, Lozano 2009, Rothman 2009), and L1 attriters (Gürel 2004, Tsimpli et. al 2004)[2] overextend the use of overt pronouns in the pro-drop language to contexts in which monolinguals would use null pronouns, due to the influence of the non-null subject language. Nevertheless, overextension of null pronouns in the pro-drop language was not found. Most of this research concluded that the indeterminacy shown by L2 learners and L1 attriters with structures at the syntax-pragmatics interface, such as pronominal subjects, is related to processing difficulties as the result of speakers having to integrate several sources of information from different cognitive domains.

Moreover, the overextension of overt pronouns could also be related to bilinguals' executive functions. As it has been demonstrated in the psycholinguistic literature, monolinguals are different from bilinguals in their executive functions, not only because bilinguals' both languages are simultaneously active, but also because bilinguals have to switch between languages and therefore need to exercise inhibition to avoid interference from the undesired language (Green 1998, Costa et al. 2000). In relation to anaphora resolution, the accessibility of the reference changes all the time when bilinguals speak because of the different linguistic contexts in which pronouns are used, so a constant update of the mental model is needed. That is, not only do bilinguals need to inhibit the unwanted language, but they also have to have the ability to update the representation of the context in order to use the appropriate pronoun and interpret the appropriate antecedent, which is a very costly process. And sometimes the need to inhibit the undesired language may take attentional resources away from the linguistic task, resulting in the bilinguals interpreting the wrong antecedent (Sorace 2011). On the other hand, as Sorace (2011) points out, indeterminacy with pronoun resolution has also been revealed in other populations sensitive to cognitive loss, such as ageing speakers (Titone et al. 2000), patients

[2] See Section 2.2 in Chapter 4 for a discussion on the studies on the L2 acquisition of subject pronominals.

diagnosed with schizophrenia (Phillips & Silverstein, 2003) and children with autism (Arnold et al. 2009), which suggests that pronouns are a costly structure to process not only for bilinguals and L2 speakers.

2.3.1 Gender and number features in pronoun resolution

As it was mentioned before, apart from the syntactic/pragmatic differences between null and overt pronouns, there are other factors that have also been shown to influence the choice of referent in anaphora resolution, such as gender and number features. Carreiras et al. (1993), Garnham et al. (1995) and Carreiras (1997) tested the online processing of gender and number features with Spanish monolinguals and showed that gender and number cues influence pronoun interpretation in Spanish. This was also shown for Italian by Cacciari et al. (1997) and Carminati (2005).

Garnham et al. (1995) carried out a self-paced reading task with Spanish speakers from Spain. Participants were presented with sentences about people, as in (2.11a), and things, as in (2.11b), in which the main clause included two antecedents with either the same gender (the same gender as the pronoun) or with different genders, and the subordinate clause included the object pronoun, either masculine or feminine.

(2.11) a. Ricardo/Alicia arrestó a Pablo porque lo descubrió robando un coche.

Richard/Alice arrested Paul because pro him-ACC found stealing a car

“Richard/Alice arrested Paul because he/she found him stealing a car.”

b. El camión/la grúa remolcó al autobús porque lo inmovilizó la nieve.

The-MASC truck/The-FEM breakdown truck towed the-MASC bus because pro it-MASC-ACC immobilized the snow-NOM

"The truck/the breakdown truck towed the bus because it was stuck in the snow."

Participants were asked to read the sentences and then answer a yes/no question about them, such as "Did Richard/Alice see Paul stealing a car?" or "Did Paul see Richard/Alice stealing a car?" The results revealed that the reading times of the sentences with antecedents of different genders (gender cue condition) were faster than the reading times of the sentences with antecedents of the same gender (no gender cue condition), for both the "people" and "things" sentences. The same results were also revealed in a very similar study by Carreiras et al. (1993) and for Italian in Cacciari et al.'s (1997) study, which suggests that pronoun interpretation is influenced by gender cues.

Similarly, Carminati (2005) tested the implication of the *Feature Hierarchy* (Person > Number > Gender) for the interpretation of null pronouns in Italian using a self-paced reading task. Carminati proposed the *Feature Strength Hypothesis*, which postulates that the higher a feature is in the hierarchy, the more cognitively significant it will be and the better it is at disambiguating pronouns. Italian monolinguals were presented with semantically ambiguous sentences, in which *pro* was disambiguated towards the object antecedent using gender cues, as in (2.12a), or number cues, as in (2.12b). Results showed that, as predicted by the Feature Strength Hypothesis, number features were more effective than gender features in indicating the correct antecedent for the pronoun. Moreover, since Italian verbal agreement includes person and number features together, it was also shown that disambiguation by person together with number is more effective than by number features only.

(2.12) a. Quando Maria cerca Roberto, diventa ansioso.

When Maria looks for Roberto, pro becomes anxious-MASC

"When Maria looks for Roberto, (he) becomes anxious."

b. Quando i Rossi cercano Roberto, diventa ansioso.

When the Rossis-PL look for Roberto, pro becomes anxious-MASC.

"When the Rossis look for Roberto, (he) becomes anxious."

The influence of gender features in anaphor resolution has also been shown in English by some eye-tracking studies (Carreiras et al. 1996, Sturt 2003), which revealed that reading times were longer in cases of gender mismatch, that is, sentences containing an anaphor (*himself/herself*) whose gender mismatched the stereotypical gender of the antecedent it referred to (*nurse/minister*). Thus, in a sentence like "She was surprised that the nurse criticized himself/herself for being late for the appointment", the pronoun *himself* would show longer RTs than the pronoun *herself*.

Therefore, it seems that pronoun resolution is not only influenced by syntactic and pragmatic information, but that features like gender and number also play a role. The present study will investigate anaphora resolution including number features in order to disambiguate the anaphora and point towards a specific antecedent as the referent for the pronoun, as we have seen in the studies presented in this section.

2.3.2 Causality and plausibility in pronoun resolution

Another factor that affects speakers' choice of antecedent in anaphora resolution that has been widely addressed in the literature is implicit causality, which is closely related to plausibility.

Implicit causality is a property that some verbs have to bias a particular interpretation, assigning the cause of the event described in the sentence to a specific antecedent, either the subject or the object of the main clause (Caramazza et al.

1977). Therefore, in sentences like (2.13) and (2.14), the antecedent for the pronoun *he* is ambiguous between the subject and the object since both referents are male, so other cues such as implicit causality influence the interpretation of the sentence. It is the information given in the subordinate clause what helps disambiguating the sentence. In (2.13), the subordinate clause says that "he was really angry", and since the verb in the main clause is "to hit" (and not "to apologize", for example), it is only semantically plausible that the event described in the subordinate clause, which is the cause for the event of "hitting", is attributed to "John". In (2.14), on the other hand, the subordinate clause says that "he stole the money", so the cause of "hitting" should now be attributed to "Paul" for the sentence to be semantically plausible.

(2.13) $John_i$ hit $Paul_j$ because he_i was really angry.

(2.14) $John_i$ hit $Paul_j$ because he_j stole the money.

The term plausibility refers to what speakers think to be semantically possible in a sentence and it reflects how they perceive and interpret sentences. In relation to pronoun resolution, plausibility would refer to the antecedent speakers think is likely to be the referent of an ambiguous pronoun, depending on the semantic context of a sentence and speakers' interpretation of the event in question.

There is a vast amount of research that investigated the effects of implicit causality in anaphora resolution by manipulating the congruency of the sentence, that is, if the implicit causality bias of the verb in the main clause was congruent or incongruent with the pronoun in the subordinate clause in terms of the semantic information given by the subordinate clause (Stewart et al. 2000, Long & De Ley 2000, Koornneef & van Berkum 2006, Featherstone & Sturt 2010, among many others). These studies used gender and verb bias to create incongruent sentences, which presented a conflict between the gender of the pronoun and the verb bias, each information pointing towards a different antecedent, as in (2.15a), and congruent sentences, in which the information given by both the pronoun and the verb pointed towards the same antecedent, as in (2.15b).

(2.15) a. John hit Mary because he stole the money.

b. John hit Mary because she stole the money.

The results from these studies revealed longer reading times for the incongruent sentences than for the congruent sentences, revealing that it is more difficult to process sentences that contain a pronoun that is inconsistent with the verb bias than sentences in which the pronoun is consistent with the verb bias. Therefore, these studies suggest that implicit causality, together with semantic plausibility, influence pronoun interpretation.

2.3.3 Prominence and recency in pronoun resolution

There is also a great amount of research (Arnold 1998, Gundel 1999, Stewart et al. 2000, Garnham 2001, Van Gompel & Majid 2004, among others) that suggests that anaphora resolution is influenced by the prominence of the antecedent, which is influenced among other factors by the recency in which the referent appears on the discourse.

Specifically for pronoun resolution, prominence refers to the status of the different antecedents within the discourse. Pronouns usually refer to highly prominent entities in the discourse, but the extent to which those entities are prominent has been shown to depend on several factors. Some of the factors that contribute to the prominence of an antecedent are frequency and saliency of the word, topicality, subjecthood and recency. In relation to the frequency of a word, Van Gompel & Majid (2004) explained that the more infrequent a word is, the more attention it attracts (i.e. the more salient), so the more easily it will be remembered. Topicality predicts that a focus antecedent will be more prominent than a topic antecedent (see Section 2.2.1 for a detailed discussion on the topic/focus articulation). In terms of subjecthood, it is expected that a subject antecedent will be

more prominent than an object antecedent (Arnold 1998). Finally, the recency factor predicts that, given an anaphor in which different antecedents are equally plausible to corefer with the pronoun, the antecedent chosen will be the most recent one, that is, the one that appeared in the discourse closest to the pronoun (Arnold 1998).

Considering all the factors that contribute to the prominence of an antecedent, when speakers are presented with an ambiguous anaphor, their choice of referent will be influenced by its prominence in the discourse context and they will choose the most prominent antecedent from all the plausible ones. Many studies have found this to be true for pronoun resolution, showing that coreference with more prominent antecedents is easier to process (i.e. the processing load is lower) than less prominent antecedents (Garnham 2001, Gundel 1999, Stewart et al. 2000).

2.4 Summary

In this chapter, the concept of null and non-null subject languages has been introduced, together with the distribution of null and overt pronouns in these two types of languages, analyzing the differences between English and Spanish in relation to the use of subject pronouns.

In the second part of the chapter, the interpretation of pronominals in relation to several theories of anaphora resolution have been discussed, with especial emphasis on Carminati's Position of Antecedent Hypothesis, which will be the account followed in the present thesis to predict attriters' strategy for pronoun resolution.

Finally, in the last section, anaphora resolution has been shown to be affected by more than just the syntactic-pragmatic division of labor between null and overt pronouns, but also by other factors like gender and number features, implicit causality and plausibility and prominence and recency.

As it was mentioned before, the present study will investigate pronoun resolution using number features to disambiguate the anaphora and point towards a specific antecedent as the referent for the pronoun. This structure at the syntax-pragmatics interface will be compared to a non-interface one, the personal preposition *a*, in order to test whether attriters will show indeterminacy with subject pronouns but not with personal *a*, as Sorace & Filiaci's (2006) Interface Hypothesis[3] predicts. The next chapter will present this second structure under investigation, the personal preposition *a*.

[3] As it will be discussed in Chapter 4, the Interface Hypothesis predicts that whereas L2 learners may show indeterminacy with structures that involve an interface between syntax and other cognitive domain, such as semantics or pragmatics, structures that do not involve such interface are completely acquirable.

CHAPTER 3

The Spanish personal preposition *a*

3.1 Introduction

In the previous chapter I introduced the main structure that is the object of the present study, pronominal subjects. As it was discussed, the appropriate use and interpretation of null and overt subject pronouns require the integration of syntax and pragmatics which, as the research presented in Chapter 4 will reveal, is more difficult to acquire and shows more indeterminacy than structures that do not involve such interfaces.

Therefore, the present investigation will include a second structure for comparison, the personal preposition *a*, whose use does not depend greatly on context and, as a result, no indeterminacy will be expected to be revealed in participants' performance with this structure.

This chapter will analyze the personal preposition, which occurs in languages like Spanish, Turkish, Persian or Hindi but does not occur in English. In the second part of this chapter, the most relevant research that has previously been carried out on the acquisition of this structure will be presented.

3.2 The Spanish personal preposition *a*

The personal preposition, also called Differential Object Marking (henceforth, DOM), is a phenomenon present in some languages, such as Spanish or Romanian, by which some direct objects must be introduced by a dative preposition, *a* "to" in the case of Spanish. The presence or absence of this preposition is not random, but it depends on the type of direct object. Generally speaking, in Spanish, a direct object must be marked with the dative preposition if it is animate and specific, as (3.1a) below exemplifies. An animate and specific direct object that is not marked with the dative preposition would result in ungrammaticality, as (3.1b) shows.

(3.1) a. María vio **a**l[1] niño esta mañana.

María saw to+the kid this morning

b. *María vio el niño esta mañana.

María saw the kid this morning

"María saw the kid this morning."

Not all direct objects are marked with the dative preposition, but the presence or absence of the dative preposition would be determined by animacy and specificity. Therefore, cases such as animate but generic direct objects, as (3.2a), or inanimate direct objects, independently of the specificity, as (3.3a), would not be preceded by personal *a*. As before, animate but generic direct objects or inanimate direct objects that are marked with the dative preposition would be ungrammatical, as (3.2b) and (3.3b) show respectively.

(3.2) a. María vio un niño esta mañana.

[1] Note that *al* is the contraction of the preposition *a* and the masculine singular definite article *el.* This contraction does not occur with any other definite or indefinite article.

María saw a kid this morning

b. *María vio **a** un niño esta mañana.

María saw to a kid this morning

"María saw a kid this morning."

(3.3) a. María vio una película/la película esta mañana.

María watched a movie/the movie this morning

b. *María vio **a** una película/la película esta mañana.

María watched to a movie/the movie this morning

"María watched a movie/the movie this morning."

The factors that influence the presence or absence of the dative preposition have nonetheless posed some controversy in the literature. Apart from animacy and specificity, Torrego (1998) points out that there are other factors that influence the DOM, such as the aspect of the verb or the affectedness on the object. Moreover, Aissen (2003) proposes a scale of animacy and specificity by which the higher in prominence a direct object is in the scales of animacy and specificity, the more likely it is to be marked with the dative preposition. On the other hand, whereas for von Heusinger & Kaiser (2003) specificity is a motivating factor for a direct object to be marked with the personal preposition, Leonetti (2004) considers specificity as a marginal factor for the DOM. However, this complex picture about the personal preposition *a* will not be relevant for the present study, since the items used in the experiment will be just limited to the presence or absence of the personal preposition in relation to the animacy of the direct object, which is a common motivating factor in the literature.

There are other cases in Spanish, apart from the DOM, which also require the dative preposition *a* preceding the object, independently of the animacy or specificity of the object. This is the case of psych verbs like *gustar* "to like", *encantar* "to love", *molestar* "to bother", etc., which not only must be marked with the preposition but also with a clitic, as (3.4) illustrates for an animate object and (3.5) for an inanimate object.

(3.4) a. **A** María/una chica le gustó la película.

To María/a girl her liked the movie

b. *María/una chica le gustó la película.

María/a girl her liked the movie

"María/a girl liked the movie."

(3.5) a. **A** una productora/la productora le gustó la película

To a production company/the production company it liked the movie

b. *Una productora/la productora le gustó la película

A production company/the production company it liked the movie

"A production company/the production company liked the movie."

Similarly, indirect objects in Spanish must be introduced by the dative preposition *a*, independently of the animacy or specificity of the object. This structure may also include a dative clitic, although in this case the clitic would be optional. Some examples are given in (3.6) for an animate object and (3.7) for an inanimate object.

(3.6) a. María (le) regaló la película **a** su hermana/una amiga.

María (her) gave the movie to her sister/a friend

b. *María (le) regaló la película su hermana/una amiga.

María (her) gave the movie her sister/a friend.

"María gave the movie to her sister/a friend."

(3.7) a. María (le) vendió la película **a** una productora/la productora.

María (it) sold the movie to a production company/the production company

b. *María (le) vendió la película una productora/la productora.

María (it) sold the movie a production company/the production company

"María sold the movie to a production company/the production company."

Nevertheless, as it was mentioned before, this study will only be concerned with the uses of the dative preposition that are related to the DOM, that is, the personal preposition *a*, and the items used for the experiment will only manipulate the presence or absence of the preposition with animate versus inanimate direct objects, which will result in grammatical or ungrammatical sentences. The next section will present the little research that has been carried out in relation to the personal preposition *a*.

3.3 Acquisition of the Spanish personal preposition

Since the personal preposition *a* is not as common as other structures across languages, there are not many studies that have addressed the acquisition of this aspect. Nevertheless, some of this research has been carried out on Spanish. This

section will present the most relevant studies that investigate the acquisition and attrition of personal *a* in Spanish.

The only study that, to my knowledge, has been carried out on the L1 acquisition of the DOM in Spanish to date is Rodríguez-Mondoñedo's (2008) study. He investigated the production of personal *a* using spontaneous data from six Spanish-speaking children under the age of 3 from the CHILDES database. Rodríguez-Mondoñedo reported an accuracy rate of 98.38%: from a total of 991 sentences containing V-O, the children only made 17 errors, 8 uses of the preposition with inanimate and generic direct objects and 9 omissions of the preposition with animate and specific direct objects. These results clearly demonstrate that children acquire this structure at a very young age and are able to produce it very accurately.

A few studies have also explored the DOM phenomenon in Spanish L2 acquisition. Guijarro-Fuentes & Marinis (2007) investigated the acquisition of the Spanish personal *a* by English-speaking adult learners of Spanish from three different proficiency levels (low intermediate, high intermediate and advanced), together with a control group of Spanish monolinguals from Spain. Participants were asked to perform an Acceptability Judgment task with sentences that correctly or incorrectly contained or lacked the preposition. Two examples of the items used in their task are given below, with sentence (3.8) being unacceptable because there is no preposition with an animate and specific direct object, and sentence (3.9) being acceptable because there is no preposition with an inanimate and generic direct object. Participants were instructed to read the sentences and rate their acceptability in a scale from 1 to 4. Results showed that while the high intermediate and low intermediate groups performed at a chance level, the advanced group performed significantly better than the high intermediate and low intermediate groups, and the Spanish control group performed very accurately.

(3.8) Pedro no tiene tiempo para hacer las tareas de la casa, pues trabaja más de 40 horas a la semana. Un día, Pedro le pregunta a su madre sobre su mujer de la limpieza:

Busco tu mujer de limpieza, ¿sabes dónde Luisa vive ahora?

Pedro does not have time to do the housework because he works more than 40 hours per week. One day, Pedro asks his mother about her cleaner.

I'm looking for your cleaner. Do you know where Luisa lives?

(3.9) Theo está de vacaciones en el Canadá. Me escribe un mensaje diciéndome lo que hizo apenas llegó. Dice:

Ayer visité el Museo de Arte Contemporáneo.

Theo is on holiday in Canada. He wrote a text message telling me what he did when he arrived. He said:

Yesterday I visited the Contemporary Art Museum.

In a later study, Guijarro-Fuentes & Marinis (2009) investigated the acquisition of the personal preposition *a* by Catalan-Spanish and English-Spanish bilinguals, in comparison with a group of Spanish monolinguals. The Catalan-Spanish bilinguals acquired both languages when they were children in a naturalistic setting, and the English-Spanish bilinguals learned Spanish in the classroom in the UK[2]. Participants had to perform a Completion task, in which they were presented with sentences like (3.10), where the preposition must be used, or (3.11), where no preposition is required, and they were asked to either fill the gap with one word or

[2] Guijarro-Fuentes & Marinis (2009) classify the English-Spanish speakers as bilinguals, although they learned Spanish in the classroom and in an English-speaking country, so their exposure to Spanish was very limited. Moreover, in the Spanish placement test that participants had to complete before the experiment, both the monolingual group and the Catalan-Spanish bilinguals performed significantly better than the English-Spanish "bilinguals".

leave it empty. It is important to note that in Catalan, like in English, direct objects do not have to be preceded by a preposition. Results showed that the monolingual group performed very accurately and significantly different from the bilingual groups. Moreover, although the Catalan-Spanish bilinguals performed better than the English-Spanish bilingual group, this difference was not significant.

(3.10) Juan persigue ___ los presos que se han fugado de la cárcel.

"Juan chases the prisoners that have run away from the prison."

(3.11) La universidad necesita ___ estudiantes extranjeros para cubrir las plazas libres.

"The university needs more foreign students in order to cover all free vacancies."

There is no research on the personal preposition that addresses attrition in first generation attriters, but there are a few studies that have investigated attrition effects of this structure on heritage speakers. As it will be discussed in Chapter 4, "heritage speakers" differ from "first generation attriters" in that while L1 attriters totally acquire their L1 before it undergoes attrition under L2 exposure, heritage speakers usually have an incomplete knowledge of the L1 when they start acquiring the dominant L2, which eventually becomes stronger. Montrul & Bowles (2008, 2009, 2010) tested the knowledge of the DOM on Spanish heritage speakers living in the US, using an elicited written production task and a written grammaticality judgment task. For the production task, participants were presented with three words (two nouns and a verb in infinitive), and they were asked to write a sentence using the three words given and any other grammatical element that they needed in order to complete the sentence, as (3.12) shows for an animate object and (3.13) for an inanimate object.

(3.12) Prompt: estudiante / visitar / profesora

student / visit / professor

Grammatical response: El estudiante visitó **a** la profesora

"The student visited the professor."

(3.13) Prompt: Patricio / visitar / Museo del Prado

Patricio / visit / del Prado Museum

Grammatical response: Patricio visitó el Museo del Prado

"Patricio visited the del Prado Museum."

For the grammaticality judgment task, participants were presented with sentences that contained grammatical and ungrammatical uses of the DOM. Example (3.14) shows a correct use of the dative preposition with an animate direct object and example (3.15) an incorrect one. On the other hand, example (3.16) shows an ungrammatical use of the dative preposition with an inanimate object and example (3.17) a grammatical one.

(3.14) Marisa conoce **a** mi hermana.

"Marisa knows my sister."

(3.15) *El jefe escuchó la secretaria.

"The boss listened to the secretary."

(3.16) *Juan visitó **a** la biblioteca.

"Juan visited the library."

(3.17) El hombre escuchó el partido de fútbol en la radio.

"The man listened to the soccer game on the radio."

The results from Montrul & Bowles' (2008, 2009, 2010) studies showed an overacceptance and overproduction of ungrammatical sentences in which no dative preposition preceded animate direct objects, as in (3.15) above, even those speakers with advanced proficiency in Spanish. Montrul & Bowles (2009) tried to account for these findings proposing that they could be the result of the lack of perceptual salience of the structure in question. In many occasions, the final vowel of the verb and the preposition are reduced to one sound if the verb ends in [a], as in (3.18), or they are diphthongized, as in (3.19), which makes the preposition difficult to be heard. Moreover, as they point out, the omission of the personal preposition does not usually interfere with communication.

(3.18) Llama a María.

"(He/she) calls María. / Call María."

(3.19) Llamó a María.

"(He/she) called María."

Moreover, Montrul & Bowles (2010) further tested these heritage speakers after being exposed to language instruction on the DOM, which consisted of explicit grammatical instruction on the uses of the preposition and three practice exercises, after which participants received feedback on their performance. The results showed that heritage speakers' intuitions and production of the personal preposition were significantly better after they were explicitly instructed on how to use the structure.

The research presented in this section seems to reveal that the acquisition of the Spanish personal preposition *a* is a bit challenging for L2 learners (Guijarro-Fuentes & Marinis 2007, 2009) and heritage speakers (Montrul & Bowles 2008,

2009, 2010), although this does not seem to hold for L1 acquisition (Rodríguez-Mondoñedo 2008). Therefore, we can predict the L1 attriters in my study to have acquired the DOM completely before they arrived to the L2 setting, and since it is a non-interface structure, they are expected to show no attrition with it, and consequently to make no or very few errors.

3.4 Summary

This chapter has presented and analyzed the second structure that will be investigated in the study, the Spanish personal preposition *a*. This structure differs from pronominal subjects in that its use does not heavily depend on context, but its appropriate use is just motivated by factors such as the animacy and/or specificity of the direct object.

The second part of this chapter introduced the most relevant research that has previously been carried out on the acquisition and attrition of the DOM in Spanish. This research showed that whereas L2 learners and heritage speakers (Guijarro-Fuentes & Marinis 2007, 2009; Montrul & Bowles 2008, 2009, 2010) seem to have difficulties with the structure, the Spanish children in Rodríguez-Mondoñedo (2008) and the control groups of Spanish monolinguals in Guijarro-Fuentes & Marinis (2007, 2009) revealed almost no errors in their use of the preposition.

It is important to note that since this thesis addresses L1 attrition, the results obtained from the present study on the personal preposition *a* are expected to differ from those of Guijarro-Fuentes & Marinis' L2 speakers and Montrul & Bowles' heritage speakers, and to be similar to those of Rodríguez-Mondoñedo's children and Guijarro-Fuentes & Marinis' control groups. Therefore, Spanish L1 attriters are predicted to show no attrition with this structure since they completely acquired it before the onset of attrition.

CHAPTER 4

The syntax-pragmatics interface in bilingualism

4.1 Introduction

A great amount of the research on L2 acquisition focuses on the role that the L1 plays in the acquisition of an L2, and to a less extent on the influence of the L2 in the L1 of bilinguals, namely on L1 attrition. Ultimately, this research aims to account for the non-convergence and instability that adult L2 learners, but also bilingual L1 learners and L1 attriters, show with certain structures.

In the present thesis, I use the term *bilingual* to refer to those speakers who are fluent in two languages and use both of them regularly, although the extent to which each one is mastered or used may differ between the different kinds of bilingual. Therefore, I will distinguish between early and late bilingualism. The term *early bilinguals* will refer to bilinguals who acquired both languages simultaneously since birth (i.e. *simultaneous bilinguals*), or bilinguals whose first exposure to the second language was in their childhood (i.e. *consecutive bilinguals*), that is, up to and including the age of ten (Unsworth et al. 2011). On the other hand, *late bilinguals* will refer to bilinguals who acquired their L2 at an adult age but still reached a native-like or advanced level in the L2. Therefore, it is important to note that within the late bilingual group, we could distinguish between *near-native speakers* and *advanced L2 speakers*, depending on their L2 ultimate attainment.

In this chapter, I will introduce the research on L2 acquisition that focuses on structures that require the integration of syntax and other cognitive domain, such as pragmatics, like preverbal versus postverbal subjects or null versus overt subject pronouns, with a special emphasis on the studies that investigate the production and interpretation of the latter structure. I will present studies on early bilinguals, late bilinguals, and L1 attriters, although the main focus will be on L1 attriters, which will be discussed in Section 4.3 below. Finally, this chapter will also discuss the two approaches that have been proposed in the literature to account for the problems that interface structures cause for L2 acquisition and L1 attrition: crosslinguistic influence versus processing difficulty.

4.2 The syntax-pragmatics interface in L2 acquisition

The general prediction in L2 acquisition research has been that it is the transfer from the L1 that causes instability in the L2, when the structure in question exists in both languages but is not realized in the exact same way. However, not all structures have been proven to show indeterminacy or trigger L1 transfer to the same extent. Hulk & Müller (2000) and Müller & Hulk (2001) proposed that in early bilingualism cross-linguistic influence will occur under two conditions: the structure must belong to the syntax-pragmatics interface, and it must show an overlap at the surface level between the two languages, although its underlying syntactic analyses differ in each language. Hulk & Müller (2000) showed evidence for this proposal in a study that explored object drop, a structure that satisfies both conditions, in comparison with optional infinitives, a structure that only satisfies the first condition. The Optional Infinitive Stage refers to the initial stage that children go through in which they produce non-finite verbs in finite sentences. They investigated these structures with two bilingual children, Anouk (Dutch-French bilingual) and Carlotta (German-Italian bilingual), whose language pairs meet the second condition for cross-linguistic influence to occur, and compared their results with those of monolingual children. Dutch and

German allow object-drop and monolingual children are found to omit objects often, even in ungrammatical contexts, whereas French and Italian monolingual children have been shown to omit objects less often. On the other hand, root infinitives have been shown to be used by children in contexts in which adults would use finite sentences, such as in declarative root clauses. Hulk & Müller (2000) revealed that both children omitted objects in their Romance language more frequently than monolingual children, so cross-linguistic influence was shown to occur from the Germanic to the Romance language. No cross-linguistic influence was shown with the root infinitives. However, it is important to mention that some weaknesses were brought up in the commentaries to Hulk & Müller's (2000) study, such as the fact that it is only based on case studies, that there is no attention to narrow syntax (i.e. they didn't demonstrate that narrow syntax is not affected by cross-linguistic influence) and that there is no definition of pragmatics or analysis of pragmatic contexts (i.e. all the examples are syntactically deviant rather than pragmatically deviant).

Parallel to Hulk & Müller (2000) and Müller & Hulk's (2001) cross-linguistic influence hypothesis, other studies converged in the same phenomenon. Many of these studies explored the L2 acquisition of null versus overt pronominal subjects (Paradis & Navarro 2003, Montrul 2004b, Tsimpli et al. 2004, Serratrice et al. 2004, Belletti et at. 2007, Argyri & Sorace 2007, Sorace et al. 2009, Lozano 2009, Rothman 2009), which is a structure that combines the syntactic and pragmatic domains, and the structure in which the present investigation will focus. Unlike English, which does not allow null subjects, pro-drop languages like Spanish syntactically allow both null and overt subjects, but their distribution is pragmatically constrained by the interpretable features *topic* and *focus*. Specifically, in Spanish, a null subject will be used when the referent has been previously introduced (i.e. when

it is a topic), whereas a subject will be overt if there is a change of referent or it introduces new information (i.e. when it is the focus).[1]

In terms of the interpretation of these pronominals, Carminati (2002) proposed the Position of Antecedent Hypothesis for Italian intra-sentential anaphora, which states that null pronouns are constantly assigned to the antecedent in the highest SpecIP (generally the subject), whereas overt pronouns are normally assigned to an antecedent in a syntactic position that is lower than the SpecIP (generally the object). This hypothesis was shown by Alonso-Ovalle et al. (2002) to hold for Spanish (see Chapter 2 for a more detailed discussion on Carminati (2002) and Alonso-Ovalle et al. (2002)).

The research mentioned above on subjects pronouns (Paradis & Navarro 2003 on Spanish-English bilingual children, Serratrice et al. 2004 on English-Italian bilingual children, Argyri & Sorace 2007 on English-Greek older bilingual children, Sorace et al. 2009 on English-Italian and Spanish-Italian bilingual children, Belletti et at. 2007 on English L1/Italian L2, Lozano 2009 on English L1/Spanish L2, Rothman 2009 on English L1/Spanish L2) converged on the same findings that both early and late bilinguals, in comparison with Italian or Spanish monolinguals, overextend the use of overt subjects in the null subject language because of the influence of the non-null subject language, in which the use of an overt pronoun as the subject is mandatory. On the other hand, no overuse of null subjects in the non-null subject language was reported. Some of these studies will be discussed further in the next section.

[1] The syntactic and pragmatic distribution of pronouns in null and non-null-subject languages is discussed in detail in Chapter 2.

4.2.1 The Interface Hypothesis

The instability and cross-linguistic influence that has been reported in L2 acquisition with structures that involve an interface between syntax and other cognitive domain is what Sorace & Filiaci (2006) tried to account for with the *Interface Hypothesis*, which is the theoretical framework which the present thesis is based on. This Interface Hypothesis predicts that whereas L2 learners may show indeterminacy (or optionality) with structures that involve an interface between syntax and other cognitive domains, such as semantics or pragmatics, syntactic properties of a language that do not involve such interfaces are completely acquirable. In addition, the current hypothesis further establishes that individual L1 attrition affects only the ability to process interface structures but not knowledge representations themselves (Sorace 2011).

Sorace & Filiaci (2006) explored the interpretation of null versus overt subject pronouns in Italian with English-speaking near-native speakers of Italian, using a picture verification task, which was adapted from Tsimpli et al. (2004)[2]. Their results showed that the near-native speakers of Italian overextended the use of the overt pronoun, producing and accepting the subject referent as its antecedent, when the object referent would be the pragmatically appropriate choice, as (4.1a) below shows. However, both the near-native speakers and the Italian monolinguals performed very accurately when assigning the subject referent as the antecedent for the null pronoun, as (4.1b) illustrates.

(4.1) a. La mamma$_i$ dà un bacio alla figlia$_j$ mentre lei$_j$ si mette il cappotto.

b. La mamma$_i$ dà un bacio alla figlia$_j$ mentre *pro*$_i$ si mette il cappotto.

“The mother kisses her daughter, while (she) is wearing her coat.”

[2] Tsimpli et al. (2004) is a study on L1 attrition. Therefore, it will be discussed in section 4.3.1.

Sorace & Filiaci associated the problems that interfaces cause in L2 acquisition with difficulties at the processing level, reporting that the optionality revealed by these near-native speakers of Italian is due to difficulties when processing pronominal subjects.

The term *residual optionality* (Sorace 2000a) refers to the indeterminacy and instability shown by L2 learners when they encounter an interface structure, due to the coexistence in the speakers' grammar of two or more variants of a construction that share the same meaning and lexical resources (i.e. the alternation between target and non-target items). In relation to the results on pronouns introduced previously, optionality would be expected because the structure differs between the L1 and the L2 and English has the most "economical" (less complex) representation (Sorace 2011). Therefore, as the results above show, English is expected to affect the Romance language, which was shown by the overuse and overacceptance of overt pronouns by L2 learners, but the Romance language is not expected to affect English, which was proven by the fact that no overextension of null pronouns was seen in English by these speakers. Therefore, cross-linguistic influence is predicted to occur from the language with the most economical representation to the language with the most restricted grammar, but not the other way around. This was shown by Argyri & Sorace (2007), who carried a study on subject pronouns with older Greek-English bilingual children (8 years old), some with Greek as the dominant language and others with English as the dominant language, and they reported some cross-linguistic influence from English to Greek due to the bilinguals' overextension of overt pronouns in Greek, although these effects were only seen in the English-dominant bilinguals.

4.2.2 Anaphora resolution in L2 acquisition

The results revealed from Sorace & Filiaci (2006) and Argyri & Sorace (2007) have

also been attested in other studies on subject pronouns, which will be the main structure in which I will focus my investigation. Serratrice et al. (2004) carried out a longitudinal study with an English-Italian bilingual child, Carlo, and compared his results with Italian monolinguals. As it was shown in the studies mentioned before, the bilingual child overproduced overt pronouns when talking to a researcher (R) to refer to antecedents that would require a null pronoun, as (4.2) illustrates, whereas his production of null pronouns was very similar to the Italian monolinguals. The same results have been revealed for Spanish in Paradis & Navarro's (2003) study with Spanish-English bilingual children.

(4.2) C: questa è la luna che è venuta via dalla sua casa.

"This is the moon that comes away from its house".

R: ah e dov' è andata?

"Ah and where did (it) go?"

C: e **lei** ha braccia cosí lunghe.

"And she has arms this long".

Pronominal subjects have also been shown to follow the same pattern with adult late bilinguals. Belletti et al. (2007) tested the production and interpretation of subject pronouns with English-speaking near-native speakers of Italian, in comparison with a control group of Italian monolinguals. They used different off-line tasks, with the interpretation tasks being adapted from Tsimpli et al. (2004), as in (4.3). Belletti et al. also concluded that the near-native speakers produced more overt pronouns than the Italian monolinguals. Again, these same results have been shown for the acquisition of Spanish in studies with English-speaking near-native speakers of Spanish (Lozano 2009, Rothman 2009).

(4.3) a. L'anziana signora saluta la ragazza, quando lei attraversa la strada.

"The old lady greets the girl, when she crosses the road."

b. La mamma dà un bacio alla figlia, mentre *pro* si mette il cappotto.

"The mother kisses the daughter, while (she) puts on the coat."

c. Appena lui chiude la borsa, il fattorino dà il denaro al cassiere.

"As soon as he closes the bag, the postman gives the money to the cashier."

d. Mentre *pro* sbadiglia, il controllore prende il biglietto al passeggero.

"While (he) yawns, the inspector takes the ticket from the passenger."

Most of the research that has been carried out on subject pronominals revealed an overextension of the overt pronoun in the null-subject language. However, the overextension of null pronouns has also been revealed in the L2 acquisition of Spanish. Pérez-Leroux & Glass (1997, 1999) investigated the acquisition of pronouns by advanced and near-native speakers of Spanish whose L1 was English, and found that while speakers performed like monolinguals with the syntactic constraints regulating the distribution of null and overt pronouns (i.e. with the Overt Pronoun Constraint, which establishes that overt pronouns cannot be interpreted as bound variables, unless a null pronoun is not allowed to occur in that context), they showed indeterminacy when pragmatic features like focus and topic constrained their distribution, and an overextension of null pronouns in focused contexts was revealed. These results are in line with the predictions made by the Interface Hypothesis, because they reveal that while L2 learners may show optionality with syntax-pragmatic structures, syntactic properties that do not require the integration of the discourse domain can be acquired at a native-like level. Moreover, Montrul & Rodríguez-Louro (2006) also investigated the acquisition of subject pronouns by English-speaking L2 learners of Spanish from three different proficiency levels (intermediate, advanced and near-native levels). They obtained the

same results as Pérez-Leroux & Glass (1997, 1999), with speakers from all proficiency levels overproducing the null pronoun, which they also associated with the difficulties that acquiring a syntax-pragmatics interface involves.

On the other hand, there have been some recent studies that revealed that bilinguals who speak typologically similar languages (i.e. Italian-Spanish bilinguals) also show indeterminacy with structures that seem to be used in the same way in both languages. Therefore, unlike what was proposed with bilinguals of typologically different languages, this indeterminacy could not be attributed to L1 transfer. In particular, Sorace et al. (2009) and Serratrice et al. (2011) studied the comprehension of pronominals by older bilingual children, one group of Spanish-Italian bilinguals and two groups of English-Italian bilinguals, one in Italy and the other one in the UK, and compared their results with a group of Italian monolingual adults. Overall, the bilinguals in Italy performed more accurately than the bilinguals in the UK. The results showed that all groups of bilinguals accepted a null pronoun referring to an object antecedent as pragmatically appropriate significantly more often than Italian monolinguals. Moreover, the Spanish-Italian bilinguals also overextended the overt pronoun. These results suggest that pronominals are likely to trigger optionality, regardless of the language combination of bilinguals, which, as it was mentioned above, could not be attributed to cross-linguistic influence from the L1 or the language with the most economical representation.

The previous finding that cross-linguistic influence can occur independently of economicity is also supported by the fact that, using the same participants as in Sorace et al. (2009), Serratrice et al. (2009) explored the linguistic sensitivity to plural NPs in specific versus generic contexts in English and Italian. In English, bare plural NPs (i.e. without a determiner), as (4.4a), can only have a generic reading, whereas in Italian or Spanish, preverbal bare plural NPs are ungrammatical, so a definite plural (i.e. with a definite article) must be used to express a generic reading, as in (4.4b). Serratrice et al. (2009) reported cross-linguistic influence from English to Italian, with the English-Italian bilinguals being less accurate in Italian than both

the Spanish-Italian bilinguals and the Italian monolinguals when rejecting ungrammatical bare plural NPs in sentences with generic reading. Moreover, the group of English-Italian bilinguals in the UK was much less accurate than the English-Italian bilinguals in Italy. These results do not support the prediction that influence will occur from the language with the most economical representation because influence was revealed from English to Italian and not from Italian to English as it would be expected since Italian has the most economical representation.

(4.4) a. In general **sharks** are dangerous.

b. In genere **gli squali** sono pericolosi.

"In general the sharks are dangerous"

The indeterminacy shown in Sorace et al. (2009) and Serratrice et al. (2011) in older bilingual children of two null-subject languages have also been found in late adult bilinguals of two null-subject languages. Lozano (2006) investigated the syntax-semantics interface in the acquisition of unaccusative versus unergative verbs, which lead to different word orders in Spanish and Greek: SV word order is used with unergative verbs, such as "dance", and VS word order is used with unaccusative verbs, such as "come", and in focused sentences, as (4.5) illustrates. Lozano tested Greek learners of L2 Spanish at three different proficiency levels and revealed that, in neutral contexts, all groups of L2 learners of Spanish performed like Spanish monolinguals, preferring SV order with unergative verbs and VS order with unaccusative verbs, but with a focused sentence, all groups of learners showed optionality, accepting both VS and SV orders with both types of verbs, instead of the pragmatically appropriate postverbal subject. Similar findings were obtained in Hertel (2003) with English-speaking L2 learners of Spanish, which shows that these results are not affected by L1 transfer.

(4.5) a. Unergative verb in neutral context: SV order

La chica bailó.

“The girl danced.”

b. Unaccusative verb in neutral context: VS order

Vino la chica.

“Came the girl.”

c. Unergative verb in focused context: VS order

Bailó la chica.

“Danced the girl.”

c. Unaccusative verb in focused context: VS order

Vino la chica.

“Came the girl.”

An explanation for the overextension of overt pronouns by bilinguals of two typologically similar languages was proposed by Filiaci (2010) and Filiaci et al. (2010), who investigated the possibility of existing differences among pro-drop languages in relation to the distribution of overt subject pronouns. They tested Carminati’s (2002) PAH to see whether Spanish monolinguals are more willing to accept a prominent antecedent (i.e. the subject) as the referent for an overt subject pronoun than Italian monolinguals. They tested Spanish and Italian monolinguals using sentences in which the subject pronoun could potentially refer to either the subject or the object antecedents, but they were semantically disambiguated (see Section 2.3 in Chapter 2 for a more detailed description of the experiment). Filiaci et al. found that there are no cross-linguistic differences between Italian and Spanish monolinguals in relation to null pronouns, being the subject the preferred antecedent

for both groups. However, they seem to differ in relation to overt pronouns, with the Italian speakers constantly preferring the object as the referent for overt pronouns, and the Spanish speakers allowing either the subject or the object as the antecedent.

It is important to mention that the findings from Filiaci (2010) and Filiaci et al. (2010) differ from the processing explanation proposed in Sorace et al. (2009), where it was suggested that the overuse of overt subject pronouns in Italian by Spanish-Italian bilinguals was due to the higher processing costs of having to deal with two languages in real time. Instead, Filiaci (2010) and Filiaci et al. (2010) propose that this overextension of the overt pronoun could just be the result of language transfer from Spanish to Italian, since they found that overt pronouns in Spanish are more flexible than in Italian. However, it can be argued that one proposal does not necessarily discard the other, but it could be the case that the overextension of overt pronouns is the result of bilingualism effects which are reinforced by the language combination spoken.

4.2.2.1 Summary

Independently of the reason why bilinguals of typologically similar languages show optionality with interface structures that are the same in both languages, such as subject pronouns, the research introduced in this section suggests that the indeterminacy showed by L2 learners, in comparison with monolinguals' performance, might be related to something else apart from language transfer. Recent studies reveal that late bilinguals have more difficulties than monolinguals when processing structures that integrate different sources of information, such as structures at the syntax-pragmatics interface.

In a recent paper, Sorace & Serratrice (2009) conclude that the L2 acquisition of structures at the syntax-discourse interface is affected by processing costs and that bilinguals have higher processing costs than monolinguals, due to the fact that they

have to deal with two languages when processing these structures in real time. They also suggest a distinction between internal interfaces, which connect aspects of the grammar (i.e. the syntax-semantics interface), and external interfaces, which connect the grammar and other aspect of cognition (i.e. the syntax-discourse interface), proposing that the higher optionality seen with external interfaces is due to the fact that they pose even greater processing difficulties for L2 learners, as a result of them having to integrate syntactic and discourse/pragmatic information, the latter being more sensitive to input conditions than other language domains.

The present thesis supports this processing account rather than the account introduced before, which proposes that optionality is caused only by the language combination spoken, which leads to language transfer from the L1 or the language with the most economical representation. Instead, I believe that a combination of language transfer and difficulties in processing is what causes the optionality in bilinguals and L2 learners with these structures that require the integration of different kinds of information in real time. Therefore, this processing account will be the rationale behind this thesis, which I will test further by analyzing the processing of a structure at the syntax-pragmatics interface in comparison with a non-interface structure by a group of L1 attriters in comparison with monolingual speakers. The next section will introduce some relevant research on bilingual processing of interface structures.

4.2.3 Processing at the syntax-pragmatics interface

The research discussed in the previous section on L2 acquisition revealed that it is the structures that require the integration of more than one language domain, such as syntax-semantics or syntax-pragmatics, that are more difficult to acquire and the ones that show optionality in bilingual speakers. In particular, it was proposed that pronoun resolution causes processing difficulties in L2 acquisition, which has also

been revealed by studies using on-line methodology, which directly reflects processing in real time. Particularly, Roberts et al.'s (2008) study clearly supports the previous claim that the processing difficulties shown by L2 learners are the consequence of these speakers having to integrate several sources of information rather than being the consequence of only the language combination or the language transfer, because they showed processing limitations with pronouns in non-null subject languages. Roberts et al. (2008) examined subject pronoun resolution by Turkish and German speakers of L2 Dutch and Dutch monolinguals using eye-tracking. German and Dutch are non-null subject languages, whereas Turkish is a null-subject language. They used three conditions, as (4.6) below shows, for both the on-line and the two off-line tasks (a grammaticality judgment test and a comprehension questionnaire).

(4.6) a. Local Resolution

De werknemers zitten in het kantoor. Terwijl Peter aan het werk is, eet hij een boterham. Het is een rustige dag.

"The workers are in the office. While Peter is working, he is eating a sandwich. It is a quiet day."

b. Disjoint Resolution

De werknemers zitten in het kantoor. Terwijl Peter aan het werk is, eten zij een boterham. Het is een rustige dag.

"The workers are in the office. While Peter is working, they are eating a sandwich. It is a quiet day."

c. Optional Resolution

Peter en Hans zitten in het kantoor. Terwijl Peter aan het werk is, eet hij een boterham. Het is een rustige dag.

> "Peter and Hans are in the office. While Peter is working, he is eating a sandwich. It is a quiet day."

While the three groups had similar results in the offline grammaticality judgment test, the comprehension test showed that, unlike the Dutch monolinguals and the German learners who preferred the discourse topic antecedent as the referent for the pronouns, the Turkish learners interpreted the external antecedent as the referent for the pronouns half of the time, just as they would do with Turkish overt pronouns. On the other hand, the on-line task did not show differences between the two groups of L2 learners, but instead both groups revealed processing difficulties with sentences in which the pronoun could refer to two potential antecedents, which was shown by the fact that these two groups showed longer reading times than the Dutch monolinguals in the "Optional Resolution" condition. These results indicate, once again, that structures like anaphors that require the integration of syntactic and discourse information are more costly to process for L2 learners and bilinguals than for monolinguals, which could be attributed to having to deal with two languages in real time instead of only one.

Kaiser & Trueswell (2008) also carried out an eye-tracking experiment in order to test the interpretation of pronouns and demonstratives in Finnish, and they proposed a different approach to interfaces. They performed the study with Finnish adult native speakers, who were presented with a set of pictures representing a scene with different referents and a written text that described the scene and the characters present and finished with a sentence like (4.7) with one of the pronouns *hän* "s/he" or *tämä* "this". Participants were expected to correct this last sentence using a subject pronoun, which would show their final interpretation of the pronominals. The results from this study revealed that Finnish speakers strongly prefer the subject referent with the sentences containing the pronoun *hän*, but this strong preference was not observed for the object referent with the sentences containing the demonstrative pronoun *täma*. Kaiser & Trueswell proposed that anaphor resolution is constrained not only by context-independent syntactic information, but also by semantic

information, following a Form-Specific Multiple-Constraints approach, which suggests that not only is anaphor resolution sensitive to multiple constraints, but that different referential forms can vary in their sensitivity to different kinds of information. That is, different pronouns (i.e. personal pronouns versus demonstrative pronouns) differ in their degree of sensitivity to diverse kinds of information. Therefore, personal pronouns would be more sensitive to syntactic information and would identify subject referents regardless of word order of constituents, and demonstratives would be more sensitive to discourse information (i.e. topichood) and would identify non-topic referents, so word order of constituents would be an important factor for demonstratives.

(4.7) Hän // tämä seisoo valokopiokoneen lähellä.

"S/he // This is standing near a photocopier."

Other studies on anaphor resolution which also support the Form-Specific Multiple-Constraints approach are Wilson (2009) and Wilson et al. (2009). They investigated the online processing of German anaphora with demonstratives and pronouns by English-speaking L2 learners of German and L1 German attriters. Participants were presented with a set of pictures like Figure 4.1 while they heard a sentence like one of the four conditions presented in (4.8), for some of which they were asked to answer to a yes/no question that revealed their antecedent preferences for the pronouns. Similar to the distribution of null and overt pronominals in null-subject languages, personal pronouns in German refer to the subject antecedent and demonstrative pronouns refer to the object antecedent.

Figure 4.1. Sample picture from Wilson's (2009) eye-tracking study.

(4.8) a. Der Kellner erkennt den Detektiv als das Bier umgekippt wird. Er ist offensichtlich sehr fleißig.

The-NOM waiter recognises the-ACC detective as the beer tipped over is. He-PRON is clearly very hard working.

"The waiter recognises the detective as the beer is tipped over. He is clearly very hard working."

b. Der Kellner erkennt den Detektiv als das Bier umgekippt wird. Der ist offensichtlich sehr fleißig.

The-NOM waiter recognises the-ACC detective as the beer tipped over is. He-DEM is clearly very hard working.

"The waiter recognises the detective as the beer is tipped over. He is clearly very hard working."

c. Den Kellner erkennt den Detektiv als das Bier umgekippt wird. Er ist offensichtlich sehr fleißig.

The-ACC waiter recognises the-NOM detective as the beer tipped over is. He-PRON is clearly very hard working.

"The waiter is recognised by the detective as the beer is tipped over. He is clearly very hard working."

d. Der Kellner erkennt den Detektiv als das Bier umgekippt wird. Der ist offensichtlich sehr fleißig.

The-ACC waiter recognises the-NOM detective as the beer tipped over is. He-DEM is clearly very hard working.

"The waiter is recognised by the detective as the beer is tipped over. He is clearly very hard working."

The results from these studies showed that while L2 learners performed similarly to German native speakers with pronouns, they showed indeterminacy with demonstratives, revealing no clear preference for the object as their antecedent. Similarly, attriters showed more attrition effects with demonstratives than with pronouns, also revealing no clear preference for a specific antecedent.

The processing problems that interface structures cause in L2 acquisition have also been shown to occur with other aspects apart from pronominals. In a recent study, Hopp (2009) investigated the L2 acquisition of discourse related word order of German scrambling, another structure at the syntax-discourse interface. He tested native speakers of English, Dutch and Russian who were near-native speakers of German. *Scrambling* refers to the process by which a subject gets assigned focus by the object moving from its original unmarked position after the subject and giving rise to OS word order, as in (4.9). Whereas Russian behaves distributionally and

functionally similar to German in terms of scrambling, Dutch allows OS order but it is functionally different, and English just does not allow OS word order. Hopp used both an off-line acceptability judgment task and an on-line self-paced reading task to explore this phenomenon, and he found that near-native speakers of German performed like German native speakers. Following these results, Hopp concluded that in this aspect at the syntax-pragmatics interface near-native speakers are able to converge with native speakers, irrespective of their L1s, so that when non-convergence occurs, it is due to processing difficulties, not to representational deficits. These findings also suggest that L2 speakers are less efficient than monolinguals at integrating different sources of information in real time.

(4.9) a. Ich glaube, dass der Vater den Onkel geschlagen hat. (SO)

b. Ich glaube, dass den Onkel der Vater geschlagen hat. (OS)

“I think that the father hit the uncle.”

4.2.4 Summary

This section has presented a great amount of research that supports the claim that the optionality shown by L2 learners with certain structures, mainly those at the syntax-pragmatics interface like subject pronouns, is related to processing difficulties as the result of having to integrate information from different language domains. This research clearly supports the processing account adopted in the present thesis, and not the account introduced in Section 4.2.1, which suggests that optionality is caused only by the language combination spoken by the bilingual, which results in transfer from the L1 or from the language with the most economical representation.

The next section will present the most relevant research on L1 attrition, which will be the focus of my investigation, and it will resemble the research presented in

this section on L2 acquisition, since the interface between syntax-pragmatics, in particular pronominal subjects, has been shown to cause optionality not only in early bilinguals and late bilinguals, but also in L1 attriters.

4.3 L1 attrition and the syntax-pragmatics interface

As mentioned above, research on L2 acquisition has focused to a lesser extent on the influence that the L2 might have in the L1 of bilinguals or near-native speakers. This phenomenon is referred to as *L1 attrition*, and it refers to the change of certain aspects of a speaker's L1 as the result of the acquisition of an L2 at an adult age when the L1 acquisition process has been completed. More specifically, L1 attrition will normally occur in the L2 environment (i.e. immigration), as the consequence of the speaker being exposed to a great amount of L2 input together with a restricted (or non-existent) L1 input.

It is important to notice that L1 attrition is different from a pathological loss of the language faculty and also different from a case of incomplete acquisition, in which the process of acquiring the L1 is interrupted before achieving native competence. There are also cases of attrition of the L2, which could take place either in the L1 setting (i.e. foreign language loss) or in the L2 setting (i.e. L2 loss by aging immigrants, Van Els 1986). However, none of these cases will be considered for the present study, which will only focus on non-pathological L1 attrition in the L2 environment by first generation attriters (the case of "heritage speakers" is discussed in Section 4.3.2 below).

It could be argued that L1 attrition is triggered by the acquisition of a high level competence of an L2, although this phenomenon cannot be considered an automatic consequence of the acquisition of an L2. (Seliger 1996) In addition, attrition does not imply the total loss of the L1 knowledge, but it should be seen as a restructuring of the L1 as the result of incorporating L2 constraints (Pavlenko 2000).

Extralinguistic factors such as educational level, age of attrition onset, emigration length and frequency of use of the L1 have also been raised as having an impact on the degree of attrition that takes place (Köpke 2004).

In an early descriptive research on attrition, Seliger (1989) investigated the influence of L2 Hebrew in the L1 English of a child who immigrated from the United States to Israel. He explored the attrition in the use of "preposition stranding" (i.e. The professor **who** you talked **to**), which is allowed in English but not in Hebrew, where the relative pronoun must be preceded by the preposition (i.e. The professor **to whom** you talked). Seliger observed how the use of preposition stranding was lost in the English of the attrited child as the result of the influence from Hebrew, and concluded that attrition is the result of replacing a more complex and marked rule with an easier and unmarked rule.

4.3.1 L1 attrition in "first generation attriters"

In line with the findings in L2 acquisition presented in the previous section, recent research on L1 attrition also supports the Interface Hypothesis, revealing that the structures at the syntax-pragmatics interface are the most vulnerable ones to undergo attrition, causing "emerging optionality" in the attrited speakers due to the influence from the L2. As for L2 acquisition, emerging optionality in L1 attriters has also been shown to occur with subject pronouns by a few studies. Sorace (2000b) tested anaphor resolution with Italian near-native speakers of English and found that these Italian attriters overgeneralized overt pronouns in Italian to contexts in which a null pronoun was expected to occur, which would not be acceptable in the L1, due to the influence from English. Sorace finally established a connection between L2 acquisition and L1 attrition given that both Italian attriters and English near-native speakers of Italian overextend the use of overt pronouns in Italian as a result of the influence from English.

Tsimpli et al. (2004) also reported attrition effects in a group of Greek and Italian near-native speakers of English in relation to subject pronouns. They tested the production and comprehension of null versus overt pronouns using a picture verification task to elicit attriters' preference for the subject or the object antecedent for each pronoun, or no preference, which would reveal ambiguity. As it was mentioned before, the methodology used in Sorace & Filiaci (2006) was adapted from Tsimpli et al. (2004). During the experiment, participants were presented with three pictures like the ones in Figure 4.2 together with a sentence like one of the four conditions presented in (4.10), and asked to choose the picture or pictures that correctly matched the meaning of the sentence. Consistent with previous results, attrition effects were revealed for Italian attriters with the interpretation of the overt pronoun, with which attriters showed indeterminacy in their choice of referent, and no attrition was discovered with the null pronoun, for which both groups of attriters preferred the subject referent as the antecedent.

Figure 4.2. Sample item from Tsimpli et al.'s (2004) picture verification task on subject pronouns.

(4.10) a. Quando lei attraversa la strada, l'anziana signora saluta la ragazza.

"While she crosses the street, the old woman greets the girl."

b. Quando *pro* attraversa la strada, l'anziana signora saluta la ragazza.

"While (she) crosses the street, the old woman greets the girl."

c. L’anziana signora saluta la ragazza quando lei attraversa la strada

“‘The old woman greets the girl when she crosses the street.”

d. L’anziana signora saluta la ragazza quando *pro* attraversa la strada

“‘The old woman greets the girl when (she) crosses the street.”

Tsimpli et al. (2004) also investigated the production and comprehension of preverbal versus postverbal subjects in a group of Greek learners of English. As for the pronominals picture verification task, participants were presented with three pictures like Figure 4.3 and a sentence like one of the two presented in (4.11), in order to see the L2 learners’ preference for the “new” (i.e. postverbal) referent, as in (4.11a), or the “old” (i.e. preverbal) referent, as in (4.11b). The results also revealed attrition effects, given that Greek attriters showed indeterminacy when interpreting both postverbal and preverbal subjects as new or old information when compared to monolinguals.

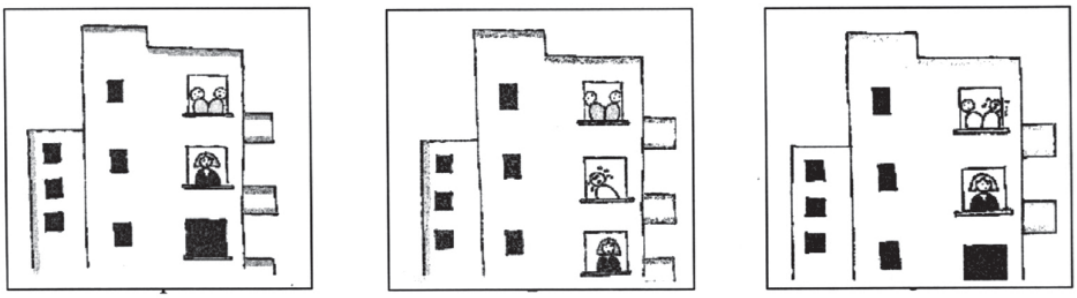

Figure 4.3. Sample item from Tsimpli et al.’s (2004) picture verification task on preverbal versus postverbal subjects.

(4.11) a. La vicina dell’ultimo piano ha due gemelli. La notte scorsa piangeva un bambino.

“My neighbour on the top floor has two babies. Last night cried a baby.”

b. La vicina dell'ultimo piano ha due gemelli. La notte scorsa un bambino piangeva.

"My neighbour on the top floor has two babies. Last night a baby cried."

Based on these results obtained from the two structures, Tsimpli et al. concluded that attrition affects structures at the syntax-pragmatics interface. This proposal will be further tested in the present thesis.

Gürel (2004) also found language attrition to be selective. She investigated the L1 attrition of null and overt pronouns in Turkish native speakers whose dominant L2 is English. Turkish has two overt pronouns: *o* "s/he" and *kendisi* "self", and the null pronoun. Whereas the overt pronoun *o* can not be bound by the subject in the main clause, both the overt pronoun *kendisi* and the null pronoun allow this option, as (4.12) and (4.13) exemplify.

(4.12) O/kendi-si/*pro* Londra'ya git-ti

S/he self-3SG pro London-DAT go-PST

"S/he went to London."

(4.13) Burak_{i} o-$\text{nu}_{*i/j}$/kendi-si-$\text{ni}_{i/j}$/$\text{pro}_{i/j}$ begˇen-iyor

Burak s/he-ACC self-3SG-ACC pro like-PRG

"Burak_{i} likes $\text{him}_{*i/j}$/$\text{self}_{i/j}$/$\textit{pro}_{i/j}$"

Gürel (2004) reported that the use of the overt pronoun *o* in Turkish L1 was influenced by English L2, because attriters appeared to treat the Turkish overt pronoun as if it was the English overt pronoun (i.e. bound by the subject). The interpretation of the null pronoun and the overt pronoun *kendisi* did not show attrition. Gürel addressed this aspect under Paradis' (1993) Activation Threshold

Hypothesis (henceforth, ATH). The ATH establishes a correlation between the frequency of use of a language element and its availability (or activation) to the speaker. In particular, it proposes that when an item is not used, the threshold of activation would rise, and when it is used, the threshold of activation would be low. Therefore, a linguistic item that has not been frequently used would have a high activation threshold and it would be difficult to activate, which would lead to the attrition of the item. This suggests that different language elements, depending of their frequency of use, would have different threshold of activation, so that some would be more likely than others to undergo attrition. More specifically, the ATH predicts that L1 attrition will occur when an element in the L1 with a high activation threshold (i.e. disused) has a corresponding "competing" element in the L2 with a lower activation threshold (i.e. used more frequently). Gurel's results are predictable under the ATH, because it is the Turkish overt pronoun *o*, which is in competition with the English overt pronoun, the one that shows attrition due to its disuse in Turkish and frequent use in English, but the other overt pronoun or the null pronoun in Turkish, which do not have a competing item in the L2, do not show attrition effects.

In a recent sociolinguistic study, Otheguy et al. (2007) investigated the attrition in the use of Spanish pronouns by different Spanish-speaking communities in the United States. They analyzed the use of pronouns using data from a corpus of 63,500 verbs extracted from interviews made to the six largest Spanish-speaking communities living in New York City, who had their origins in six different Latin American countries. In order to analyze the use of overt pronouns, speakers were divided in terms of their dialect regions, "Caribbean" (newcomers from the Dominican Republic, Puerto Rico, and Cuba) vs. "Mainlanders" (newcomers from Ecuador, Colombia, and Mexico), and in terms of their generation, "newcomers" (those who arrived in New York after the age of seventeen and had lived there for a maximum of five years) vs. "born and/or raised in New York" (those who were born in New York or arrived before the age of three). The results from this study revealed that overt pronouns are used more frequently by the Caribbean speakers than by

Mainlanders. More importantly, the "born and/or raised in New York" group showed a significantly higher rate of overt pronouns than the newcomers, which clearly revealed the influence from English in the use of overt pronouns in the Spanish of both Caribbean and Mainlanders speakers living in New York City.

On the other hand, L1 attrition effects have been revealed with more grammatical structures other than overt pronouns or postverbal subjects. Schmitt (2010) investigated the attrition of Russian morphemes in Russian speakers of English L2. As Gürel (2004), Schmitt also investigated this phenomenon under the ATH, which correctly explained the results of his study. She found that less frequent content morphemes are more susceptible to attrition than more frequent ones, and that case markers, which do not have to be inhibited because they do not compete with English, are very stable in the speakers' L1. In Wilson's (2009) study, which was introduced in Section 4.2.3, the on-line processing of German demonstratives and pronouns by L1 attriters of German who spoke English as their L2 was investigated. Results revealed that attriters showed more attrition effects with demonstratives than with pronouns in comparison to monolinguals, and that the degree of attrition effects depended on the attriters' length of residence in the UK. Moreover, attrition has also been shown to affect other L1 domains apart from syntax, such as the lexicon (Seliger 1996) or phonology (Bullock & Gerfen 2004, Celata & Cancila 2010).

4.3.1.1 Summary

The studies introduced previously predict that L1 attrition will occur with structures at the syntax-discourse interface, given that the structure differs between the L1 and the L2, and that speakers are under prolonged exposure to L2 input, together with limited exposure to L1 input. Under these circumstances, emerging optionality in the L1 would be expected. Nevertheless, what none of these studies have ever tested, at least to the best of my knowledge, is the hypothesis that attrition may decrease or

disappear under exposure to L1 input. Therefore, following the predictions made by the ATH that frequency of use of an item determines its availability to be used by the speaker, this thesis will test a group of attriters after having been exposed exclusively to the L1 in order to explore whether attrition can decrease or disappear under L1 exposure. This aspect has never been investigated before in the literature, and it is an important one because it will reveal whether L1 grammatical representations are affected by attrition or whether attrition is the result of a lack of online sensitivity to certain structures in real time.

4.3.2 L1 attrition in heritage speakers

The phenomenon of attrition discussed in the previous section is related to cases of emerging optionality in the L1, that is, adult L2 learners who acquired the L2 after acquiring their L1 completely, usually by migrating to the country where the L2 is spoken at an adult age. Therefore, these "first generation attriters" are different from "heritage speakers" in the sense that whereas the former completed the process of L1 acquisition before the onset of attrition, the process of L1 acquisition of the latter was interrupted before they attained native competence, so their acquisition of the L1 was incomplete. Most of the research on L1 attrition focuses on these "incomplete" heritage speakers, which are usually communities that have migrated to the L2 setting, separating from the L1 community, so the use of the L1 decreases (Johnson & Newport 1989, Silva-Corvalán 1991, Håkansson 1995).

It is important to emphasize that heritage speakers are usually children of attrited parents, and therefore the language they acquire is divergent from the "standard" L1, due to the fact that their parents, as a consequence of residing in the country where the L2 is spoken, have already undergone attrition of their L1. That is, since the L1 that first generation immigrants speak to their children is already attrited, the input received by second generation children will be attrited, so they will

acquire a complete but divergent L1 (Sorace 2005). Consequently, we can expect heritage speakers to show attrition not only when processing structures at the interfaces, as it has been shown for L1 attriters, but generational attrition may affect representations as well, since the input received by second and third generation speakers is different from the original L1, which could be considered a case of "language change". This idea is in line with Larmouth's (1974) study on the attrition of the Finnish case system across four generations of Finnish immigrants in the United States, in which he reports that Finnish case system undergoes major changes across these four generations of speakers.

As mentioned before, most of the research related to language attrition has focused on "incomplete heritage speakers". Montrul (2002) used an oral production task and a written completion task to investigate the incomplete acquisition and attrition in tense/aspect distinctions in the Spanish of heritage speakers living in the United States, and more specifically in the preterit-imperfect contrast. Ultimately, she aimed to explore the effects of age of onset of bilingualism on ultimate attainment. She tested three different groups of adult bilinguals (simultaneous bilinguals, early child L2 learners, who were exposed to English at the age of 4 to 7 years old, and late child L2 learners, who were exposed to English at the age of 8 to 12 years old) and a group of Spanish monolinguals. The results showed that all groups seem to have problems with the preterit/imperfect contrast, with the simultaneous bilinguals and the early child L2 learners differing more from the monolinguals than the late child L2 learners. From these findings, she concluded that the earlier the age of onset of bilingualism and the more exposure to the dominant language, the more incomplete the less dominant language will be for these bilinguals as adults, even if that was the family language and the one learned first. More recently, Montrul (2009) also investigated the incomplete acquisition of tense/aspect and mood in adult Spanish heritage speakers from three proficiency levels (advanced, intermediate and low). She revealed that while all Spanish heritage speakers showed to have a good command of the preterit-imperfect contrast, they did

not master the indicative-subjunctive distinction, especially in the case of the low proficiency group.

In a different study on unaccusativity, Montrul (2005) compared the Spanish knowledge of a group of English-speaking adult learners of Spanish and a group of English-dominant Spanish heritage speakers living in the United States. The results showed that both groups had a robust and similar knowledge of the syntax of unaccusativity (i.e. VS word order), although some indeterminacy was found in the semantics of unaccusative verbs by the L2 learners.

Polinsky (1997) explored case marking in Russian by Russian heritage speakers in the United States and found that the Russian spoken by this group had undergone changes in comparison to standard Russian. Results revealed that "American-Russian" presented a more reduced case marking system, and that these heritage speakers did not use case in positions in which standard Russian would include them. In a later study also in "American Russian", Polinsky (2008) investigated Russian gender by heritage speakers from two proficiency groups. Russian has three genders: masculine, feminine and neuter, and their assignment depends on the declensional system. Polinsky reported that the high proficiency group presented the three genders in their Russian, although it was different from the standard Russian gender system, whereas the low proficiency group presented only two genders (masculine and feminine).

As for L2 acquisition and L1 attrition, pronominal subjects have also been documented to cause attrition effects in heritage speakers. Montrul (2004b) tested the production of Spanish subject and object pronouns by an intermediate and an advanced group of Spanish heritage speakers who were born in the United States. The results showed that, although the advanced group overused overt subject pronouns, it was the intermediate group who revealed inappropriate uses of both null and overt pronouns. These findings suggest that, as a consequence of the influence from the dominant language in the heritage language, the Spanish grammar of these

intermediate heritage speakers has converged with English in relation to the production of subjects and objects.

A different case from that of heritage speakers and of first generation attriters living in the L2 environment is the one presented by Flores (2010). She tested a group of bilingual Portuguese-German "returnees" who had been raised bilingually in Germany, but at the time of the experiment had already been living in Portugal for a few years and had lost contact with the German. She tested two different groups of returnees: "child returnees", who left Germany between the ages of seven and ten, and "teenage returnees", who left Germany after they were eleven. Participants were tested on their knowledge of German word order. In German, the finite verb occupies the second position of simple clauses, preceded only by one constituent, as in (4.14). However, in subordinate clauses the finite verb occupies the final sentence position, resulting in OV word order, as (4.15) illustrates. None of these two word phenomena are found in Portuguese.

(4.14) a. Ich **bin** in Portugal geboren.

"I am in Portugal born".

b. Jetzt **bin** ich in der vierten Klasse in Porto.

"Now am I in the fourth grade in Porto".

(4.15) [. . .] weil er kein Haus **hat**.

"Because he no house has"

The results from this study showed that child returnees performed less accurately than the teenage returnees, revealing that the age factor plays and important role in the attrition effects of these returnees. More importantly, Flores suggests that the attrition revealed seems to be the result of insufficient L2 activation, and not the

result of the loss of the returnees' language competence. This prediction will be tested in the present thesis.

4.3.3 Processing in L1 attrition

As it was proposed for the residual optionality documented in L2 acquisition with certain structures, mostly those at the syntax-pragmatics interface like subject pronouns, the emerging optionality revealed by L1 attriters with those same structures can also be attributed to speakers' processing difficulties when integrating the different sources of information in real time. However, unlike in L2 acquisition research, not many studies have addressed the source of attrition and just a few have implemented on-line methods.

Pallier et al. (2003) carried out one of those few studies (see also Wilson 2009 in Section 4.2.3) to address the possibility that a second language may even replace the first language. They used fMRI to explore a group of adult native Korean speakers who were adopted by French families between the ages of 3 and 8 years old, and compared it to a control group of French native speakers. Participants were exposed to Korean, and other unknown languages, and two behavioral tests were implemented to compare their reaction towards Korean in comparison to the unknown languages. Interestingly, Palier et al. observed that the Korean native speakers could not distinguish between their first language and the other languages since they showed no differences with the French monolinguals when they were exposed to Korean. Consequently, the results from the fMRI test showed no differences in brain activation when the Korean native speakers were exposed to their first language in comparison to their exposure to any of the other languages. These results suggest that the early brain changes that take place in the acquisition of an individual's L1 can be reversible in the first years of life, and that the L1 can be

forgotten and replaced by an L2 if the individual is exposed to the L2 at an early age and deprived of his L1.

4.4 Summary

In this chapter, I have presented the most relevant research on L2 acquisition and L1 attrition that supports the claim that those structures that require the integration of several cognitive domains, namely interface structures, cause optionality in L2 learners and L1 attriters. Specifically, optionality was clearly shown with structures at the syntax-pragmatics interface, such as pronominal subjects, with its source being related to processing difficulties as the result of having to integrate information from different language domains.

Section 4.3 focused on L1 attrition and it presented a great amount of research that revealed that speakers' L1 can undergo changes under prolonged exposure to an L2, together with limited exposure to the L1, especially with structures at the syntax-pragmatics interface, such as subject pronouns. However, to the best of my knowledge, the hypothesis that attrition may decrease or disappear under prolonged exposure to L1 input has never been tested before. Moreover, as it was mentioned before, not many studies have addressed the source of attrition or used on-line methods, which would be necessary in order to have a better understanding of how attriters process certain structures and whether the source of attrition lies at the processing level.

Therefore, this study will investigate for the first time the hypothesis that attrition effects may reverse under L1 exposure, and the implications that this hypothesis might have in relation to the source of attrition. In order to do this, a group of attriters will be tested after having been exposed exclusively to their L1, to explore if attrition effects diminish or disappear as a consequence of this L1 exposure. If these effects reduce, then we can conclude that attrition is due to a lack

of online sensitivity when processing interface structures in real time, and that it is not the consequence of a permanent change in the speakers' L1 grammatical representations.

In the next chapter, I will discuss the present study in more detail, together with the research questions, hypotheses and predictions made, and I will present the experiments carried out on subject pronouns and the results obtained from them.

CHAPTER 5

The study

5.1 Introduction

This chapter will present the experiments carried out that explored the interpretation of Spanish pronominal subjects and the results obtained. These results will be compared with those of the personal preposition *a,* which will be introduced in the next chapter.

It is important to note that both structures under investigation (subject pronouns and personal *a*) were presented together in a single experiment, so each of the sections presented as Experiments 1A, 1B, 1C and 1D are part of the same experiment and were carried out simultaneously by each participant in a single session. The experimental session was designed to be carried out as a single task, in which participants had to read the sentences that were shown in a computer screen (a sentence containing either a pronoun, a personal preposition or a filler), which was used as the online eye-tracking-while-reading data (see Section 5.3.2.3 for a detailed explanation of the online experiment procedure), and then rate each sentence in terms of its naturalness (see Section 5.3.1.3 for a detailed explanation of the offline experiment procedure), which was used as the off-line judgment data. However, since the data were analysed separately (online and offline tasks for each of the two structures) they will be reported as four independent experiments: Experiment 1A (offline task on pronouns), Experiment 1B (online task on pronouns), Experiment 1C

(offline task on the personal preposition) and Experiment 1D (online task on the personal preposition). As it was mentioned above, Experiments 1C and 1D will be discussed in Chapter 6.

Finally, due to some unexpected results obtained in Experiment 1, a second experiment on subject pronouns was carried out, which will be introduced in the last section of the present chapter.

5.2 Experiment 1

5.2.1 Aims and hypotheses

The present thesis intends to explore whether structures at the interfaces in an L1 will undergo attrition under prolonged exposure to an L2. More specifically, since attrition is expected to occur with those structures at the interfaces that are in competition in the L1 and the L2, and not with syntactic properties that do not involve any interface (Interface Hypothesis, Sorace & Filiaci 2006), this study will investigate the interpretation of an interface structure, Spanish pronominal subjects, in comparison with the interpretation of a non-interface structure, the Spanish personal preposition *a* (or DOM). Moreover, this study will explore whether attrition is sensitive to recent L1 exposure (Paradis 1993, Sorace 2011). Therefore, the following hypothesis will be tested:

- H_1: L1 attriters will not show online sensitivity when processing the interface structure in real time (i.e. in the online task), but no attrition effects will be shown with the non-interface structure in offline or online processing.

- H_2: attrition effects will decrease or disappear with recent (re)exposure to the L1 for a "prolonged" period of time.

It is important to emphasize that H_2 is a novel investigation that has never been addressed before in the literature, and it will be of great insight on the effects of recent input and (re)exposure to L1 input on attrition. On the one hand, it will reveal whether bilinguals are sensitive to input changes, and on the other, whether attrition affects bilinguals' online sensitivity or whether it is due to a permanent change in their L1 grammatical representations.

5.3 Experiments 1A and 1B

Experiments 1A and 1B investigated the interpretation of overt versus null subject pronouns in Spanish, which was addressed within the framework of Carminati's (2002) Position of Antecedent Hypothesis. As introduced in Chapter 2, the PAH states that, in intra-sentential anaphora, null pronouns are assigned to the antecedent in the highest SpecIP (generally the subject), whereas overt pronouns are assigned to an antecedent in a syntactic position that is lower than the SpecIP (generally the object). Thus, in an intra-sentential anaphora, like (5.1) below, the overt pronoun *ella* is expected to be assigned to the object *la niña*, as (5.1a) shows, while the null pronoun is expected to be assigned to the subject *la madre*, as (5.1b) shows.

(5.1) a. La madre$_i$ se despidió de la niña$_j$ cuando **ella**$_j$ salía por la puerta.

The mother said goodbye to the girl when she was leaving through the door.

b. La madre$_i$ se despidió de la niña$_j$ cuando ***pro***$_i$ salía por la puerta.

The mother said goodbye to the girl when PRO was leaving through the door.

Considering previous findings (Carreiras et al. 1993, Garnham et. al 1995, Carreiras et al. 1996, Carreiras 1997, Cacciari et al. 1997, Sturt 2003, Carminati 2005) that gender and number features influence the interpretation of pronouns, the

previous sentences (5.1a) and (5.1b) could be manipulated introducing number information that is in conflict with the syntactic information given by the null or the overt pronouns. Thus, the pronoun information can be in conflict with the number information, as in (5.2a) for the overt pronoun and (5.2d) for the null, or it can agree with it, as in (5.2b) for the overt and (5.2c) for the null.

(5.2) a. La madre se despidió de las niñas cuando **ella** salía por la puerta.

The mother said goodbye to the girls when she was leaving through the door

b. Las madres se despidieron de la niña cuando **ella** salía por la puerta.

The mothers said goodbye to the girl when she was leaving through the door

c. La madre se despidió de las niñas cuando ***pro*** salía por la puerta.

The mother said goodbye to the girls when pro was leaving through the door

d. Las madres se despidieron de la niña cuando ***pro*** salía por la puerta.

The mothers said goodbye to the girl when pro was leaving through the door

The pronoun in (5.2a) and (5.2b), since it is overt, syntactically points towards the object as its antecedent which, in (5.2b), agrees in number with the pronoun. However, in (5.2a), the object disagrees in number with the overt pronoun, and it is the subject antecedent the one that carries the same number feature. Similarly, the null pronoun in (5.2c) and (5.2d), syntactically points towards the subject as its antecedent which, in the case of (5.2c), agrees in number with the verb in the embedded clause (in the case of (5.2c) and (5.2d), since they include a null pronoun, the number feature is given by the verb in the embedded clause). However, in (5.2d), the number information carried by the subject of the main clause disagrees with that carried by the verb in the embedded clause, causing, as in (5.2a), a conflict between the syntactic and the number information.

The four sentences presented above are examples of the items used in Experiments 1A and 1B, which investigated the interpretation and processing of overt and null subject pronouns in intra-sentential semantically-neutral anaphora. Experiment 1A is an offline naturalness task, whereas Experiment 1B is an online eye-tracking while reading task, which will provide some insight on the actual processing of subject pronouns.

5.3.1 Experiment 1A

Experiment 1A used an off-line task in which participants were given sentences like (5.2) above to read and then rate on a 5-point scale depending on their perceived naturalness. The purpose of this experiment is to investigate whether participants show any attrition with interface structures when they are able to analyze them.

5.3.1.1 Participants

Seventy-two native speakers of Spanish participated in the experimental session. They were all from Spain and had no knowledge of any other language from birth (Spanish speakers from regions in which another L1 was spoken, such as Catalan, Basque or Galician were excluded from the experiment). All participants were paid for their participation in the experiment.

Three groups of participants were tested: 24 “monolinguals”, 24 “attriters”, and 24 “exposed”. The control group of “monolinguals” (MON) were 24 Spanish native speakers (14 females, 10 males) who had recently arrived in Edinburgh (the mean number of weeks spent in the UK was 7.958, SD = 7.117), and had no (or very little) knowledge of English. As it was mentioned in Chapter 1, considering that English is currently a mandatory subject in Spanish education, we assume that most of the participants will have had some previous contact with the language. However,

participants were asked to rate their use of the L1 and the L2 on a 5-point scale (1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = always) in three different settings (at home, in their social circle and at their job or professional/educational setting) and, as Table (5.1) shows, the monolingual group clearly still uses the L1 more often than the L2 (for the L1, the mean use was 4.312, *SD* = .639; for the L2, the mean use was 2.708, *SD* = .908). Table 5.1 shows in detail each participant's information in relation to gender, age, educational level, time spent in the UK, and use of the L1 and the L2, together with the minimums, maximums, means and standard deviations of these data.

Participant	Gender	Age	Level of Education	Weeks of residence in UK	Use of L1	Use of L2
1	M	26	PhD	24	4	2.5
2	F	28	BA	2	5	1
3	F	25	BA	4	4.5	3
4	M	28	BA	20	3.5	2.5
5	F	20	BA	8	4	4
6	M	24	BA	4	2.5	1
7	F	25	BA	12	4.5	3
8	M	24	BA	2	5	3
9	M	24	MA	2	5	3
10	M	24	BA	2	5	2
11	M	24	Secondary	4	4.5	2
12	M	31	BA	8	4	3
13	F	23	BA	4	5	2
14	F	24	Secondary	8	4	4
15	F	29	PhD	24	4	3
16	F	23	BA	4	4	4
17	F	23	BA	2	3.5	2
18	F	24	BA	16	4	4
19	F	24	BA	12	4.5	3
20	F	23	BA	12	4	4
21	M	25	BA	2	5	2
22	M	24	Secondary	2	5	2.5
23	F	24	Secondary	1	5	1.5
24	F	24	BA	12	4	3
Min.		20		1	2.5	1
Max.		31		24	5	4
Mean		24.708		7.958	4.312	2.708
SD		2.293		7.117	0.639	0.908

Table 5.1. Monolinguals' information and minimum, maximum, mean and SD of gender, age, level of education, weeks of residence in UK, use of L1 and use of L2.

The group of "attriters" (ATT) consisted of 24 Spanish native speakers (16 females, 6 males) who had been residing in the UK for a minimum of five years and were near-native speakers of English (the mean number of years spent in the UK was 7, *SD* = 2.844). As Table 5.2 shows, this group, unlike the monolinguals, uses the L2 more often than the L1 (for the L1, the mean use was 3.417, *SD* = .843; for the L2, the mean use was 4.333, *SD* = .434).

Participant	Gender	Age	Level of Education	Years of residence in UK	Use of L1	Use of L2
1	F	34	PhD	10	1.5	5
2	F	42	PhD	7	3	4.5
3	M	25	PhD	7	4.5	5
4	F	29	MA	6	3.5	3.5
5	F	28	MA	5	3.5	4
6	F	50	BA	15	4	4
7	F	43	BA	9	4	4
8	M	32	BA	5	4	4.5
9	F	35	PhD	5	2.5	4.5
10	F	23	BA	5	3	4
11	F	33	BA	5	4	4.5
12	F	28	BA	5	3.5	4
13	F	35	MA	14	2.5	4
14	F	31	PhD	5	4.5	5
15	F	31	Secondary	5	4	4.5
16	M	36	BA	7	3.5	4
17	M	32	MA	5	2.5	4.5
18	M	35	MA	6	3.5	4
19	F	37	MA	9	3	4.5
20	M	28	BA	5	4.5	5
21	M	32	BA	10	2	3.5
22	F	30	BA	7	2.5	4.5
23	M	35	PhD	5	4	4.5
24	F	36	BA	6	4.5	4.5
Min.		23		5	1.5	3.5
Max.		50		15	4.5	5
Mean		33.333		7	3.417	4.333
SD		5.873		2.844	0.843	0.434

Table 5.2. Attriters' information and minimum, maximum, mean and SD of gender, age, level of education, years of residence in UK, use of L1 and use of L2.

Finally, the "exposed" group (EXP) was formed by 24 Spanish native speakers (12 females, 12 males) who, as the ATT group, had been living in the UK for a minimum of five years and were near-native speakers of English (the mean number of years spent in the UK was 5.833, *SD* = 1.736). Also, as it is shown in Table 5.3, like the attriters, the exposed group clearly uses the L2 more often than the L1 (for the L1, the mean use was 2.583, *SD* = .880; for the L2, the mean use was 4.417, *SD* = .565). However, this group had been exposed exclusively to Spanish for

a minimum of a week in a Spanish-speaking environment (i.e. Spain) during their Christmas holidays right before they were tested (the mean number of days that they were exposed to the L1 was 13.083, *SD* = 4.745).

Participant	Gender	Age	Level of Education	Years of residence in UK	Use of L1	Use of L2	Days of recent exposure to L1
1	M	32	BA	5	3	3.5	7
2	F	31	MA	5	3	3.5	15
3	M	40	PhD	13	3	3.5	14
4	F	29	MA	5	3	4	11
5	F	23	BA	5	2.5	5	21
6	M	31	BA	6	3.5	4	18
7	F	30	Secondary	5	2	5	7
8	F	33	BA	5	2	4.5	7
9	M	28	MA	5	1	5	11
10	F	30	BA	7	3.5	4.5	14
11	M	30	BA	8	2.5	5	14
12	F	23	BA	5	3	5	14
13	M	30	BA	5	1	5	13
14	F	30	Secondary	6	1	5	12
15	M	24	BA	5	2.5	5	18
16	F	30	MA	6	2.5	4.5	15
17	F	31	PhD	7	3.5	4	20
18	M	28	BA	5	3.5	4	9
19	F	28	BA	5	3	3.5	10
20	M	29	BA	5	4	4.5	7
21	M	30	BA	5	2	4.5	7
22	F	23	BA	5	1	5	9
23	M	28	Secondary	6	3	4.5	21
24	M	30	BA	6	3	4	20
Min.		23		5	1	3.5	7
Max.		40		13	4	5	21
Mean		29.21		5.833	2.583	4.417	13.083
SD		3.623		1.736	0.880	0.565	4.745

Table 5.3. Exposed participants' information and minimum, maximum, mean and SD of gender, age, level of education, years of residence in UK, use of L1, use of L2, and days of recent exposure to the L1.

5.3.1.2 Materials

Thirty-two items as the ones illustrated in (5.3) below were constructed. Each sentence consisted of a main clause, which contained a subject and an object antecedent of the same gender, and a subordinate clause always introduced by *cuando* ('when') and followed by the subject pronoun, either overt or null, and a verb conjugated in third-person singular. The pronoun could refer to either the subject or the object antecedent, so one carried singular number and the other plural number in order to disambiguate. Since the pronoun and the verb were always in singular, they would co-refer with the antecedent in singular. Appendix A includes all experimental items and fillers.

(5.3) a. Condition 1: **?Overt/subject match**[1]

La madre saludó a las chicas cuando ella cruzaba una calle con mucho tráfico.

The mother greeted[sing.] the girls when she crossed[sing.] a street with a lot of traffic

b. Condition 2: **Overt/object match**

Las madres saludaron a la chica cuando ella cruzaba una calle con mucho tráfico.

The mothers greeted[plural] the girl when she crossed[sing.] a street with a lot of traffic

c. Condition 3: **Null/subject match**

La madre saludó a las chicas cuando *pro* cruzaba una calle con mucho tráfico.

[1] The notation "?" expresses that the antecedent that the verb agrees in number with in the sentences of that condition is the unpragmatic choice, not that those sentences are ungrammatical.

The mother greeted[sing.] the girls when pro crossed[sing.] a street with a lot of traffic

d. Condition 4: **?Null/object match**

Las madres saludaron a la chica cuando *pro* cruzaba una calle con mucho tráfico.

The mothers greeted[plural] the girl when pro crossed[sing.] a street with a lot of traffic

Thus, two factors were manipulated, each containing two levels: *Pronoun* (overt or null) and *Antecedent* (subject or object), which resulted in the four conditions shown in (5.3) above.

Each item contained four conditions, two with an overt pronoun and the other two with a null pronoun. Moreover, half of the items included all female referents and the other half all male referents. The 32 items were divided into four lists and, using a Latin square, each list contained one of the four conditions of each of the 32 items, and all conditions appeared the same number of times in each of the lists. In addition to the experimental items, 32 fillers were also randomly included in each list.

For the purpose of using these same stimuli for the online experiment (Experiment 1B), all sentences had the same number of words, except for the ones that contained a null pronoun, which had a word less.

5.3.1.3 Procedure

The experiment was run in a laboratory at the University of Edinburgh. Sentences like (5.3) above were presented in a computer monitor. The instructions were

presented in Spanish in written form, at the beginning of the experiment (see Appendix A). Participants were asked to read each sentence and press a button on a game pad once they had comprehended it. When they pressed the button, the question '¿Cómo de natural te suena esta frase?' (*How natural does this sentence sound to you?*) followed and they were asked to rate the previous sentence on a 5-point scale in terms of their perceived naturalness (1 = not natural at all; 2 = not very natural; 3 = more or less natural; 4 = very natural; 5 = totally natural). Three trial items preceded the experimental items.

Scores were later recorded for each participant and each condition separately for a subsequent analysis.

At the end of the experiment, participants were asked to fill out a questionnaire that included some personal information and their L1 and L2 background (see Appendix A).

5.3.1.4 Data analysis

As mentioned above, two factors were manipulated, each containing two levels: *Pronoun* (overt or null) and *Antecedent* (subject or object), which were combined to create a 2x2 factorial design. A repeated-measures ANOVA with these two factors was run for each of the three groups.

Also, in order to compare the results of the three groups, a third factor was introduced, this one with three levels: *Language Group* (monolinguals, attriters or exposed). A repeated-measures ANOVA with the three factors was run for monolinguals versus attriters, monolinguals versus exposed, and attriters versus exposed.

5.3.1.5 Predictions

If the hypotheses stated in Section 5.2.1 are correct, I predict to obtain the following results from Experiment 1A:

1. Since this is an offline task, participants from all of the three groups (MON, ATT and EXP) will perform well and no differences between the groups will be shown. Therefore:

(a) Since conditions 1 and 4 are the ones in which pronoun and number information are in conflict, all groups will rate condition 1 (overt/subject match) lower than condition 2 (overt/object match), and condition 4 (null/object match) lower than condition 3 (null/subject match).

(b) All groups will show significant interaction of Pronoun*Antecedent in their ratings.

(c) No significant three-way interaction of Pronoun*Antecedent*Language Group will be seen when comparing MON vs. EXP, MON vs. ATT or ATT vs. EXP.

5.3.1.6 Results

As Table 5.4 and Figure 5.1 below show, overall participants from the three groups show means that follow our predictions, with the ratings for condition 1 (overt/subject match) lower than those for condition 2 (overt/object match), and the ratings for condition 4 (null/object match) lower than those for condition 3 (null/subject match).

	MON		EXP		ATT	
C1 - ?ov/subj	3.2604	(.87377)	3.1510	(.62007)	2.9115	(.71616)
C2 - ov/obj	3.6034	(.75033)	3.4896	(.55648)	3.4531	(.82407)
C3 - null/subj	3.7158	(.66944)	3.5781	(.58840)	3.6399	(.73356)
C4 - ?null/obj	3.6082	(.60027)	3.5937	(.59464)	3.5417	(.77290)

Table 5.4. Score means and (standard deviations) for the three groups.

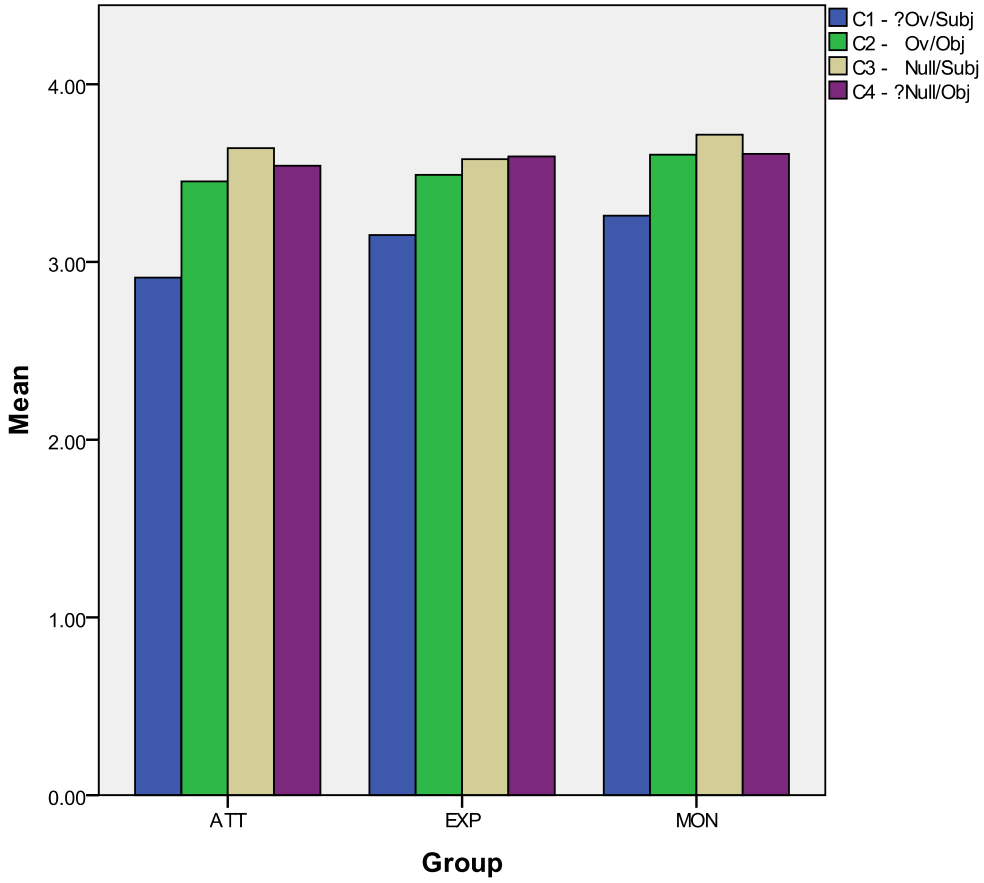

Figure 5.1. Score means for pronominal subjects in the three groups.

Monolinguals

The repeated-measures ANOVA run for the monolinguals revealed a main effect of *Pronoun* on the rating of the sentences ($F_1(1, 23) = 4.345$, $p = .048$; $F_2(1, 31) = 10.465$, $p = .003$), which indicates that the type of pronoun presented in the sentence had a significant influence on monolinguals' scores of the stimuli, with the null pronoun rated higher than the overt.

On the other hand, the main effect of *Antecedent* was not significant ($F_1(1, 23) = 1.946$, $p = .176$; $F_2(1, 31) = 1.530$, $p = .225$), which shows that the type of antecedent, either subject or object, did not influence monolinguals' scores of the sentences.

As predicted, a significant interaction between *Pronoun* and *Antecedent* was shown by subjects, and a marginal interaction by items, on monolinguals' ratings of anaphors ($F_1(1, 23) = 12.328$, $p = .002$; $F_2(1, 31) = 3.880$, $p = .058$), which indicates that each antecedent had a different effect on monolinguals' ratings of the sentences depending on which type of pronoun was used (Figure 5.2).

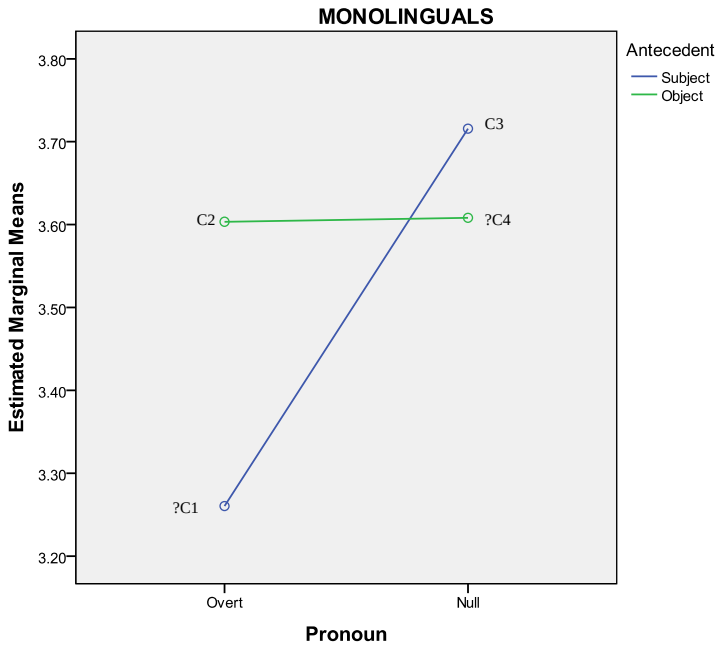

Figure 5.2. Monolinguals' score means by subjects.

Therefore, to see the nature of the interaction effect, paired samples t-tests were conducted to compare the use of overt and null pronouns. For the overt pronoun ($t_1(23) = -3.158$, $p = .004$; $t_2(31) = -2.237$, $p = .033$), monolinguals showed significantly lower scores for the Subject Antecedent (M = 3.2604, SD = .87377) than for the Object Antecedent (M = 3.6034, SD = .75033). The results for the null pronoun were not significant ($t_1(23) = 1.041$, $p = .309$, $r = .687$; $t_2(31) = .577$, $p = .568$, $r = .027$), although the tendency is as expected, showing the Subject Antecedent higher scores (M = 3.7158, SD = .66944) than the Object Antecedent (M = 3.6082, SD = .60027).

Exposed

The exposed group obtained very similar results to those obtained by the monolinguals. The ANOVA revealed a main effect of *Pronoun* ($F_1(1, 23) = 4.935$, $p = .036$; $F_2(1, 31) = 20.595$, $p < .001$), showing that the type of pronoun presented in the sentence had a significant influence on exposed's scores, with the null pronoun rated higher than the overt.

Again, the main effect of *Antecedent* was not significant ($F_1(1, 23) = 3.640$, $p = .069$; $F_2(1, 31) = 2.745$, $p = .108$), which indicates that the type of antecedent did not influence exposed's scores of the sentences.

As predicted, a significant interaction of *Pronoun* and *Antecedent* was shown, but it was significant only by subjects ($F_1(1, 23) = 5.403$, $p = .029$; $F_2(1, 31) = 2.793$, $p = .105$), indicating that the each antecedent had different effects on exposed's scores of the sentences depending on the type of pronoun presented (Figure 5.3).

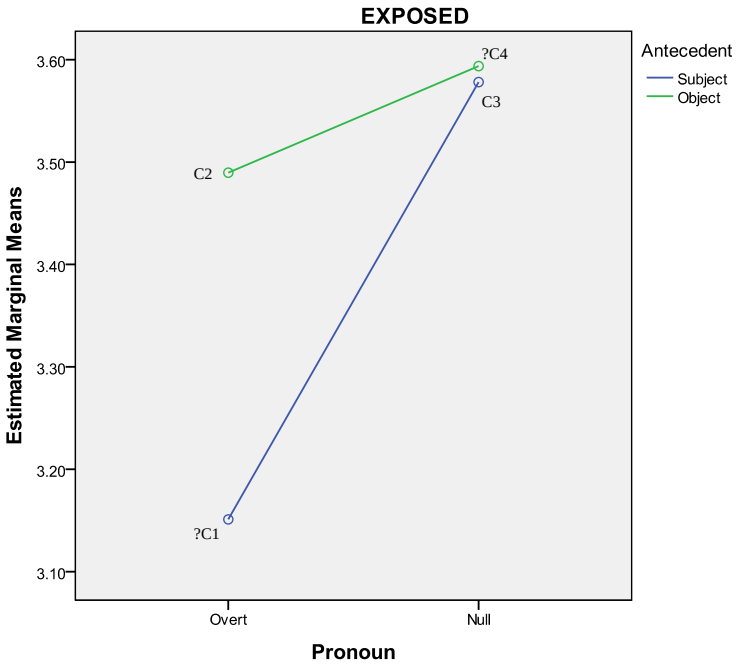

Figure 5.3. Exposed's score means by subjects.

Thus, to explore the nature of this effect, paired samples t-tests were run. For the overt pronoun ($t_1(23) = -2.804$, $p = .010$; $t_2(31) = -3.822$, $p = .001$) exposed showed significantly lower scores for the Subject Antecedent (M = 3.1510, SD = .62007) than for the Object Antecedent (M = 3.4896, SD = .55648). Again, the results for the null pronoun were not significant ($t_1(23) = -.141$, $p = .889$; $t_2(31) = -.062$, $p = .951$), and contrary to what it was expected, the scores for the Subject Antecedent are slightly lower (M = 3.5781, SD = .58840) than for the Object Antecedent (M = 3.5937, SD = .59464).

Attriters

For the attriters, the ANOVA showed a main effect of *Pronoun* ($F_1(1, 23) = 16.681$, $p < .001$; $F_2(1, 31) = 25.393$, $p < .001$), demonstrating that the type of

pronoun presented in the sentence had a significant influence on attriters' scores, with the null pronoun rated higher than the overt.

A main effect of *Antecedent* was also seen ($F_1(1, 23) = 7.858$, $p = .010$; $F_2(1, 31) = 9.321$, $p = .005$), revealing that attriters' scores are influenced by the type of antecedent presented in the sentences, with the subject antecedent rated higher than the object.

Again, a highly significant interaction of *Pronoun* and *Antecedent* was obtained ($F_1(1, 23) = 16.468$, $p < .001$; $F_2(1, 31) = 19.936$, $p < .001$), which confirms that the each antecedent had a different effect on attriters' scores of the sentences depending on the type of pronoun used (Figure 5.4).

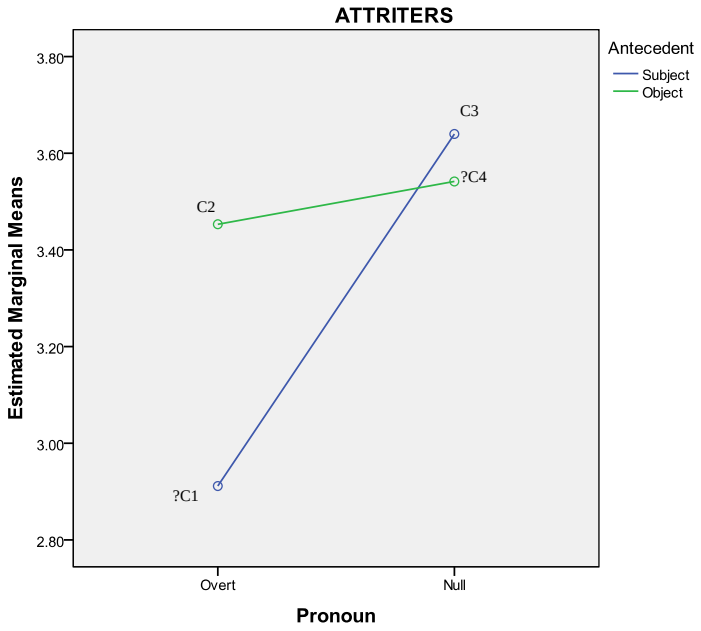

Figure 5.4. Attriters' score means by subjects.

The t-tests run for the attriters also showed a significant effect only for the overt pronoun. For the overt pronoun ($t_1(23) = -6.347$, $p < .001$; $t_2(31) = -6.663$, $p < .001$), they showed significantly lower scores for the Subject Antecedent (M = 2.9115, SD = .71616) than for the Object Antecedent (M = 3.4531, SD = .82407). As

mentioned before, the results for the null pronoun were not significant for this group either ($t_1(23) = .739$, $p = .467$; $t_2(31) = .858$, $p = .397$) although the Subject Antecedent again revealed higher scores (M = 3.6399, SD = .73356) than the Object Antecedent (M = 3.5417, SD = .77290).

Monolinguals versus Exposed

As expected for all of the three group comparisons in the off-line experiment, the ANOVA results revealed no three-way interaction of *Pronoun*, *Antecedent*, and *Language Group* ($F_1(1, 46) = .456$, $p = .503$; $F_2(1, 31) = .112$, $p = .740$), which indicates that there are no significant differences between monolinguals and exposed in terms of how they are affected by the type of pronoun and antecedent presented in the stimuli.

Similarly to the other two group comparisons below, a highly significant interaction of *Pronoun* and *Antecedent* is now shown ($F_1(1, 46) = 16.727$, $p < .001$; $F_2(1, 31) = 5.087$, $p = .031$), which suggests that in the case of the monolinguals and the exposed group, when their results were analyzed separately, the marginal interaction effect revealed by items was due to lack of power of 24 participants. Interestingly, 48 participants are still not enough to show any significant effect for the null pronoun. As before, the t-test showed significant effects for the overt pronoun ($t_1(47) = -4.242$, $p < .001$), but not for the null ($t_1(47) = .609$, $p = .546$).

A main effect of *Pronoun* was also shown ($F_1(1, 46) = 9.279$, $p = .004$; $F_2(1, 31) = 25.182$, $p < .001$), with the null pronoun rated higher than the overt, as well as a main effect of *Antecedent* by subjects ($F_1(1, 46) = 5.524$, $p = .023$; $F_2(1, 31) = 3.106$, $p = .088$), with the object antecedent rated higher than the subject.

Monolinguals versus Attriters

As for monolinguals versus exposed, no three-way interaction of *Pronoun*, *Antecedent*, and *Language Group* was shown ($F_1(1, 46) = .867$, $p = .357$; $F_2(1, 31) = 1.483$, $p = .232$), showing that there are no significant differences between monolinguals and attriters either in relation to how they are affected by the type of pronoun and antecedent presented in the sentences.

Again, a highly significant interaction of *Pronoun* and *Antecedent* is revealed ($F_1(1, 46) = 28.770$, $p < .001$; $F_2(1, 31) = 15.748$, $p < .001$), with the t-test showing significant effects for the overt pronoun ($t_1(47) = -6.333$, $p < .001$), but not for the null ($t_1(47) = 1.236$, $p = .223$).

A main effect of *Pronoun* ($F_1(1, 46) = 18.378$, $p < .001$; $F_2(1, 31) = 26.475$, $p < .001$), with the null pronoun rated higher than the overt, and a main effect of *Antecedent* ($F_1(1, 46) = 8.614$, $p = .005$; $F_2(1, 31) = 6.753$, $p = .014$), with the object antecedent rated higher than the subject, were also shown.

Attriters versus Exposed

Results revealed no significant three-way interaction of *Pronoun*, *Antecedent*, and *Language Group*, although a marginal interaction effect was shown, but only by items ($F_1(1, 46) = 2.275$, $p = .138$; $F_2(1, 31) = 3.355$, $p = .077$). Therefore, no significant differences between attriters and exposed can be reported in terms of how they are affected by the type of pronoun and antecedent presented in the stimuli.

Similarly to the above results, a highly significant interaction of *Pronoun* and *Antecedent* is seen ($F_1(1, 46) = 20.989$, $p < .001$; $F_2(1, 31) = 12.366$, $p < .001$), and the t-test run afterwards also showed a significant effect for the overt pronoun ($t_1(47) = -5.898$, $p < .001$) but not for the null ($t_1(47) = .480$, $p = .633$).

Moreover, a main effect of *Pronoun* ($F_1(1, 46) = 18.699$, $p < .001$; $F_2(1, 31) = 39.651$, $p < .001$), with the null pronoun rated higher than the overt, and a main effect of *Antecedent* ($F_1(1, 46) = 10.695$, $p = .002$; $F_2(1, 31) = 9.129$, $p = .005$), with the object antecedent rated higher than the subject, were revealed.

5.3.1.7 Discussion

The results presented for Experiment 1A show that, as predicted in Section 5.3.1.5, all three groups of participants correctly scored the sentences in which the overt pronoun was assigned to the object antecedent (condition 2) and those in which the null pronoun was assigned to the subject antecedent (condition 3) as being 'natural', and the sentences in which the number information forced the overt pronoun to co-refer with the subject antecedent (condition 1) and those in which it forced the null pronoun to co-refer with the object antecedent (condition 4) as being 'not natural'. This supports the predictions made following Carminati's (2002) Position of Antecedent Hypothesis.

Nevertheless, an unexpected difference between the pronouns was revealed, suggesting that participants from the three groups had a clear preference for the object as the antecedent for the overt pronoun, but for the null pronoun, their preference for the subject as its antecedent was weaker.

On the other hand, because Experiment 1A was an offline task, no difference between the groups was predicted. The results from the offline ratings did show equal mismatch sensitivity for all groups of participants to subject pronouns, which support our predictions.

5.3.2 Experiment 1B

Experiment 1B consisted of an eye-tracking-while-reading task. The purpose of this experiment was to explore whether participants showed online sensitivity when dealing with interface structures in real time.

5.3.2.1 Participants

The participants were exactly the same as the participants in Experiment 1A.

5.3.2.2 Materials

The materials were identical to those for Experiment 1A.

5.3.2.3 Procedure

The experiment was run using an Eyelink 1000 tower-mounted eye-tracking system. After participants had read the instructions (see Appendix A), they were asked to sit in front of the eye-tracker so that it could be fitted on their heads. Before the experiment started, a calibration process was carried out until the calibration was successful. This process had to be repeated during the experiment if calibration failed.

The experiment began with three practice trials. For the trials to appear in the monitor screen, participants were instructed to look at the black square that appeared at the left edge of the white screen, which automatically triggered the sentence to appear in the position where the square was. Sentences were all presented in one line (the font was Times New Roman, in black, size 18). Once they had read and

understood the sentence, they were instructed to press a button on a game pad and the 'naturalness' question that was then used for Experiment 1A was displayed.

At the end of the experiment, participants were asked to fill out a questionnaire that included some personal information and their L1 and L2 background (see Appendix A).

5.3.2.4 Data analysis

Using EyeDoctor.0.5.7 (http://www.psych.umass.edu/eyelab/software/), vertical drift in the position of fixations was corrected, and blinks and fixations that fell very outside of the boundaries deleted. Extremely short fixations, less than 80 ms, and extremely long fixations, more than 1200 ms were also removed.

Items were divided into seven regions, as (5.4) below illustrates. The critical region (region 5) contained the pronoun and the verb (in the case of sentences with null pronoun, only the verb was included).

(5.4) La madre/ saludó a/ las chicas/ cuando/ ella cruzaba/ una calle/ con mucho tráfico./

The mother greeted the girls when she crossed a street with a lot of traffic

Three different eye-movement measures will be reported: first pass time, go-past time and total time. *First pass time* includes the sum of all the fixations made in a particular region from the first time the eye enters the region until it leaves the region. *Go-past time* includes the sum of all the fixations made in a region from the first time that region is entered until and it is passed to the right, including fixations made in previous regions. *Total time* includes the sum of all the fixations made in a particular region during the whole trial. For first pass and go-past only the critical

region, the post-critical region and the final region will be reported, and for total time also the pre-critical will be reported.

As for Experiment 1A, two factors were manipulated, each containing two levels: *Pronoun* (overt or null) and *Antecedent* (subject or object), which were combined to create a 2x2 factorial design. For each of the three groups, a repeated-measures ANOVA for each measure and region was run.

For the comparison between the groups, the factor *Language Group* (monolinguals, attriters or exposed) was included. A repeated-measures ANOVA with the three factors for each measure and region was run for monolinguals versus attriters, monolinguals versus exposed and attriters versus exposed.

5.3.2.5 Predictions

If the hypotheses stated in Section 5.2.1 are correct, I predict the following results from Experiment 1B:

1. Because conditions 1 and 4 are the ones in which pronoun and number information are in conflict, MON and EXP are expected to consistently show longer RTs for condition 1 (overt/subject match) than for condition 2 (overt/object match), and longer RTs for condition 4 (null/object match) than for condition 3 (null/subject match), in the critical, postcritical and/or final regions. Therefore:

    (a) MON and EXP are expected to show significant interaction of Pronoun*Antecedent in any of these three regions.

2. On the other hand, unlike for the offline experiment, attriters are now expected to differ from the other two groups in their processing of pronominal subjects. Since attrition is expected to occur when processing

interface structures in real time, ATT are expected to show less online sensitivity than MON and EXP (i.e. ATT are generally expected to be inconsistent with the direction above, and when followed, the difference between the conditions will not be significant). Therefore:

(a) ATT are not expected to show significant interaction effects of Pronoun*Antecedent.

(b) ATT are expected to reveal significant three-way interaction of Pronoun*Antecedent*Language Group in the critical, post-critical and/or final regions when compared with MON and EXP.

3. Since attrition effects are expected to decrease or disappear after recent exposure to the L1, EXP are predicted to perform similar to MON and differ from ATT. Therefore,

(a) EXP are expected to reveal significant three-way interaction of Pronoun*Antecedent*Language Group in the critical, post-critical and/or final regions when compared with ATT, but not when compared with MON.

5.3.2.6 Results

Overall, as Table 5.5 reveals, participants show means that follow our predictions. MON show longer RTs for condition 1 (overt/subject match) than for condition 2 (overt/object match), and longer RTs for condition 4 (null/object match) than for condition 3 (null/subject match) in the critical region for first pass, in all three regions for go-past, and in the critical and post-critical regions for total time.

	Critical region (ella) cruzaba			**Post-critical region** una calle			**Final region** con mucho tráfico.		
	MON	EXP	ATT	MON	EXP	ATT	MON	EXP	ATT
first pass									
?ov/subj	472.13 (156.174)	480.58 (120.889)	448.83 (154.404)	382.83 (103.165)	394.13 (128.147)	372.96 (80.346)	636.38 (231.796)	694.83 (312.555)	586.08 (141.551)
ov/obj	394.71 (93.861)	428.46 (109.121)	426.67 (118.033)	382.67 (93.111)	373.42 (118.891)	350.33 (98.411)	662.63 (204.870)	664.00 (305.475)	544.50 (136.352)
null/subj	263.46 (51.608)	283.17 (80.091)	278.21 (81.437)	414.54 (165.764)	403.38 (93.455)	366.08 (98.341)	682.83 (282.081)	652.75 (262.658)	547.21 (159.669)
?null/obj	285.25 (94.519)	269.79 (65.782)	267.25 (55.192)	405.25 (122.629)	368.42 (87.656)	372.54 (120.139)	648.96 (216.069)	668.83 (252.227)	595.75 (209.572)
go-past									
?ov/subj	672.50 (249.517)	612.50 (224.359)	542.33 (233.349)	548.21 (236.251)	629.33 (296.965)	541.79 (196.597)	3361.21 (1707.945)	4142.96 (2087.786)	4020.71 (1904.484)
ov/obj	567.83 (180.154)	525.08 (188.818)	472.33 (171.777)	507.25 (185.575)	486.92 (208.092)	541.17 (243.785)	3207.75 (1979.964)	3639.75 (1574.639)	3945.62 (1811.567)
null/subj	361.42 (132.099)	359.83 (134.943)	390.58 (161.457)	561.88 (231.111)	528.25 (201.604)	529.33 (174.684)	3275.71 (1889.326)	3837.67 (1907.993)	4292.21 (2121.230)
?null/obj	395.75 (159.703)	382.42 (189.633)	350.21 (161.643)	568.29 (224.204)	486.96 (181.888)	516.50 (199.704)	3595.08 (1819.110)	4250.71 (2006.880)	4509.83 (1697.841)
total time									
?ov/subj	1146.63 (518.118)	1287.92 (551.463)	1188.33 (322.213)	867.13 (306.036)	940.42 (449.028)	945.58 (358.250)	1077.63 (349.153)	1247.50 (545.262)	1137.38 (358.250)
ov/obj	941.04 (496.480)	1003.04 (400.660)	1069.75 (401.099)	825.13 (304.890)	788.13 (316.732)	909.63 (366.586)	1128.87 (416.849)	1197.46 (475.500)	1144.83 (366.586)
null/subj	574.42 (316.730)	702.33 (334.785)	701.29 (259.541)	949.12 (368.563)	982.83 (439.764)	1037.25 (348.725)	1274.63 (509.098)	1263.88 (603.195)	1245.67 (348.725)
?null/obj	624.13 (296.315)	673.17 (266.598)	685.33 (257.153)	978.71 (378.941)	1020.42 (433.070)	1078.33 (347.700)	1288.92 (533.731)	1383.58 (558.030)	1370.21 (347.700)

Table 5.5. First pass, go-past and total time RT means and (standard deviations) in critical, post-critical and final regions for the three groups.

On the other hand, EXP reveal longer RTs for condition 1 (overt/subject match) than for condition 2 (overt/object match), and longer RTs for condition 4 (null/object match) than for condition 3 (null/subject match) in the final region for first pass, in the critical and final regions for go-past, and in the post-critical and final regions for total time.

Finally, ATT show longer RTs for condition 1 (overt/subject match) than for condition 2 (overt/object match), and longer RTs for condition 4 (null/object match) than for condition 3 (null/subject match) in the post-critical and final regions for first pass, in the final region for go-past, and in the post-critical region for total time.

Monolinguals

First pass

The repeated-measures ANOVA revealed significant effects only in the critical region. A main effect of *Pronoun* was shown only in the critical region ($F_1(1, 23) = 88.340$, $p < .001$; $F_2(1, 31) = 86.777$, $p < .001$), but not in the post-critical ($F_1(1, 23) = 2.985$, $p = .097$; $F_2(1, 31) = 2.325$, $p = .137$) or final regions ($F_1(1, 23) = .388$, $p = .539$; $F_2(1, 31) = .338$, $p = .565$), which reveals that the type of pronoun presented in the sentences had a significant influence in monolinguals' RTs when processing the critical region, with the overt pronoun showing longer RTs than the null. This main effect of *Pronoun* is consistent across all groups for all regions and measures, and it is due to the length difference between the sentences containing a null pronoun and the sentences containing an overt pronoun (the sentences with an overt pronoun contain more characters, two in the case of 'él' and four in the case of 'ella', than the sentences with a null pronoun).

A main effect of *Antecedent* was also seen in the critical region ($F_1(1, 23) = 4.358$, $p = .048$; $F_2(1, 31) = 5.945$, $p = .021$), and not in the post-critical ($F_1(1, 23) =$

.076, p = .785; $F_2(1, 31)$ = .200, p = .658) or final regions ($F_1(1, 23)$ = .017, p = .896; $F_2(1, 31)$ = .069, p = .794), which reveals that the type of antecedent used in the stimuli had a significant influence in monolinguals' RTs when processing the critical region, with the subject antecedent showing longer RTs than the object.

As predicted, a highly significant interaction of *Pronoun* and *Antecedent* was shown in the critical region ($F_1(1, 23)$ = 12.391, p = .002; $F_2(1, 31)$ = 6.199, p = .018), shown in Figure 5.5, but no interaction effects were seen in the post-critical region ($F_1(1, 23)$ = .094, p = .762; $F_2(1, 31)$ = .288, p = .595) or in the final region ($F_1(1, 23)$ = 2.101, p = .161; $F_2(1, 31)$ = .084, p = .774), which indicates that when monolinguals processed the critical region each antecedent had a different effect on their RTs depending on which type of pronoun was used.

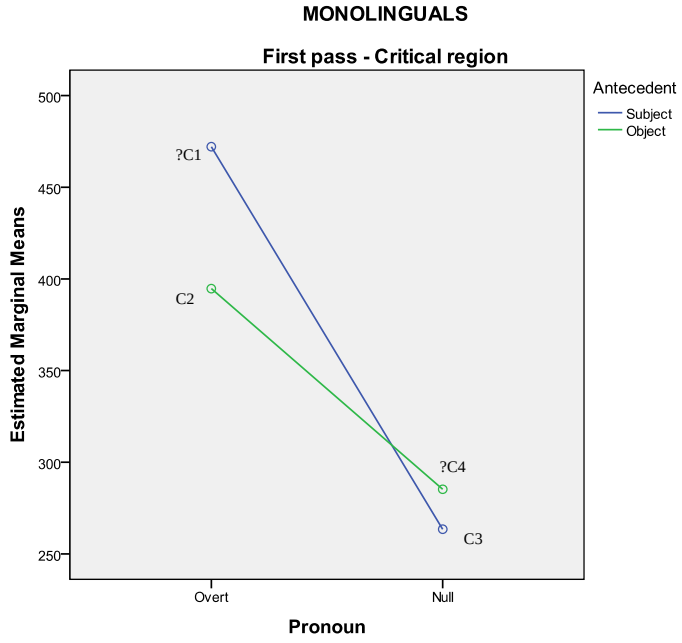

Figure 5.5. Monolinguals' RT means for first pass by subjects in the critical region.

Therefore, to see the nature of the interaction effect, paired samples t-tests were conducted for the critical region to compare the use of overt and null pronouns. As in Experiment 1A, only the results for the overt pronoun were significant. For the

overt pronoun ($t_1(23) = 3.919$, $p < .001$; $t_2(31) = 3.023$, $p = .005$), monolinguals showed significantly longer RTs for Subject Antecedent (M = 472.13, SD = 156.174) than for Object Antecedent (M = 394.71, SD = 93.861). The results for the null pronoun were not significant ($t_1(23) = -1.145$, $p = .264$; $t_2(31) = -.495$, $p = .624$), although the tendency is as expected, showing the Subject Antecedent shorter RTs (M = 263.46, SD = 51.608) than the Object Antecedent (M = 285.25, SD = 94.519),

Go-past

Means for go-past times are very similar to those for first pass times, showing the repeated-measures ANOVA significant effects only in the critical region. A main effect of *Pronoun* was again revealed in the critical ($F_1(1, 23) = 47.813$, $p < .001$; $F_2(1, 31) = 42.160$, $p < .001$), but not in the post-critical ($F_1(1, 23) = .966$, $p = .336$; $F_2(1, 31) = .273$, $p = .605$) or final regions ($F_1(1, 23) = .866$, $p = .362$; $F_2(1, 31) = .016$, $p = .899$), with the overt pronoun showing longer RTs than the null.

However, no main effect of *Antecedent* was seen in the critical ($F_1(1, 23) = 1.582$, $p = .221$; $F_2(1, 31) = .899$, $p = .350$), post-critical ($F_1(1, 23) = .210$, $p = .651$; $F_2(1, 31) = .330$, $p = .570$) or final regions ($F_1(1, 23) = .539$, $p = .470$; $F_2(1, 31) = .006$, $p = .938$), which shows that the type of antecedent used did not have an influence in monolinguals' RTs when processing the stimuli.

Also, as shown in Figure 5.6, a significant interaction of *Pronoun* and *Antecedent* was shown in the critical region, although only by subjects ($F_1(1, 23) = 4.889$, $p = .037$; $F_2(1, 31) = 1.962$, $p = .171$), but no interaction effects are seen in the post-critical region ($F_1(1, 23) = .831$, $p = .371$; $F_2(1, 31) = .637$, $p = .431$) or in the final region ($F_1(1, 23) = 1.753$, $p = .198$; $F_2(1, 31) = .849$, $p = .364$), revealing that when processing the critical region each antecedent had a different effect on monolinguals' RTs depending on the type of pronoun used.

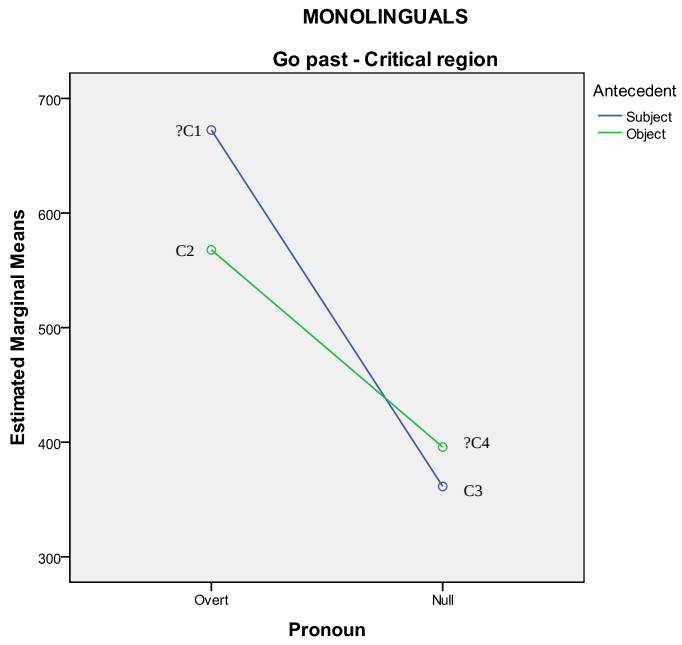

Figure 5.6. Monolinguals' RT means for go-past by subjects in the critical region.

A paired samples t-test was then conducted for the critical region, which again only showed significant results for the overt pronoun, and not for the null. With the overt pronoun ($t_1(23) = 2.130$, $p = .044$; $t_2(31) = 1.473$, $p = .151$), monolinguals showed significantly longer RTs for Subject Antecedent (M = 672.50, SD = 249.517) than for Object Antecedent (M = 567.83, SD = 180.154), although only by subjects. The results for the null pronoun were not significant ($t_1(23) = -1.024$, $p = .316$; $t_2(31) = -.219$, $p = .828$) although, as expected, the Subject Antecedent showed shorter RTs (M = 361.42, SD = 132.099) than the Object Antecedent (M = 395.75, SD = 159.703).

Total time

The repeated-measures ANOVA revealed a main effect of *Pronoun* in the critical region ($F_1(1, 23) = 52.894$, $p < .001$; $F_2(1, 31) = 172.088$, $p < .001$), post-

critical region ($F_1(1, 23) = 9.793$, $p = .005$; $F_2(1, 31) = 4.608$, $p = .040$), and final region ($F_1(1, 23) = 9.851$, $p = .005$; $F_2(1, 31) = 6.996$, $p = .013$), with the overt pronoun showing longer RTs than the null in the critical region, but shorter RTs than the null in the other two regions.

However, a main effect of *Antecedent* was only shown in the critical region by subjects ($F_1(1, 23) = 7.850$, $p = .010$; $F_2(1, 31) = 1.465$, $p = .235$), but not in the post-critical ($F_1(1, 23) = .031$, $p = .861$; $F_2(1, 31) = .002$, $p = .966$) or the final regions ($F_1(1, 23) = .974$, $p = .334$; $F_2(1, 31) = .856$, $p = .362$), with the subject antecedent revealing longer RTs than the object.

As Figure 5.7 reveals, a highly significant interaction of *Pronoun* and *Antecedent* was shown again the critical region by subjects ($F_1(1, 23) = 11.896$, $p = .002$; $F_2(1, 31) = 1.016$, $p = .321$), but no interaction effects were shown in the post-critical ($F_1(1, 23) = .708$, $p = .409$; $F_2(1, 31) = .072$, $p = .791$) or the final regions ($F_1(1, 23) = .247$, $p = .624$; $F_2(1, 31) = .511$, $p = .480$), revealing that the type of antecedent presented in the stimuli had a different effect on monolinguals' RTs depending on which type of pronoun was used when processing the critical region.

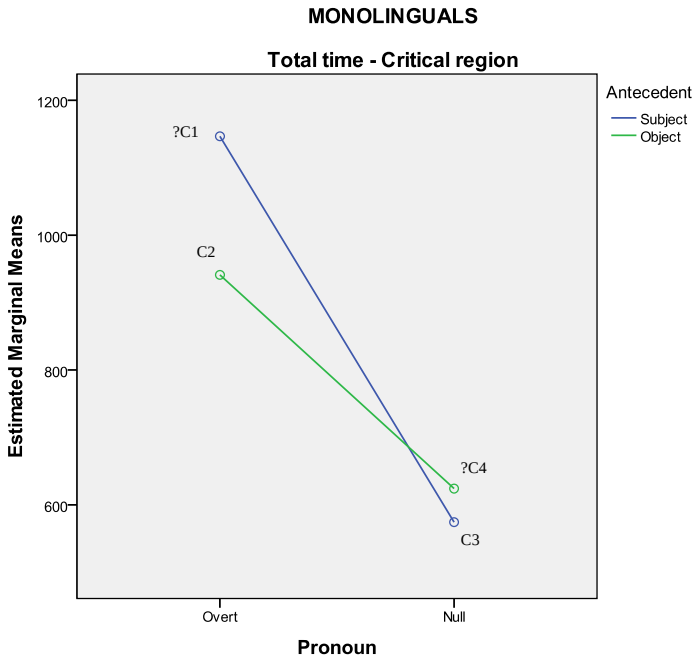

Figure 5.7. Monolinguals' RT means for total time by subjects in the critical region.

The paired samples t-test by subjects run for the critical region showed, once again, significant results for the overt pronoun, but not for the null. With the overt pronoun, monolinguals showed significantly longer RTs for Subject Antecedent (M = 1146.63, SD = 518.118) than for Object Antecedent (M = 941.04, SD = 496.480), although only by subjects ($t_1(23) = 4.712$, $p < .001$; $t_2(31) = 1.206$, $p = .237$). The results for the null pronoun were not significant ($t_1(23) = -1.018$, $p = .319$; $t_2(31) = .684$, $p = .499$) although, as expected, the Subject Antecedent showed shorter RTs (M = 574.42, SD = 316.730) than the Object Antecedent (M = 624.13, SD = 296.315).

Exposed

First pass

The repeated-measures ANOVA revealed a main effect of *Pronoun* only in the critical region ($F_1(1, 23) = 112.588$, $p < .001$; $F_2(1, 31) = 112.985$, $p < .001$), with the overt pronoun showing longer RTs than the null, but no main effect was seen in the post-critical ($F_1(1, 23) = .027$, $p = .871$; $F_2(1, 31) = .000$, $p = .998$) or final regions ($F_1(1, 23) = .551$, $p = .465$; $F_2(1, 31) = .029$, $p = .865$).

Moreover, a main effect of *Antecedent* was seen in the critical region ($F_1(1, 23) = 7.138$, $p = .014$; $F_2(1, 31) = 7.507$, $p = .010$) and in the post-critical region ($F_1(1, 23) = 4.493$, $p = .045$; $F_2(1, 31) = 5.568$, $p = .025$), with the subject antecedent showing longer RTs than the object, but no main effect was revealed in the final region ($F_1(1, 23) = .050$, $p = .826$; $F_2(1, 31) = .004$, $p = .952$).

As expected, similarly to monolinguals, a marginally significant interaction of *Pronoun* and *Antecedent* was also shown for the critical region ($F_1(1, 23) = 3.566$, $p = .072$; $F_2(1, 31) = 3.617$, $p = .067$), as it can be seen in Figure 5.8, but not for the post-critical ($F_1(1, 23) = .245$, $p = .625$; $F_2(1, 31) = .465$, $p = .500$) or final regions ($F_1(1, 23) = .258$, $p = .616$; $F_2(1, 31) = .438$, $p = .513$), confirming that when the exposed processed the stimuli each antecedent had a different effect on their RTs depending on which type of pronoun was used, although to a less extent than for the monolinguals, as Figure 5.8 reveals.

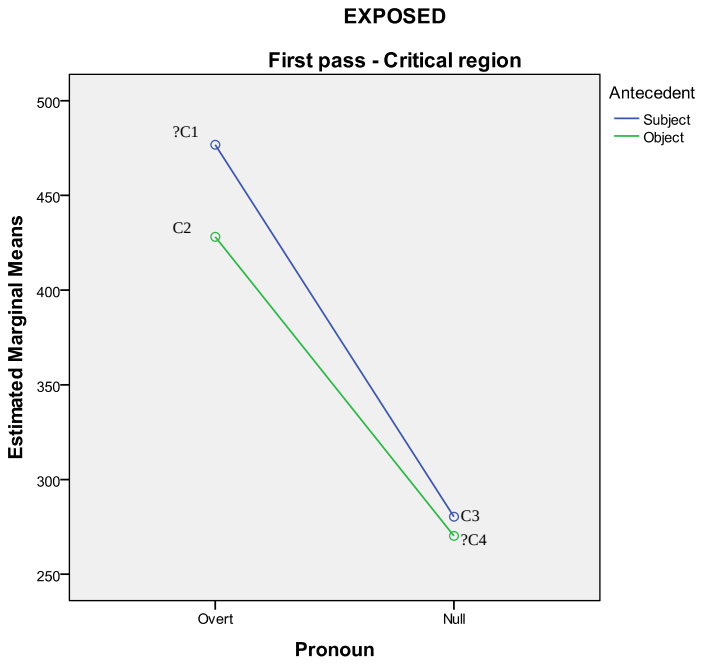

Figure 5.8. Exposed's RT means for first pass by items in the critical region.

Two paired samples t-test were then conducted for the critical region and only the results for the overt pronoun were significant. For the overt pronoun ($t_1(23) = 2.602$, $p = .016$; $t_2(31) = 2.752$, $p = .010$) exposed showed significantly longer RTs for Subject Antecedent (M = 480.58, SD = 120.889) than for Object Antecedent (M = 428.46, SD = 109.121). The results for the null pronoun were not significant ($t_1(23) = 1.278$, $p = .214$; $t_2(31) = .918$, $p = .366$), which contrary as expected, showed longer RTs for the Subject Antecedent (M = 283.17, SD = 80.091) than for the Object Antecedent (M = 269.79, SD = 65.782).

Go-past

For go-past measures, ANOVA showed a main effect of *Pronoun* only in the critical region ($F_1(1, 23) = 31.309$, $p < .001$; $F_2(1, 31) = 36.822$, $p < .001$), but not in the post-critical region ($F_1(1, 23) = 2.066$, $p = .164$; $F_2(1, 31) = 1.032$, $p = .318$) or in

the final region ($F_1(1, 23) = .550$, $p = .466$; $F_2(1, 31) = 1.116$, $p = .299$), with the overt pronoun revealing longer RTs than the null.

A main effect of *Antecedent* was revealed only in the post-critical region ($F_1(1, 23) = 4.997$, $p = .035$; $F_2(1, 31) = 7.808$, $p = .009$), not in the critical region ($F_1(1, 23) = 1.022$, $p = .323$; $F_2(1, 31) = 2.393$, $p = .132$) or in the final region ($F_1(1, 23) = .062$, $p = .805$; $F_2(1, 31) = .143$, $p = .708$), with the subject antecedent showing longer RTs than the object.

As Figure 5.9 illustrates, a significant interaction of *Pronoun* and *Antecedent* was shown only in the final region ($F_1(1, 23) = 4.261$, $p = .050$; $F_2(1, 31) = 7.550$, $p = .010$), but no interaction effects were seen in the critical region ($F_1(1, 23) = 2.932$, $p = .100$; $F_2(1, 31) = 2.447$, $p = .128$) or in the post-critical region ($F_1(1, 23) = 1.432$, $p = .244$; $F_2(1, 31) = 2.617$, $p = .116$), demonstrating that each antecedent had a different effect on the exposed's RTs depending on the type of pronoun used.

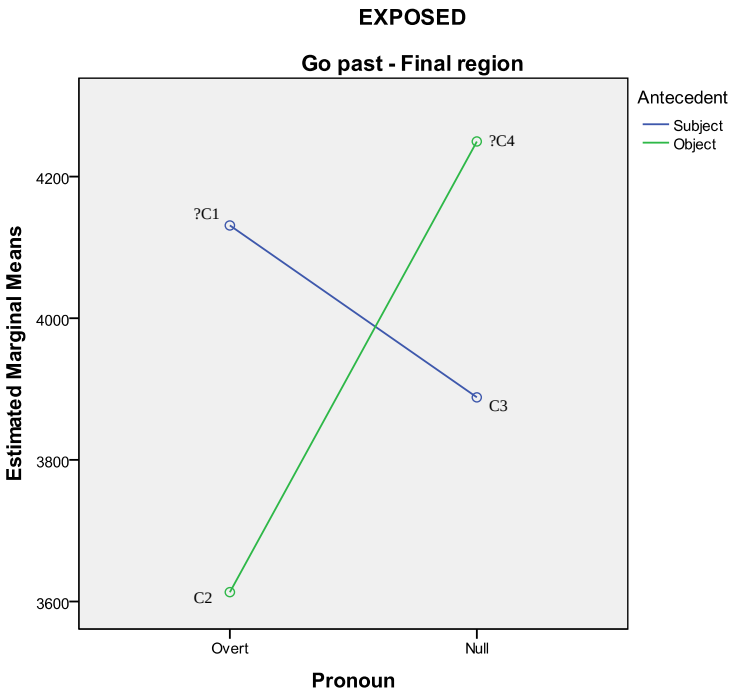

Figure 5.9. Exposed's RT means for go-past by items in the final region.

Therefore, a paired samples t-test was run for the final region. With the overt pronoun ($t_1(23) = 1.635$, $p = .116$; $t_2(31) = 2.274$, $p = .030$), the exposed group showed significantly longer RTs for the Subject Antecedent (M = 4142.96, SD = 2087.786) than for the Object Antecedent (M = 3639.75, SD = 1574.639), although only by items. No significant effects were shown for null pronouns ($t_1(23) = -1.572$, $p = .130$; $t_2(31) = -1.237$, $p = .225$) although, as expected, exposed showed shorter RTs for the Subject Antecedent (M = 3837.67, SD = 1907.993) than for the Object Antecedent (M = 4250.71, SD = 2006.880).

Total time

The repeated-measures ANOVA revealed a main effect of *Pronoun* in the critical region ($F_1(1, 23) = 71.962$, $p < .001$; $F_2(1, 31) = 203.124$, $p < .001$) and in the post-critical region ($F_1(1, 23) = 11.927$, $p = .002$; $F_2(1, 31) = 9.368$, $p = .005$), and a marginal effect in the final region by subjects ($F_1(1, 23) = 3.269$, $p = .084$; $F_2(1, 31) = 2.749$, $p = .107$), with the overt pronoun showing longer RTs than the null in the critical region, but shorter RTs than the null in the other two regions.

However, a main effect of *Antecedent* is shown only in the critical region ($F_1(1, 23) = 8.540$, $p = .008$; $F_2(1, 31) = 11.180$, $p = .002$), but not in the post-critical ($F_1(1, 23) = 1.334$, $p = .260$; $F_2(1, 31) = 1.498$, $p = .230$) or in the final regions ($F_1(1, 23) = .411$, $p = .528$; $F_2(1, 31) = .564$, $p = .458$), with the subject antecedent revealing longer RTs than the object.

A significant interaction of *Pronoun* and *Antecedent* was shown in the pre-critical region by subjects, with a marginal effect by items ($F_1(1, 23) = 4.590$, $p = .043$; $F_2(1, 31) = 3.582$, $p = .068$), in the critical region ($F_1(1, 23) = 9.963$, $p = .004$; $F_2(1, 31) = 11.502$, $p = .002$), in the post-critical region by subjects, with a marginal effect by items ($F_1(1, 23) = 4.644$, $p = .042$; $F_2(1, 31) = 3.906$, $p = .057$), and a marginally significant effect in the final region by items ($F_1(1, 23) = 2.017$, $p = .169$;

$F_2(1, 31) = 3.089$, $p = .089$), demonstrating that each antecedent presented in the stimuli had a different effect on the exposed's RTs depending on which type of pronoun was used (Figure 5.10).

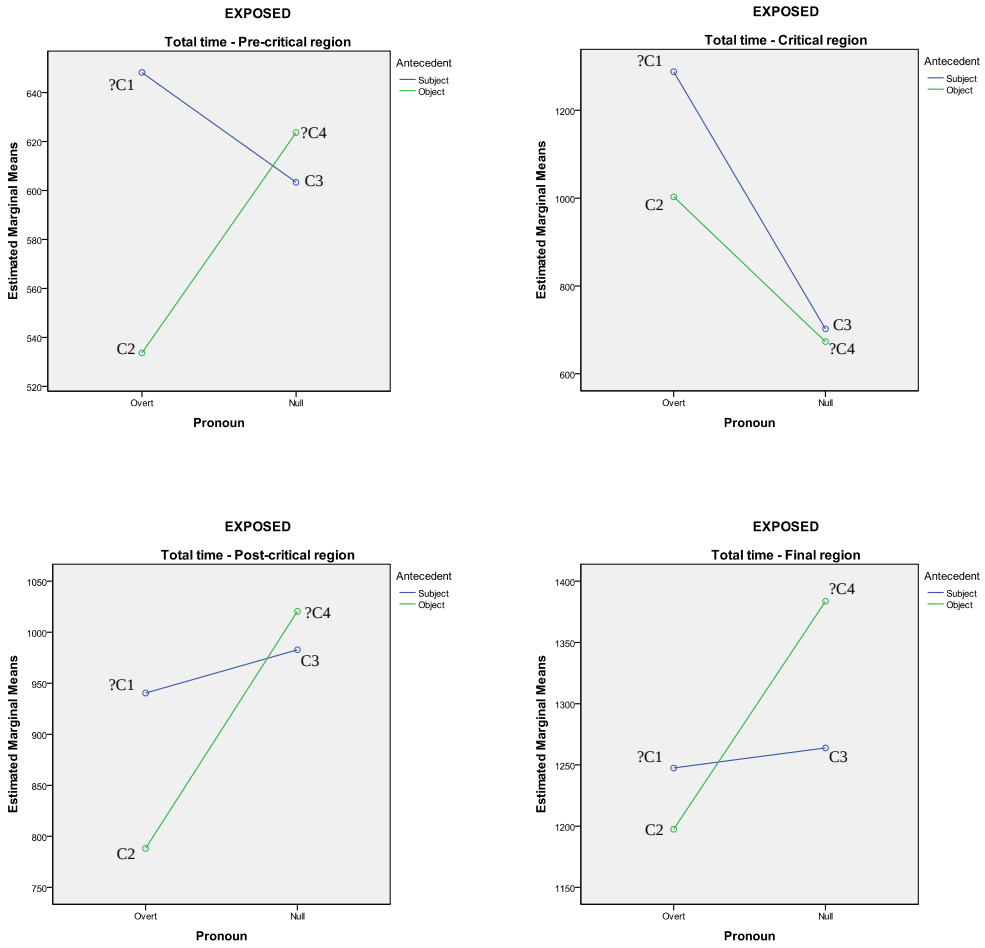

Figure 5.10. Exposed's RT means for total time by subjects in the pre-critical, critical, post-critical and final regions.

Consequently, paired samples t-tests were run for the pre-critical, critical and post-critical regions, which as before, only showed significant results for the overt pronoun, but not for the null. In the pre-critical region, for the overt pronoun ($t_1(23) = 2.905$, $p = .008$; $t_2(31) = 2.712$, $p = .011$), exposed revealed significantly longer RTs for the Subject Antecedent (M = 648.21, SD = 217.498) than for the Object

Antecedent (M = 533.63, SD = 236.565). The null pronoun showed non-significant effects ($t_1(23) = -.512$, $p = .614$; $t_2(31) = -.121$, $p = .904$), although exposed's RTs were still shorter for the Subject Antecedent (M = 603.33, SD = 245.735) than for the Object Antecedent (M = 623.67, SD = 260.158).

In the critical region, for the overt pronoun ($t_1(23) = 3.632$, $p < .001$; $t_2(31) = 3.774$, $p < .001$), exposed showed significantly longer RTs for the Subject Antecedent (M = 1287.92, SD = 551.463) than for the Object Antecedent (M = 1003.04, SD = 400.660). However, the results for the null pronoun were not significant ($t_1(23) = .541$, $p = .593$; $t_2(31) = 1.090$, $p = .284$) and showed, contrary to what it would be expected, longer RTs for the Subject Antecedent (M = 702.33, SD = 334.785) than for the Object Antecedent (M = 673.17, SD = 266.598).

Finally, the same was shown in the post-critical region. For the overt pronoun ($t_1(23) = 2.457$, $p = .022$; $t_2(31) = 2.617$, $p = .014$), exposed revealed longer RTs for Subject Antecedent (M = 940.42, SD = 449.028) than for Object Antecedent (M = 788.13, SD = 316.732). For the null pronoun ($t_1(23) = -.533$, $p = .599$; $t_2(31) = -.255$, $p = .801$), although the results were not significant, the RTs were still shorter for the Subject Antecedent (M = 982.83, SD = 439.764) than for the Object Antecedent (M = 1020.42, SD = 433.070).

Attriters

First pass

As predicted in Section 5.3.2.5, attriters differ greatly from the other two groups. The repeated-measures ANOVA revealed only a main effect of *Pronoun* in the critical region ($F_1(1, 23) = 70.290$, $p < .001$; $F_2(1, 31) = 70.325$, $p < .001$), not in the post-critical region ($F_1(1, 23) = .314$, $p = .580$; $F_2(1, 31) = .192$, $p = .665$) or in

the final region ($F_1(1, 23) = .058$, $p = .812$; $F_2(1, 31) = .007$, $p = .933$), with the overt pronoun revealing longer RTs than the null.

No main effect of *Antecedent* was found in the critical ($F_1(1, 23) = 1.359$, $p = .256$; $F_2(1, 31) = .148$, $p = .703$), post-critical ($F_1(1, 23) = .471$, $p = .500$; $F_2(1, 31) = .281$, $p = .600$) or in the final regions ($F_1(1, 23) = .036$, $p = .850$; $F_2(1, 31) = .030$, $p = .863$), revealing that the type of antecedent presented did not have an influence in attriters' RTs when processing the stimuli.

Furthermore, as expected, no significant interaction of *Pronoun* and *Antecedent* was revealed in the critical ($F_1(1, 23) = .171$, $p = .683$; $F_2(1, 31) = .219$, $p = .643$) or post-critical regions ($F_1(1, 23) = 1.281$, $p = .269$; $F_2(1, 31) = 1.751$, $p = .195$), and a marginal effect was revealed in final region, although only by items ($F_1(1, 23) = 2.685$, $p = .115$; $F_2(1, 31) = 3.760$, $p = .062$). These results indicate that when attriters processed the stimuli each antecedent did not have a different effect in their RTs depending on which type of pronoun was presented.

Go-past

Very similar results to those obtained for total time were shown for go-past. The ANOVA revealed only a main effect of *Pronoun* in the critical region ($F_1(1, 23) = 15.880$, $p < .001$; $F_2(1, 31) = 23.033$, $p < .001$), not in the post-critical region ($F_1(1, 23) = .229$, $p = .637$; $F_2(1, 31) = .136$, $p = .714$) or in the final region ($F_1(1, 23) = 2.475$, $p = .129$; $F_2(1, 31) = 1.219$, $p = .278$), with the overt pronoun revealing longer RTs than the null.

A main effect of *Antecedent* was found in the critical region by subjects ($F_1(1, 23) = 4.302$, $p = .049$; $F_2(1, 31) = 2.345$, $p = .136$), but not in the post-critical ($F_1(1, 23) = .055$, $p = .817$; $F_2(1, 31) = .075$, $p = .787$) or in the final regions ($F_1(1,$

23) = .171, p = .683; F_2(1, 31) = .399, p = .532), with the subject antecedent showing longer RTs than the object.

Again, no interaction of *Pronoun* and *Antecedent* was shown in the critical region (F_1(1, 23) = .206, p = .654; F_2(1, 31) = 1.525, p = .226), post-critical region (F_1(1, 23) = .033, p = .858; F_2(1, 31) = .011, p = .918) or final region (F_1(1, 23) = .574, p = .456; F_2(1, 31) = .334, p = .567), showing again that when attriters processed the stimuli each antecedent did not have a different effect in their RTs depending on the type of pronoun used.

Total time

Similar results were also obtained for total time. The repeated-measures ANOVA revealed only a main effect of *Pronoun*, but this time in the critical region (F_1(1, 23) = 44.518, p < .001; F_2(1, 31) = 82.406, p < .001), the post-critical region (F_1(1, 23) = 8.070, p = .009; F_2(1, 31) = 4.604, p = .040) and the final region (F_1(1, 23) = 6.917, p = .015; F_2(1, 31) = 4.773, p = .037), with the overt pronoun revealing longer RTs than the null in the critical region, but shorter RTs than the null in the other two regions.

However, no main effect of *Antecedent* was seen in the critical (F_1(1, 23) = 4.252, p = .051; F_2(1, 31) = 1.247, p = .273), post-critical (F_1(1, 23) = .006, p = .937; F_2(1, 31) = .611, p = .440) or final regions (F_1(1, 23) = 3.629, p = .069; F_2(1, 31) = 3.401, p = .075), which indicates that the type of antecedent presented did not have an influence in attriters' RTs.

Consistent with the previous results, no interaction of *Pronoun* and *Antecedent* was shown in the critical region (F_1(1, 23) = 1.506, p = .232; F_2(1, 31) = .946, p = .338), post-critical region (F_1(1, 23) = .584, p = .452; F_2(1, 31) = .557, p = .461) or final region (F_1(1, 23) = 1.165, p = .292; F_2(1, 31) = .829, p = .370),

confirming that when attriters processed the stimuli each antecedent did not have a different effect in their RTs depending on the type of pronoun presented.

Monolinguals versus Exposed

First pass

Overall, as predicted, the repeated-measures ANOVAs run revealed no differences between the groups. No significant three-way interaction of *Pronoun*, *Antecedent* and *Language Group* was shown for first pass in the critical ($F_1(1, 46) = 3.007$, $p = .090$; $F_2(1, 31) = .867$, $p = .359$), post-critical ($F_1(1, 46) = .015$, $p = .902$; $F_2(1, 31) = .003$, $p = .954$) or final regions ($F_1(1, 46) = 1.117$, $p = .296$; $F_2(1, 31) = .460$, $p = .503$), revealing that there are no significant differences between monolinguals and exposed in terms of how they are affected by the type of pronoun and antecedent presented in the stimuli.

Similarly to the offline task, a significant interaction of *Pronoun* and *Antecedent* ($F_1(1, 46) = 15.660$, $p < .001$; $F_2(1, 31) = 14.476$, $p < .001$) was shown in the critical region, but not in the post-critical or final regions. The t-test revealed significant effects for the overt pronoun ($t_1(47) = 4.614$, $p < .001$), but not for the null ($t_1(47) = -.381$, $p = .705$)

A main effect of *Pronoun* ($F_1(1, 46) = 200.086$, $p < .001$; $F_2(1, 31) = 217.945$, $p < .001$), with the overt pronoun revealing longer RTs than the null, and a main effect of *Antecedent* ($F_1(1, 46) = 11.191$, $p = .002$; $F_2(1, 31) = 12.564$, $p < .001$), with the subject antecedent showing longer RTs than the object, were shown in the critical region, but no main effects were shown in the post-critical or final regions.

Go-past

No significant three-way interaction of *Pronoun*, *Antecedent* and *Language Group* was revealed for go-past either in the critical ($F_1(1, 46) = .104$, $p = .748$; $F_2(1, 31) = .000$, $p = .991$), post-critical ($F_1(1, 46) = .293$, $p = .591$; $F_2(1, 31) = .149$, $p = .702$) or final regions ($F_1(1, 46) = .606$, $p = .440$; $F_2(1, 31) = .971$, $p = .332$), which indicates again that there are no significant differences between monolinguals and exposed in terms of how they are affected by the type of pronoun and antecedent presented in the stimuli.

A significant interaction of *Pronoun* and *Antecedent* was shown in the critical region ($F_1(1, 46) = 7.675$, $p = .008$; $F_2(1, 31) = 4.056$, $p = .053$) and in the final region ($F_1(1, 46) = 5.945$, $p = .019$; $F_2(1, 31) = 4.292$, $p = .047$), but not in the post-critical region. The t-tests revealed significant effects for the overt pronoun in the critical ($t_1(47) = 2.952$, $p = .005$) and final regions ($t_1(47) = 2.303$, $p = .026$), but no significant effects were seen for the null pronoun in the critical ($t_1(47) = -.995$, $p = .325$) or in the final regions ($t_1(47) = .502$, $p = .618$).

Finally, a main effect of *Pronoun* was revealed in the critical region ($F_1(1, 46) = 78.158$, $p < .001$; $F_2(1, 31) = 74.539$, $p < .001$), with the overt pronoun showing longer RTs than the null, but not in the post-critical or final regions. No main effects of *Antecedent* were revealed in any of the regions.

Total time

The only significant three-way interaction of *Pronoun*, *Antecedent* and *Language Group* was shown in total time exclusively in the final region, and only by items ($F_1(1, 46) = 2.157$, $p = .149$; $F_2(1, 31) = 4.962$, $p = .033$), but no three-way interaction was revealed in the critical ($F_1(1, 46) = .000$, $p = .997$; $F_2(1, 31) = 2.952$, $p = .096$) or post-critical regions ($F_1(1, 46) = .933$, $p = .339$; $F_2(1, 31) = 2.961$, $p =$

.095), which indicates that there might be some differences between monolinguals and exposed in terms of how they are affected by the type of pronoun and antecedent presented in the stimuli. In order to see which group had a stronger two-way interaction effect between Pronoun and Antecedent, the RT means of each condition were subtracted for each group (i.e. (C1-C2) – (C3-C4)), and exposed showed a stronger Pronoun*Antecedent interaction (129.43) than monolinguals (-60). In fact, as it was introduced before and Figure 5.11 illustrates, when analyzing the results for each group separately, monolinguals did not show any two-way interaction effect in the final region for any of the measures.

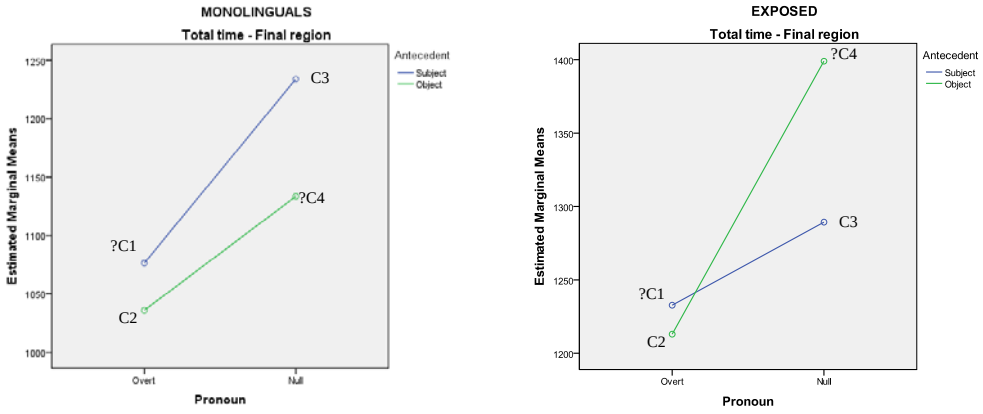

Figure 5.11. Monolinguals and exposed's RT means for total time by items in the final region.

As a result of the three-way interaction, some tests were run to explore the nature of this effect in the final region. Monolinguals and exposed did not reveal significant results for the overt pronoun ($t_1(47) = -.012$, $p = .991$; $F_2(1, 31) = .058$, $p = .812$), showing similar RTs for the Subject Antecedent (M = 1162.56, SD = 460.996) and for the Object Antecedent (M = 1163.17, SD = 443.710). For the null pronoun ($t_1(47) = -1.558$, $p = .126$; $F_2(1, 31) = 4.500$, $p = .042$), they showed significantly shorter RTs for the Subject Antecedent (M = 1269.25, SD = 552.190) than for the Object Antecedent (M = 1336.25, SD = 542.290), but only by items.

Nevertheless, since this was the only three-way interaction found when comparing monolinguals and exposed, and it was only shown for total time by items in the final region, in order to find out whether this result was reliable, first pass regression analyses were run for the final region in these two groups, and then the two groups compared. *First-pass regressions* refer to the leftward eye fixations that are made immediately after a first-pass fixation in a particular region. Results did not reveal any significant main effects of *Pronoun* or *Antecedent* nor interaction effects of *Pronoun*Antecedent* in the monolinguals ($F_1(1, 23) = 2.247$, $p = .148$; $F_2(1, 31) = 1.913$, $p = .177$) or exposed group ($F_1(1, 23) = .001$, $p = .982$; $F_2(1, 31) = .074$, $p = .787$). More importantly, when the two groups' results were compared, no significant three-way interaction effects of *Pronoun*Antecedent*Language Group* were shown either ($F_1(1, 46) = 1.238$, $p = .272$; $F_2(1, 31) = .467$, $p = .499$), which shows there are not significant differences between monolinguals and exposed in terms of how they are affected by the type of pronoun and antecedent when interpreting the sentences. These results indicate that the three-way interaction effect revealed when comparing monolinguals vs. exposed for total time by items in the final region is not reliable.

On the other hand, a significant interaction of *Pronoun* and *Antecedent* was revealed in the pre-critical region ($F_1(1, 46) = 8.208$, $p = .006$; $F_2(1, 31) = 3.309$, $p = .079$), the critical region ($F_1(1, 46) = 21.685$, $p < .001$; $F_2(1, 31) = 7.783$, $p = .009$) and post-critical region by subjects ($F_1(1, 46) = 4.557$, $p = .038$; $F_2(1, 31) = 2.225$, $p = .146$), but not in the final region ($F_1(1, 46) = .890$, $p = .350$; $F_2(1, 31) = .272$, $p = .605$). The t-tests revealed significant effects for the overt pronoun in the pre-critical ($t_1(47) = 3.166$, $p = .003$), critical ($t_1(47) = 5.477$, $p < .001$) and post-critical regions ($t_1(47) = 2.385$, $p = .021$), but no significant effects were seen for the null pronoun in the pre-critical ($t_1(47) = -1.222$, $p = .228$), critical ($t_1(47) = -.282$, $p = .779$) or in the post-critical regions ($t_1(47) = -.742$, $p = .462$).

A main effect of *Pronoun* was shown in the critical ($F_1(1, 46) = 122.464$, $p < .001$; $F_2(1, 31) = 496.988$, $p < .001$), post-critical ($F_1(1, 46) = 21.710$, $p < .001$; $F_2(1, 31) = 11.992$, $p = .002$) and final regions ($F_1(1, 46) = 12.284$, $p < .001$; $F_2(1, 31) =$

7.166, p = .012), with the overt pronoun revealing longer RTs than the null in the critical region, and shorter RTs than the null in the other two regions. Also, a main effect of *Antecedent* was shown only in the critical region (F_1(1, 46) = 15.079, p < .001; F_2(1, 31) = 7.308, p = .011), with the subject antecedent showing longer RTs than the object, but not in the post-critical or final regions.

Monolinguals versus Attriters

First pass

As predicted, the repeated-measures ANOVAs run revealed differences between the two groups. A significant three-way interaction of *Pronoun*, *Antecedent* and *Language Group* was shown in the critical region by subjects (F_1(1, 46) = 5.064, p = .029; F_2(1, 31) = 2.047, p = .163) and in the final region by subjects as well (F_1(1, 46) = 4.757, p = .034; F_2(1, 31) = 1.827, p = .186), but not in the post-critical region (F_1(1, 46) = .943, p = .337; F_2(1, 31) = 1.833, p = .186), which reveals that there are differences between monolinguals and attriters in terms of how they are affected by the type of pronoun and antecedent presented in the stimuli. Moreover, after subtracting the RT means of each group, in the critical region (Figure 5.12), monolinguals showed a stronger Pronoun*Antecedent interaction (99.21) than attriters (11.20) reacting to the sentences, but in the final region (Figure 5.13), it is the attrited group the one that shows stronger Pronoun*Antecedent interaction (90.12) than monolinguals (-60.12). However, as it was introduced before, when analyzing the results for each group separately, monolinguals did not show any two-way interaction effect in the final region because, as Table 5.5 showed, monolinguals' RT means for first pass in the final region show shorter RTs for condition 1 than for condition 2 and shorter RTs for condition 4 than for condition 3, contrary to what it would be expected and to what monolinguals show for the other measures and regions.

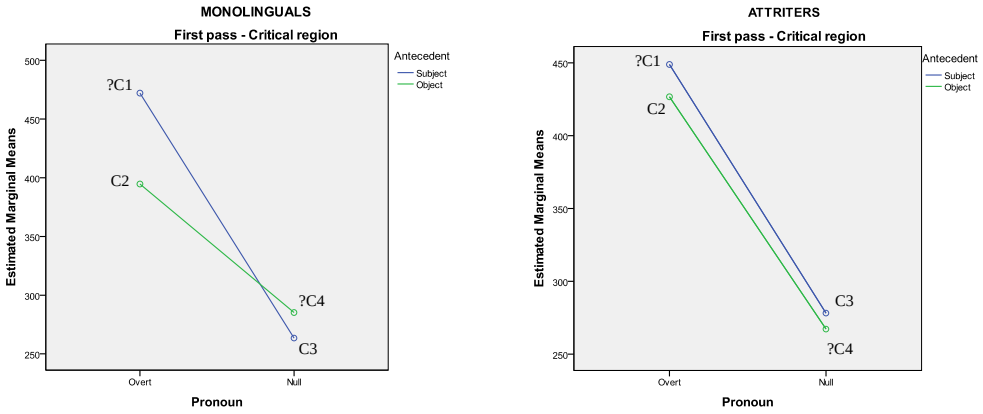

Figure 5.12. Monolinguals and attriters' RT means for first pass by subjects in the critical region.

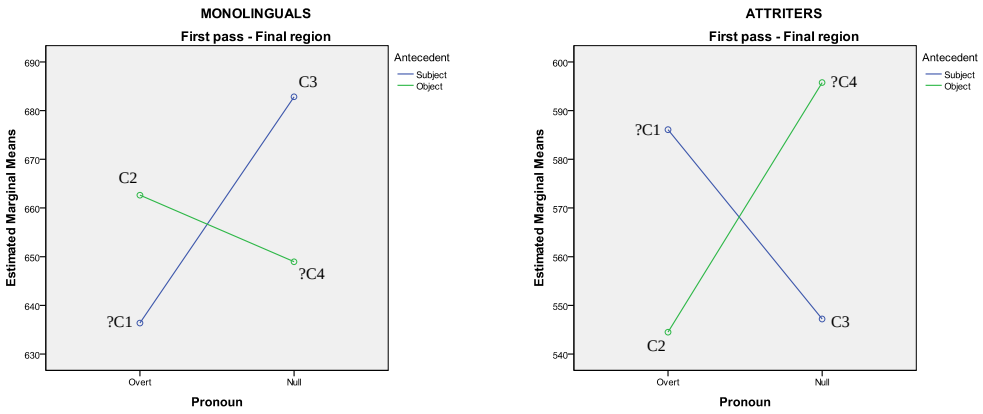

Figure 5.13. Monolinguals and attriters' RT means for first pass by subjects in the final region.

As a result of the three-way interaction, some tests were run to explore the nature of this effect. In the critical region, monolinguals and attriters only revealed significant results for the overt pronoun ($t_1(47) = 3.107$, $p = .003$; $F_2(1, 31) = 2.615$, $p = .116$), showing significantly longer RTs for the Subject Antecedent (M = 460.48, SD = 154.081) than for the Object Antecedent (M = 410.69, SD = 106.722). The results for the null pronoun were not significant ($t_1(47) = -.461$, $p = .647$; $F_2(1, 31) = .100$, $p = .754$) although, as expected, these two groups showed shorter RTs for the

Subject Antecedent (M = 270.83, SD = 67.855) than for the Object Antecedent (M = 276.25, SD = 77.106).

In the final region, no significant results were seen for any of the pronouns. For the overt pronoun ($t_1(47) = .322$, $p = .749$; $F_2(1, 31) = 1.788$, $p = .191$), monolinguals and attriters still showed longer RTs for the Subject Antecedent (M = 611.23, SD = 191.687) than for the Object Antecedent (M = 603.56, SD = 182.209), and for the null pronoun ($t_1(47) = -.289$, $p = .774$; $F_2(1, 31) = .497$, $p = .486$), shorter RTs for the Subject Antecedent (M = 615.02, SD = 236.877) than for the Object Antecedent (M = 622.35, SD = 212.278).

Finally, it should be pointed out that the three-way interaction effect revealed for monolinguals and attriters for first pass in the final region (see Figure 5.13) seems to be due to the fact that monolinguals show the opposite pattern from that predicted (i.e. the overt/object condition shows longer first-pass times than the overt/subject condition, and the null/subject condition longer than the null/object condition) and attriters show the expected effect. This could be explained if we consider, on the one hand, the possibility that attriters may show the expected effect, but they show it later than monolinguals, and on the other hand, that the inconsistency shown by the monolinguals might be related to first-pass regressions from the final region. This could actually be associated to processing difficulties, so in the conditions where processing difficulty is expected (i.e. overt/subject, null/object), participants may make one or two initial fixations before regressing to other regions, resulting in short first-pass times, and in conditions where no processing difficulty is expected (i.e. overt/object, null/subject), participants may just make more initial fixations without the need to go back to previous regions, resulting in longer first-pass times (Sturt 2007, Sturt et al. 2010).

A significant interaction by subjects and marginal by items of *Pronoun* and *Antecedent* ($F_1(1, 46) = 7.972$, $p = .007$; $F_2(1, 31) = 3.597$, $p = .067$) was seen in the critical region. Also, a main effect of *Pronoun* ($F_1(1, 46) = 155.871$, $p < .001$; $F_2(1,$

31) = 118.989, $p < .001$), with the overt pronoun revealing longer RTs than the null, and a main effect of *Antecedent* by subjects ($F_1(1, 46) = 5.190$, $p = .027$; $F_2(1, 31) = 2.112$, $p = .156$), with the subject antecedent showing longer RTs than the object, were shown in the critical region. No main or two-way interaction effects were shown in the post-critical or final regions.

Go-past

No significant three-way interactions of *Pronoun*, *Antecedent* and *Language Group* were revealed for the critical ($F_1(1, 46) = 1.457$, $p = .234$; $F_2(1, 31) = .380$, $p = .542$), post-critical ($F_1(1, 46) = .492$, $p = .487$; $F_2(1, 31) = .371$, $p = .547$) or final regions ($F_1(1, 46) = .117$, $p = .734$; $F_2(1, 31) = .071$, $p = .792$), indicating that there are no significant differences in go-past between monolinguals and attriters in terms of how they are affected by the type of pronoun and antecedent presented in the stimuli.

Main effects of *Pronoun* ($F_1(1, 46) = 59.662$, $p < .001$; $F_2(1, 31) = 68.629$, $p < .001$), with the overt pronoun revealing longer RTs than the null, and of *Antecedent* by subjects ($F_1(1, 46) = 5.480$, $p = .024$; $F_2(1, 31) = 2.091$, $p = .158$), with the subject antecedent showing longer RTs than the object, were shown in the critical region, but not in the post-critical or final regions. No significant interaction effects were found in any of the three regions.

Total time

No significant three-way interaction of *Pronoun*, *Antecedent* and *Language Group* was shown in the critical ($F_1(1, 46) = 1.869$, $p = .178$; $F_2(1, 31) = .015$, $p = .903$), post-critical ($F_1(1, 46) = .002$, $p = .967$; $F_2(1, 31) = 1.101$, $p = .302$) or final

regions ($F_1(1, 46) = 1.372$, $p = .247$; $F_2(1, 31) = 1.974$, $p = .170$), revealing that there are no significant differences in total time between monolinguals and attriters in terms of how they are affected by the type of pronoun and antecedent presented in the stimuli.

A significant interaction of *Pronoun* and *Antecedent* was revealed in the critical ($F_1(1, 46) = 10.271$, $p = .002$; $F_2(1, 31) = 25.300$, $p < .001$), but not in the post-critical or final regions. The t-test revealed significant effects for the overt pronoun ($t_1(47) = 4.103$, $p < .001$), but not for the null ($t_1(47) = -.554$, $p = .582$).

Moreover, a main effect of *Pronoun* was seen in the critical ($F_1(1, 46) = 96.849$, $p < .001$; $F_2(1, 31) = 118.538$, $p < .001$), post-critical ($F_1(1, 46) = 17.484$, $p < .001$; $F_2(1, 31) = 7.566$, $p = .010$) and final regions ($F_1(1, 46) = 16.431$, $p < .001$; $F_2(1, 31) = 11.067$, $p = .002$), with the overt pronoun revealing longer RTs than the null in the critical region, but shorter RTs than the null in the other two regions. A main effect of *Antecedent* was also shown in the critical ($F_1(1, 46) = 11.471$, $p < .001$; $F_2(1, 31) = 24.853$, $p < .001$) and final regions by subjects ($F_1(1, 46) = 4.236$, $p = .045$; $F_2(1, 31) = .000$, $p = .987$), with the subject antecedent showing longer RTs than the object in the critical region, but shorter RTs than the object in the final region.

Attriters versus Exposed

First pass

Contrary to our predictions, the repeated-measures ANOVAs run revealed no differences between these two groups. No significant three-way interaction of *Pronoun*, *Antecedent* and *Language Group* was shown for first pass in the critical ($F_1(1, 46) = .656$, $p = .422$; $F_2(1, 31) = .233$, $p = .633$), post-critical ($F_1(1, 46) = 1.262$, $p = .267$; $F_2(1, 31) = 1.816$, $p = .188$) or final regions ($F_1(1, 46) = .161$, $p =$

.690; $F_2(1, 31) = .428$, $p = .518$), indicating that there are no significant differences between attriters and exposed in terms of how they are affected by the type of pronoun and antecedent presented in the stimuli.

A significant interaction of *Pronoun* and *Antecedent* was seen in the final region by items ($F_1(1, 46) = .161$, $p = .690$; $F_2(1, 31) = 5.488$, $p = .026$), but not in critical or the post-critical regions. The t-test did not reveal significant effects for the overt ($t_1(47) = .999$, $p = .323$) or the null pronouns ($t_1(47) = -1.136$, $p = .262$).

A main effect of *Pronoun* ($F_1(1, 46) = 175.930$, $p < .001$; $F_2(1, 31) = 196.000$, $p < .001$) was shown in the critical region, with the overt pronoun revealing longer RTs than the null, but not in the post-critical or final regions. Also, a main effect of *Antecedent* was seen in the critical region by subjects ($F_1(1, 46) = 6.905$, $p = .012$; $F_2(1, 31) = 2.604$, $p = .117$) and in the post-critical region by subjects, with a marginal effect by items ($F_1(1, 46) = 4.145$, $p = .048$; $F_2(1, 31) = 3.811$, $p = .060$), showing the subject antecedent longer RTs than the object.

Go-past

No significant three-way interaction of *Pronoun*, *Antecedent* and *Language Group* was revealed either for go-past in the critical ($F_1(1, 46) = .770$, $p = .385$; $F_2(1, 31) = .318$, $p = .577$), post-critical ($F_1(1, 46) = 1.101$, $p = .300$; $F_2(1, 31) = 1.272$, $p = .268$) or final regions ($F_1(1, 46) = 1.123$, $p = .295$; $F_2(1, 31) = 1.441$, $p = .239$), indicating that there are no significant differences between attriters and exposed in terms of how they are affected by the type of pronoun and antecedent presented in the stimuli.

A significant interaction of *Pronoun* and *Antecedent* was shown in the critical region by items ($F_1(1, 46) = 2.325$, $p = .385$; $F_2(1, 31) = 4.603$, $p = .040$) and in the final region by subjects, with a marginal effect by items ($F_1(1, 46) = 4.221$, $p = .046$;

$F_2(1, 31) = 3.364$, $p = .076$), but not in the post-critical region. In the critical region, the t-test revealed significant effects for the overt pronoun ($t_1(47) = 2.672$, $p = .010$), but not for the null pronoun ($t_1(47) = .227$, $p = .783$). In the final region, no significant effects were seen for the overt ($t_1(47) = 1.569$, $p = .123$) or the null pronouns ($t_1(47) = -1.576$, $p = .122$).

A main effect of *Pronoun* ($F_1(1, 46) = 46.097$, $p < .001$; $F_2(1, 31) = 45.858$, $p < .001$), with the overt pronoun revealing longer RTs than the null, and a main effect of *Antecedent* ($F_1(1, 46) = 4.420$, $p = .041$; $F_2(1, 31) = 4.269$, $p = .047$), with the subject antecedent showing longer RTs than the object, were revealed in the critical region, but no main effects were seen in the post-critical or final regions.

Total time

Again, no significant three-way interaction of *Pronoun*, *Antecedent* and *Language Group* was seen in the critical ($F_1(1, 46) = 1.729$, $p = .195$; $F_2(1, 31) = 1.388$, $p = .248$), post-critical ($F_1(1, 46) = .711$, $p = .404$; $F_2(1, 31) = .877$, $p = .356$) or final regions ($F_1(1, 46) = .106$, $p = .746$; $F_2(1, 31) = .001$, $p = .977$), indicating that there are no significant differences between attriters and exposed in terms of how they are affected by the type of pronoun and antecedent presented in the stimuli.

A significant interaction of *Pronoun* and *Antecedent* was revealed in the critical region ($F_1(1, 46) = 9.471$, $p = .004$; $F_2(1, 31) = 8.506$, $p = .007$), but not in the post-critical or final regions. The t-test revealed significant effects for the overt pronoun ($t_1(47) = 3.877$, $p < .001$), but not for the null ($t_1(47) = .702$, $p = .486$).

Finally, a main effect of *Pronoun* was shown in the critical ($F_1(1, 46) = 111.237$, $p < .001$; $F_2(1, 31) = 196.964$, $p < .001$), post-critical ($F_1(1, 46) = 19.440$, $p < .001$; $F_2(1, 31) = 11.854$, $p = .002$) and final regions ($F_1(1, 46) = 10.037$, $p = .003$; $F_2(1, 31) = 9.638$, $p = .004$), with the overt pronoun revealing longer RTs than the

null in the critical region, but shorter RTs than the null in the other two regions. A main effect of *Antecedent* was shown only in the critical region ($F_1(1, 46) = 12.731$, $p < .001$; $F_2(1, 31) = 11.949$, $p = .002$), with the subject antecedent showing longer RTs than the object, but not in the post-critical or final regions.

5.3.2.7 Discussion

The results presented for Experiment 1B reveal that, as expected, participants overall showed longer RTs with the sentences in which the number information forced the overt pronoun to co-refer with the subject antecedent (condition 1) than with the sentences in which the overt pronoun was assigned to the object antecedent (condition 2), as well as longer RTs with the sentences in which the number features forced the null pronoun to co-refer with the object antecedent (condition 4) than with the sentences in which the null pronoun was assigned to the subject antecedent (condition 3). Again, this supports the predictions made following Carminati's (2002) Position of Antecedent Hypothesis.

As in Experiment 1A, an unexpected difference between the pronouns was shown again, revealing that participants from the three groups had a clear preference for the object as the antecedent for the overt pronoun, but for the null pronoun, their preference for the subject as its antecedent was weaker. This effect was shown for all measures and all regions. These results seem to differ from previous findings that suggest that native speakers of Spanish consistently assign the subject antecedent with a null pronoun, whereas the overt pronoun is more flexible and not so strictly assigned to the object antecedent (Filiaci 2010, Filiaci et al. 2010)[2]. However, some differences exist between the task and the stimuli used in the previously mentioned studies and the present study. On the one hand, they used a self-paced reading task, whereas we used an eye-tracking-while-reading task. More importantly, they based

[2] See Section 2.3 in Chapter 2 for a detailed description of these studies.

this prediction on Spanish using anaphora in which the subordinate clause with the antecedents was followed by the main clause with the pronoun (Subordinate-Main) and forced a co-reference using semantic meaning (i.e. Cuando Ana visitó a María en el hospital, ella le llevó un ramo de rosas / *When Ana visited Mary in the hospital, she brought her a bunch of roses*), whereas we used anaphora with the reverse order, a main clause followed by a subordinate clause (Main-Subordinate) and forced a co-reference using number features. In fact, Filiaci (2010) includes two experiments in which she tests only the Main-Subordinate anaphora, and her results are similar to the ones presented here, with the overt pronoun revealing a strong bias for the object antecedent and the null pronoun a weak preference for the subject antecedent. That is, both Italian and Spanish speakers revealed faster RTs with anaphora in which the overt pronoun referred to the object antecedent than when it referred to the subject antecedent, and their answers to the comprehension questions that followed the sentences were significantly more accurate when the overt pronoun referred to the object antecedent than when it referred to the subject antecedent. Moreover, sentences containing a null pronoun did not reveal any significant antecedent preference, especially in Spanish. These results obtained by Filiaci for the Main-Subordinate anaphora are consistent with the ones revealed from the experiment presented in this chapter.

Interestingly, Carminati's (2002) Position of Antecedent Hypothesis (see Section 5.3 above) was also based on Subordinate-Main anaphora. However, she conducted a questionnaire study to explore participants' antecedent preferences in ambiguous sentences and her results showed that that in Main-Subordinate anaphora with temporal clauses, which are exactly the kind of anaphora used in the present experiment, more object antecedents were assigned to null pronouns that in other type of clauses. Her explanation is that temporal clauses are attached to the VP and so is the overt pronoun, so it becomes more accessible as an antecedent. Therefore, for Main-Subordinate anaphora with temporal clauses, Carminati predicts a weaker subject preference with null pronouns than for other types of anaphora, whereas the overt pronoun bias should remain the same.

Moreover, a rigid preference for the subject as the antecedent for the null pronoun has not been found for L2 Italian either in other studies, which also supports the results obtained in the present study. For example, Sorace & Filiaci (2006) investigated the interpretation of null versus overt subject pronouns in Italian with English-speaking near-native speakers of Italian (see Section 4.2.1 in Chapter 4), and their results revealed that null pronouns were accepted to refer to either the subject or the object antecedent in forward anaphora, which is the type of anaphora that the participants in our experiments were presented with. Fedele & Kaiser (2012) also show the same stronger antecedent preference of the overt pronoun that was revealed in the present study. They studied the comprehension of anaphora and cataphora in L2 Italian comparing null and overt pronouns. For the anaphor configuration they used the same kind of sentences as the ones used in this study (i.e. Maria abbraccia Rita, mentre (null/lei) parla del viaggio a Londra / *Maria hugs Rita, while (null/she) is talking about the trip to London*), and their results revealed that whereas for the null pronoun there is a general subject preference, it is more likely to be assigned to refer to the object antecedent in anaphor configuration than in cataphor configuration ($p < .05$). On the other hand, the overt pronoun clearly prefers the object antecedent in anaphor configuration ($p < .05$), being this strong object bias of the overt pronoun weaker in cataphora conditions.

Bosch et al. (2003, 2007) and Bosch & Umbach (2007) also found a distinction in terms of the antecedent preferences of two types of pronouns in German: personal pronouns (*er, sie, es*) and demonstrative pronouns (*der, die, das*). They tested German native speakers to explore their antecedent preferences for these two pronouns in sentences like (5.5) below, using both corpus studies and psycholinguistic experiments (a self-paced reading task and a completion task where they had to type their preferred antecedent in a final target sentence, which established the participants' reading times). They reported that while personal pronouns show a slight preference for subject antecedents, demonstrative pronouns reveal a clear strong bias for object antecedents. Bosch & Umbach (2007) further

generalized this hypothesis by predicting that personal pronouns prefer discourse topics as their antecedents and demonstrative pronouns prefer non-topic antecedents.

(5.5) Peter wollte mit Paul Tennis spielen. Doch (er/der) war erkältet.

Paul wanted to play tennis with Peter. But (he/DEM) had a cold.

A feasible explanation of this phenomenon could be related to the recency factor. That is, given the position of the object antecedent in Main-Subordinate anaphora, the fact that the object is the more recent antecedent might favor the strong bias of the overt pronoun for the object antecedent and weaken the bias of the null pronoun for the subject antecedent. However, due to the fact that the subject is usually still the preferred antecedent for the null pronoun, a more accurate proposal is that although when speakers parse this type of sentence they retrieve the syntactic information (i.e. null pronouns refer to the most prominent antecedent whereas overt pronouns refer to the non-prominent antecedent), the recency factor might interfere with the syntactic information. This explanation accounts for the strong bias of the overt pronoun, since speakers can rely on the syntactic information plus the recency factor, and the weaker bias of the null pronoun, since the syntactic information alone might not be enough for a strong subject preference. Moreover, other studies have shown that the use of overt pronouns increases in contexts in which ambiguity exists, so speakers opt to use an overt pronoun to avoid confusion or miscommunication, even when it may be considered to be redundant (Cameron 1992, Serratrice 2007, Sorace et al. 2009, Lapidus & Smith 2009, Posio 2011). Experiment 2 (see Section 5.4) will explore this unexpected result further.

On the other hand, since Experiment 1B implemented an eye-tracking while reading task in which the online processing of pronominal subjects was explored, following the Interface Hypothesis, attriters were expected to show no online sensitivity with this interface structure and, consequently, to perform differently from monolinguals and exposed. This prediction was supported by our results, which revealed that monolinguals and exposed are reliably more sensitive than attriters to

the pronoun mismatch. While for monolinguals and exposed each type of antecedent had a different effect when they processed the stimuli depending on the type of pronoun presented, this was not true for attriters, who did not show significant interaction effects of *Pronoun*Antecedent* in any of the regions for any of the measures, although as it was mentioned before, the three-way interaction effect of *Pronoun*Antecedent*Language Group* revealed in the final region for first pass by subjects when they were compared to monolinguals raises the possibility that attriters may be sensitive to the pronoun mismatch, but later than monolinguals (see Figure 5.13 above). These results reveal attriters' weaker online sensitivity when processing pronominal subjects in real time and confirm our first hypothesis.

In contrast, following Paradis' (1993) ATH and Sorace's (2011) Interface Hypothesis, which predict that attrition diminishes with frequency and recency of exposure to the L1 (see Chapter 4), the group of attriters exposed to L1 Spanish (i.e. the 'exposed' group) was expected to show online sensitivity to the pronoun mismatch and, consequently, to perform similarly to monolinguals. The results obtained for the exposed group did reveal no attrition effects with pronominal subjects, since this group, unlike the attriters, showed online sensitivity when processing this interface structure in real time (i.e. they showed a reliable sensitivity to the pronoun mismatch). Moreover, when they were compared to the monolinguals, no significant differences between the two groups were revealed. However, when this group was compared to the attriters, no differences between the groups were shown either.

Therefore, it might be the case that the exposed group is somewhere in between the attriters and the monolinguals; that is, their attrition effects have clearly diminished after having been exposed to the L1 for a prolonged period of time, but not to the point of behaving native-like. The question now is whether attrition with interface structures such as subject pronouns just cannot be completely overcome or whether it is a matter of the length of exposure to the L1, so that a longer exposure might be needed for attriters to totally overcome attrition and behave natively again.

The one thing that is clear from these results is that no permanent change in the attriters' L1 grammatical representations takes place, because in the off-line task attriters behave like monolinguals and exposed, with all groups of participants showing an equal mismatch sensitivity, and also because the exposed group was able to overcome their attrition with L1 exposure. Therefore, we could conclude that attrition effects decrease as a result of L1 exposure, which reveals that bilinguals are sensitive to input changes and that attrition affects online sensitivity rather than causing a permanent change in speakers' L1 grammatical representations (at least at a first stage)[3].

5.4 Experiment 2

As it was discussed before, both Experiments 1A and 1B revealed an interesting unexpected result, with all groups of participants showing a clear preference for the object as the antecedent for the overt pronoun, but for the null pronoun, their preference for the subject as its antecedent was weaker. The explanation proposed was that when speakers are presented with anaphoric sentences in which there is ambiguity between different possible antecedents, they retrieve the syntactic information (i.e. null pronouns refer to the most prominent antecedent whereas overt pronouns refer to the non-prominent antecedent), but for the null pronoun the recency factor might interfere with the syntactic information.

Therefore, in order to rule out the possibility that having disambiguation by number cues might have led participants to show a more reliable preference for the antecedent of overt pronoun, but not for that of the null pronoun, a second experiment was conducted. This second experiment consisted of an off-line judgment

[3] It is important to note that these results relate to first generation attriters, and not to heritage speakers or second-generation attriters, whose L1 grammatical representations might be affected over time.

task in which participants had to choose the antecedent of ambiguous anaphors, which this time excluded number cues. The purpose of this experiment was to investigate whether participants would also show a stronger preference for the object as the antecedent of the overt pronoun and a weaker preference for the subject as the antecedent of the null if they were presented with ambiguous sentences instead of sentences in which verb agreement caused the disambiguation.

5.4.1 Participants

Since the results from the first experiment were consistent for the three groups (monolinguals, attriters and exposed), only one group of participants was used for this experiment, which consisted of 24 Spanish "monolinguals" from Spain (16 females, 6 males), with no knowledge of any other language from birth (Spanish speakers from regions in which another L1 was spoken, such as Catalan, Basque or Galician were excluded from the experiment). As the monolingual group in Experiment 1, participants had recently arrived in Edinburgh, and had no (or very little) knowledge of English (the mean number of weeks spent in the UK was 12.583, SD = 8.366). Moreover, very similarly to the monolingual group in Experiment 1, their personal questionnaire (see Appendix B) revealed that they clearly still used the L1 more often than the L2 (for the L1, the mean use was 4.542, *SD* = .509; for the L2, the mean use was 2.875, *SD* = .824). Participants were paid for their participation in the experiment.

Participant	Gender	Age	Level of Education	Weeks of residence in UK	Use of L1	Use of L2
1	F	24	BA	20	4	2.5
2	M	26	Secondary	8	4	4
3	F	25	BA	1	5	2.5
4	M	30	BA	24	4.5	3
5	F	30	Secondary	8	4.5	3
6	F	27	Secondary	12	5	3.5
7	F	26	Secondary	24	5	2
8	M	25	BA	20	4.5	3
9	M	26	BA	2	5	1.5
10	F	27	MA	20	3.5	3
11	M	29	Secondary	12	4.5	3.5
12	F	30	BA	24	4.5	4
13	M	27	PhD	1	5	2
14	F	25	BA	2	5	2
15	F	30	BA	24	5	1
16	F	25	Secondary	12	5	2.5
17	M	26	Secondary	12	4.5	3
18	F	26	BA	16	4	4
19	F	22	BA	8	3.5	3
20	M	27	BA	24	5	2.5
21	F	25	BA	12	5	3
22	F	27	BA	2	4	4
23	F	27	Secondary	12	5	2.5
24	F	25	BA	2	4	4
Min.		22		1	3.5	1
Max.		30		24	5	4
Mean		26.542		12.583	4.542	2.875
SD		2.064		8.366	0.509	0.824

Table 5.6. Participants' information and minimum, maximum, mean and SD of gender, age, level of education, weeks of residence in UK, use of L1 and use of L2.

5.4.2 Materials

The same thirty-two items constructed for Experiment 1 were used, although this time the number disambiguation was excluded, as (5.6) below illustrates. Each sentence consisted of a main clause, which contained a subject and an object antecedent of the same gender, and a subordinate clause always introduced by *cuando* 'when' and followed by the subject pronoun, either overt or null, and a verb conjugated in third-person singular. Since both the subject and the object antecedent carried singular number, the pronoun could ambiguously refer to either one of them. Appendix B includes all experimental items and fillers.

(5.6) a. Condition 1: **Overt pronoun**

La madre saludó a la chica cuando ella cruzaba una calle con mucho tráfico.

¿Quién cruzaba una calle con mucho tráfico?

a. La madre

b. La chica

c. Una tercera persona

The mother waved the girl when she was crossing a street with a lot of traffic.

Who was crossing a street with a lot of traffic?

a. The mother

b. The girl

c. A third person

b. Condition 2: **Null pronoun**

La madre saludó a la chica cuando cruzaba una calle con mucho tráfico.

¿Quién cruzaba una calle con mucho tráfico?

a. La madre

b. La chica

c. Una tercera persona

The mother waved the girl when (pro) was crossing a street with a lot of traffic.

Who was crossing a street with a lot of traffic?

a. The mother

b. The girl

c. A third person

Thus, one factor with two levels was manipulated, *Pronoun* (object or null), which resulted in the two conditions shown above.

Each item contained two conditions, one with an overt pronoun and the other with a null pronoun. Moreover, half of the 32 items included all female referents and the other half all male referents. Also, half of the items presented the subject referent in answer *a* and the object referent in answer *b*, and the other half presented the subject referent in answer *b* and the object referent in answer *a* (the "a third person" response was always in answer *c*). The 32 items were randomly divided into two lists, each containing one of the two conditions of each item, so both conditions appeared the same number of times in each list. Furthermore, each of the two lists was presented in two different orders, so that order 2 presented the items starting from the last sentence in order 1 and finishing with the first sentence in order 1. In addition to the experimental items, 64 fillers were also randomly included in each list. The fillers had the same format as (5.4) above, but included inanimate referents, plural referents, common names, other subject pronouns, other conjunctions such as *mientras* 'while' and *para que* 'so that', etc.

As in Experiment 1, all anaphors had the same number of words, except for the ones that contained a null pronoun, which had a word less.

5.4.3 Procedure

The experiment was conducted in a quiet seminar room at the University of Edinburgh. Participants were first given the instructions, which were presented in Spanish in written form (see Appendix B). Participants were instructed to carefully read all the sentences in the questionnaire they were given and then answer the question that followed each sentence, choosing as many answers as they wanted from the three they were presented with. No time limit was given to perform the task.

At the end of the experiment, participants were asked to fill out a questionnaire that included some personal information and their L1 and L2 backgrounds (see Appendix B).

5.4.4 Data analysis

As mentioned above, one factor was manipulated, *Pronoun*, which contained two levels: overt or null.

The answers from the experiment were coded into Microsoft Excel for each participant, item and condition separately for the subsequent analysis.

5.4.5 Results

As Table 5.7 and Figures 5.14 and 5.15 below reveal, participants show an overall bias towards the object as the antecedent for both pronouns, although the null pronoun does show a higher percentage of subject preference than the overt pronoun. Moreover, the percentages for “a third person” and “either subject or object” are much lower than those for “subject” or “object” and they are very similar for both pronouns.

	Null pronoun	Overt pronoun
Subject	40.62%	32.03%
Object	53.12%	63.80%
A third person	0.52%	0.78%
Either subject or object	5.72%	3.38%

Table 5.7. Percentages of antecedent preferences for each pronoun.

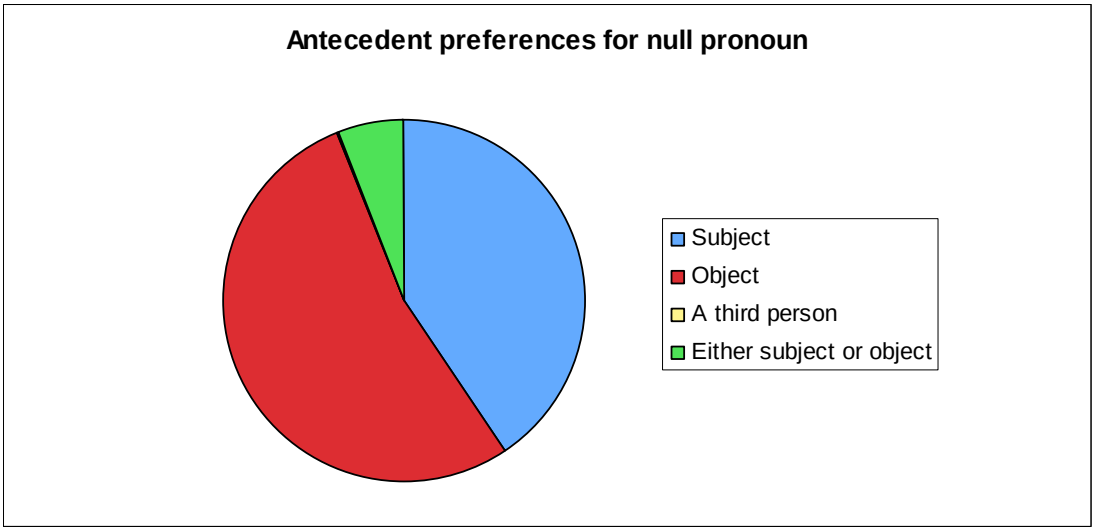

Figure 5.14. Antecedent preferences for the null pronoun.

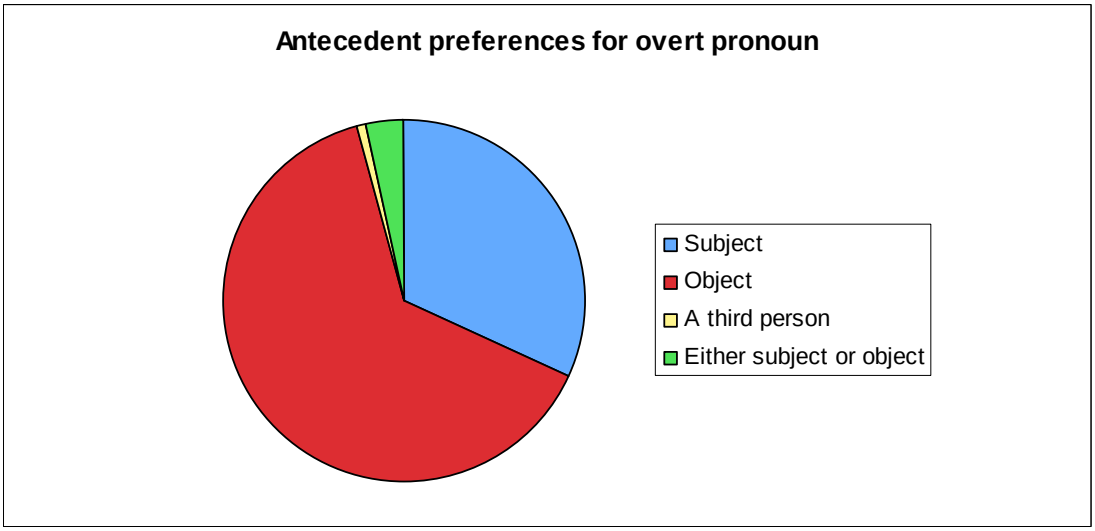

Figure 5.15. Antecedent preferences for the overt pronoun.

Considering the percentages illustrated above and before analyzing the results for the subject and object antecedents, the proportion of "other responses" (i.e. "third person" and "either subject or object") obtained for the null and the overt pronouns was compared to check whether they differed. In order to do so, "subject" and "object" responses were coded as 0 and "other responses" as 1, and then the proportion of "other responses" was compared between null and overt pronouns. Means showed 6.25% of "other responses" for the null pronoun and 4.17% for the overt, but in order to see whether this difference was significant, a paired samples t-test was run after converting the regular averages into arcsine values. Results from the t-test showed that, although participants selected more "other responses" for the null than for the overt pronoun, this difference was not significant ($t_1(23) = 1.678$, $p = .107$; $t_2(31) = 1.234$, $p = .266$).

Secondly, the proportion of object responses was checked to see whether it was different between the null and the overt pronouns. In order to do so, "other responses" were excluded from the data, subject responses were coded as 0 and object responses as 1. Means showed that participants selected the object referent as the antecedent for both the null and the overt pronoun more often than the subject referent, with 56.53% of "object" responses for the null pronoun and 66.58% for the overt. Consequently, as it was done before, a paired samples t-test was conducted to check whether this difference was significant (averages were also converted into arcsine values before running the t-test). The t-test revealed that this difference between the null and the overt pronouns in relation to participants' preference for the object as their antecedent is significant ($t_1(23) = -2.497$, $p = .020$; $t_2(31) = -2.441$, $p = .021$); that is, the null and the overt pronouns both showed a preference for the object as the antecedent, but the extent of this preference differed between the two pronouns, with the preference for the object as the antecedent being significantly higher for the overt pronoun than for the null pronoun.

Finally, considering the preference for the object as the antecedent shown in the previous t-test, a one-sample t-test was conducted to explore whether there is

actually a preference for the object referent when the null and the overt pronouns are tested separately. In order to do so, the proportion of object responses was checked to see whether it is significantly different from 50% for both the overt and the null pronouns. The coding used was the same as the one in the previous t-test, also excluding "other" responses, and the one-sample t-test was again carried out with arcsine values. The results showed that the object antecedent preference is significant only for the overt pronoun ($t_1(23) = 3.349$, $p = .003$; $t_2(31) = 3.621$, $p < .001$), but not for the null ($t_1(23) = 1.572$, $p = .130$; $t_2(31) = 1.127$, $p = .268$), which reveals that participants clearly prefer the object referent as the antecedent for the overt pronoun, but with the null pronoun their answers are very inconsistent.

5.4.6 Discussion

The results from Experiment 2 are consistent with those of Experiments 1A and 1B. As in Experiments 1A and 1B, participants in Experiment 2 seem to consistently assign an object as the antecedent for overt pronouns, whereas their antecedent preference appears to be more variable when they are dealing with null pronouns. And what is more, there seems to be an overall bias towards the object as the preferred referent, due to the fact that participants over-selected the object as the antecedent for both pronouns.

As mentioned in Section 5.3.2.7, other studies in Italian and Spanish have also found a strong preference of the object as the antecedent for the overt pronoun and a weaker subject bias for the null pronoun (Sorace & Filiaci 2006, Filiaci 2010, Fedele & Kaiser 2012), which supports the results obtained in the present study. Also, a similar bias towards the object antecedent has been found with German demonstrative pronouns (Bosch et al. 2003, 2007, Bosch & Umbach 2007).

As it was proposed for Experiment 1, the recency factor together with the syntactic information can account for these results. That is, given the position of the

object antecedent in Main-Subordinate anaphora, the fact that the object is the more recent antecedent might favor the strong bias of the overt pronoun for the object antecedent and weaken the bias of the null pronoun for the subject antecedent (or even both pronouns showing a bias towards the object antecedent, as it was shown in this second experiment). Therefore, when speakers process this type of ambiguous sentence they retrieve the syntactic information (i.e. null pronouns refer to the most prominent antecedent whereas overt pronouns refer to the non-prominent antecedent), but the recency factor plays a more important role than the syntactic information. This explains the strong bias of the overt pronoun, since speakers rely on the syntactic information plus the recency factor, and the weak bias of the null pronoun, since the syntactic information alone might not be enough for a strong subject preference.

CHAPTER 6

Results on the Spanish personal preposition

6.1 Introduction

This chapter will present the experiments conducted in relation to the interpretation of the Spanish personal preposition *a* and the results obtained. These results will be compared with those presented in Chapter 5 on pronominal subjects to see if participants show any differences between the interface and the non-interface structures.

As it was mentioned in the previous chapter, the experiments that will be discussed in this chapter, Experiments 1C and 1D, were part of the same experimental session as Experiments 1A and 1B, which were presented in Chapter 5. That is, Experiments 1A, 1B, 1C and 1D are part of the same experiment that was carried out simultaneously by each participant in a single session (see Section 5.1 in Chapter 5).

6.2 Aims and hypotheses

As it was presented in Chapter 5, our first hypothesis proposed:

- H_1: L1 attriters will not show online sensitivity when processing the interface structure in real time (i.e. in the online task), but no attrition effects will be shown with the non-interface structure in offline or online processing.

In order to fully test this first hypothesis, a non-interface structure such as the Spanish personal preposition was needed to be compared with the interface structure (subject pronouns), in order to explore whether attrition did occur with the interface structure but not with the non-interface structure (Interface Hypothesis, Sorace & Filiaci 2006).

6.3 Experiments 1C and 1D

As it was introduced in Chapter 3, the distribution of the personal preposition (or DOM) in Spanish is very straightforward and, although it might be argued that it is not completely independent of context because of the animacy and specificity features, a constant mental update of the linguistic and pragmatic context is not necessary when using it, unlike with pronouns, which require a constant update of the context to be used and interpreted accurately.

As it was explained in Chapter 3, in Spanish, unlike English, animate and specific direct objects must be introduced by the personal preposition *a*, as in (6.1a). Therefore, the use of an animate direct object, such as *el niño* 'the kid', without it being introduced by the preposition results in ungrammaticality, as in (6.1b).

(6.1) a. María vio **a**l[1] niño esta mañana.

María saw to+the kid this morning

b. *María vio el niño esta mañana.

[1] Note that *al* is the contraction of the preposition *a* and the masculine singular definite article *el.* This contraction does not occur with any other definite or indefinite article.

María saw the kid this morning

"María saw the kid this morning."

On the other hand, inanimate direct objects, independently of the specificity, must not be preceded by the preposition, as in (6.2a). Therefore, an inanimate direct objects, such as *una película* 'a movie', that are marked with the dative preposition would be ungrammatical, as in (6.2b).

(6.2) a. María vio una película/la película esta mañana.

María watched a movie/the movie this morning

b. *María vio **a** una película/la película esta mañana.

María watched to a movie/the movie this morning

"María watched a movie/the movie this morning."

Sentences similar to those in (6.1) and (6.2) above are samples of the items used in Experiments 1C and 1D, which tested the interpretation of the DOM with animate and inanimate direct objects. Experiment 1C is a naturalness judgment offline task, whereas Experiment 1D is an online eye-tracking while reading task, which will reveal possible processing differences between interface structures and non-interface structures.

6.3.1 Experiment 1C

Experiment 1C is an off-line task, just like the one in Experiment 1A presented in Chapter 5, in which participants were given sentences like (6.1) and (6.2) above to read and then rate on a 5-point scale depending on their perceived naturalness. The purpose of this experiment was to investigate whether participants show any attrition effects with non-interface structures.

6.3.1.1 Participants

The participants were exactly the same three groups of participants (monolinguals, attriters and exposed) from Experiments 1A and 1B (see Section 5.3.1.1 in Chapter 5).

6.3.1.2 Materials

Thirty-two items as the ones illustrated in (6.3) were constructed. Each sentence consisted of a simple sentence, which contained a subject, a verb and a direct object, either animate or inanimate. The animate direct object could be correctly introduced by a personal preposition *a*, as in (6.3a), or ungrammatically lacking the preposition, as in (6.3b). On the other hand, the inanimate direct object could be correctly lacking the preposition, as in (6.3c), or ungrammatically introduced by it, as in (6.3d). Appendix A includes all experimental items and fillers[2].

(6.3) a. Condition 1: *__Animate/el__[3]

Juan defendió el conductor que fue despedido.

Juan defended the driver that was fired

b. Condition 2: **Animate/al**

Juan defendió al conductor que fue despedido.

Juan defended to the driver that was fired

---

[2] It was brought to my attention after the experiment was conducted and the data analyzed that seven of the experimental items included a dative NP in the animate conditions, instead of a "true" DOM (items 5, 6, 15, 17, 20, 21, 27 in Section A.3 of Appendix A). However, it is important to note that this does not affect the distribution of the personal preposition, so that in these items Condition 2 still must include the preposition in order to be grammatical; otherwise the sentence would be ungrammatical, as in Condition 1. Therefore, these items should not make a difference in the participants' performance or the results.

[3] The notation "*" expresses that the sentences of that condition are ungrammatical.

c. Condition 3: **Inanimate/el**

Juan defendió el argumento de forma efusiva

Juan defended the argument in an effusive way

d. Condition 4: ***Inanimate/al**

Juan defendió al argumento de forma efusiva.

Juan defended to the argument in an effusive way

Thus, two factors were manipulated, each containing two levels: *Animacy* (animate or inanimate) and *Article* (el or al), which resulted in the four conditions shown in (6.3) above.

Each item contained four conditions, two with an animate direct object and the other two with an inanimate direct object. Thus, two different nouns, one animate and one inanimate, had to be included in the direct object position for each item. For this reason, both nouns were matched to have the same number of characters and very similar frequency, which was checked using a Spanish corpus, *Corpus del Español* (http://www.corpusdelespanol.org/), so that word length and frequency did not influence participants' processing in the online experiment.

Moreover, the subjects from the 32 items were distributed in a way so that 16 of them were proper names (8 male, 8 female) and the other 16 were pronouns (4 female singular, 4 female plural, 4 male singular, 4 male plural). The 32 items were divided into four lists and, using a Latin square, each list contained one of the four conditions of each of the 32 items, and all conditions appeared the same number of times in each of the lists. In addition to the experimental items, 32 fillers were also randomly included in each list.

For the purpose of using these same stimuli for the online experiment (Experiment 1D), all sentences had the same number of words. In order to be able to do that, only masculine nouns were included in the direct object position, because the

contraction of the preposition and the article that takes place with the masculine singular definite article *el* (*al*) is not possible with the feminine singular definite article (*a la*).

6.3.1.3 Procedure

The procedure was identical to that of Experiment 1A (see section 5.3.1.3 in Chapter 5).

6.3.1.4 Data analysis

As mentioned above, two factors were manipulated, each containing two levels: *Animacy* (animate or inanimate) and *Article* (el or al), which were combined to create a 2x2 factorial design. A repeated-measures ANOVA with these two factors was run for each of the three groups.

Also, in order to compare the results of the three groups, a third factor was introduced, this one with three levels: *Language Group* (monolinguals, attriters or exposed). A repeated-measures ANOVA with the three factors was run for monolinguals versus attriters, monolinguals versus exposed, and attriters versus exposed.

6.3.1.5 Predictions

If the hypothesis in Section 6.2 is correct, I predict to obtain the following results from Experiment 1C:

1. Since this is an offline task testing the interpretation of a non-interface structure, participants from all of the three groups (MON, ATT and EXP) will perform at ceiling and no differences between the groups will be shown. Therefore:

(a) Since conditions 1 and 4 are the ungrammatical ones and conditions 2 and 3 the grammatical ones, participants are expected to rate condition 1 (*animate/el) lower than condition 2 (animate/al), and condition 4 (*inanimate/al) lower than condition 3 (inanimate/el).

(b) All groups will show significant interaction of Animacy*Article in their ratings.

(c) No significant three-way interaction of Animacy*Article*Language Group will be seen when comparing MON vs. EXP, MON vs. ATT or ATT vs. EXP.

6.3.1.6 Results

As Table 6.1 and Figure 6.1 reveal, participants from the three groups show means that clearly follow our predictions, being the ratings for condition 1 (*animate/el) much lower than those for condition 2 (animate/al), and the ratings for condition 4 (*inanimate/al) much lower than those for condition 3 (inanimate/el).

	MON		EXP		ATT	
C1 - *anim/el	2.1563	(.76989)	2.5469	(.73888)	1.8906	(.74483)
C2 - anim/al	4.3385	(.47129)	4.2396	(.46467)	4.2031	(.44814)
C3 - inan/el	4.3073	(.49175)	4.2031	(.44966)	4.0000	(.59664)
C4 - *inan/al	2.1094	(.83023)	2.3073	(.61013)	2.1094	(.85443)

Table 6.1. Score means and (standard deviations) for the three groups.

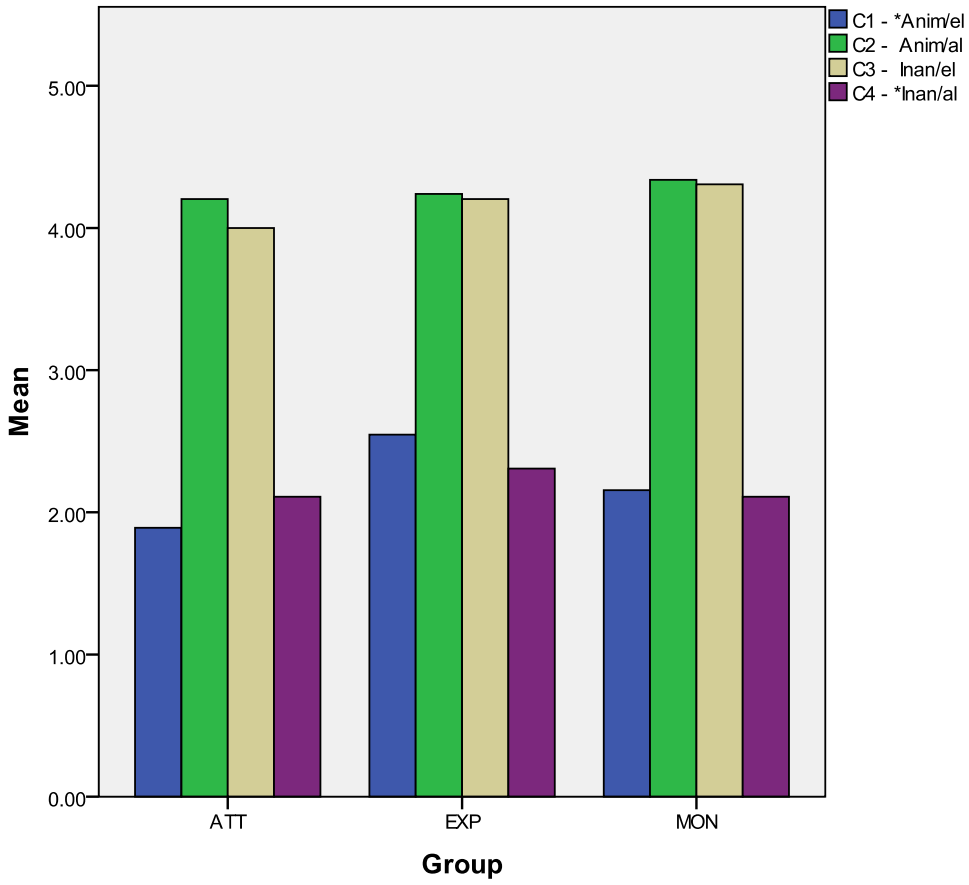

Figure 6.1. Score means for personal 'a' in the three groups.

Monolinguals

The repeated-measures ANOVA did not show any main effect of *Animacy* on the rating of the stimuli ($F_1(1, 23) = .160$, $p = .693$; $F_2(1, 31) = .108$, $p = .745$), which indicates that the type of object presented in the sentence, either animate or inanimate, did not have a significant influence on monolinguals' scores.

Similarly, no main effect of *Article* was shown ($F_1(1, 23) = .011$, $p = .917$; $F_2(1, 31) = .004$, $p = .951$), revealing that the type of article used in the sentence, either el or al, did not have a significant influence either on monolinguals' scores.

As predicted, the repeated-measures ANOVA run for the monolinguals revealed a highly significant interaction of *Animacy* and *Article* on monolinguals' ratings of the stimuli ($F_1(1, 23) = 189.812$, $p < .001$; $F_2(1, 31) = 292.753$, $p < .001$), which shows that the type of article presented had a different effect on monolinguals' scores depending the type of object used (Figure 6.2).

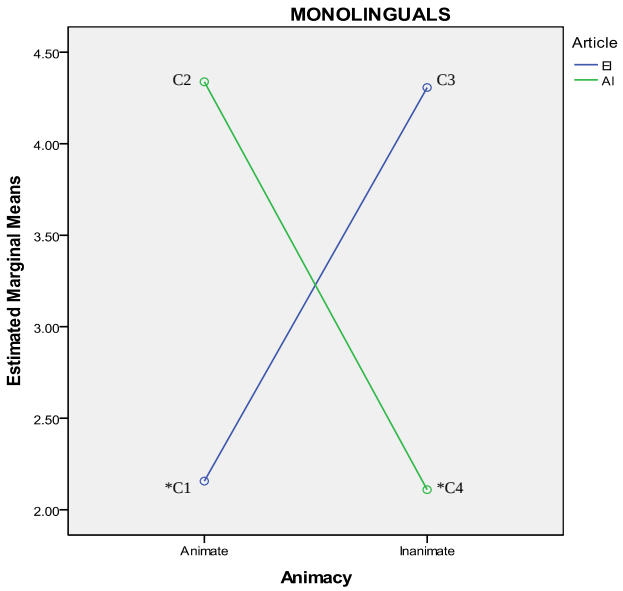

Figure 6.2. Monolinguals' score means by subjects.

Therefore, to see the nature of this interaction effect, paired samples t-tests were conducted to compare the use of animate and inanimate direct objects. For the animate object, monolinguals showed significantly lower scores for the *el* article (M = 2.1563, SD = .76989) than for the *al* article (M = 4.3385, SD = .47129), ($t_1(23) = -13.130$, $p < .001$; $t_2(31) = -11.689$, $p < .001$). In contrast, for the inanimate object, they showed significantly higher scores for the *el* article (M = 4.3073, SD = .49175) than for the *al* article (M = 2.1094, SD = .83023), ($t_1(23) = 11.956$, $p < .001$; $t_2(31) = 12.657$, $p < .001$).

Exposed

The exposed group obtained very similar results to those obtained by the monolinguals and the attriters. The repeated-measures ANOVA only showed a marginally significant main effect of *Animacy* ($F_1(1, 23) = 3.924$, $p = .060$; $F_2(1, 31) = .987$, $p = .328$), which indicates that the type of object presented in the sentence had some influence on exposed's scores, with the animate object rated higher than the inanimate.

As for monolinguals, no main effect of *Article* was shown ($F_1(1, 23) = .665$, $p = .423$; $F_2(1, 31) = .594$, $p = .447$), revealing that the type of article used in the sentence did not have a significant influence on exposed's scores.

A highly significant interaction of *Animacy* and *Article* was also revealed ($F_1(1, 23) = 187.453$, $p < .001$; $F_2(1, 31) = 217.135$, $p < .001$), which demonstrates that the type of article presented had a different effect on exposed's scores depending the type of object used (Figure 6.3).

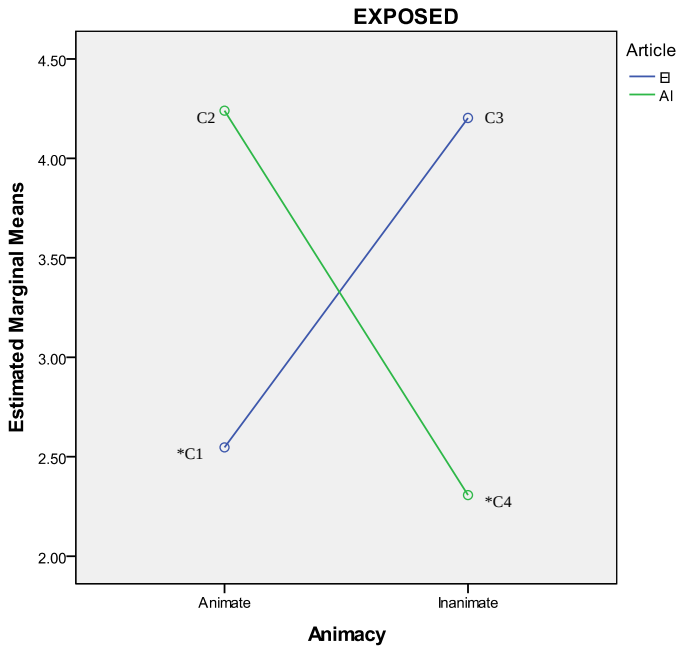

Figure 6.3. Exposed's score means by subjects.

Thus, to explore the nature of the interaction effect, paired samples t-tests were run. For the animate object ($t_1(23) = -8.485$, $p < .001$; $t_2(31) = -10.015$, $p < .001$), exposed showed significantly lower scores for the *el* article (M = 2.5469, SD = .73888) than for the *al* article (M = 4.2396, SD = .46467). On the other hand, for the inanimate object ($t_1(23) = 11.856$, $p < .001$; $t_2(31) = 10.016$, $p < .001$), they showed significantly higher scores for the *el* article (M = 4.2031, SD = .44966) than for the *al* article (M = 2.3073, SD = .61013).

Attriters

The attrited group did not differ much from the other two. The ANOVA revealed no main effect of *Animacy* ($F_1(1, 23) = .008$, $p = .928$; $F_2(1, 31) = .004$, $p = .950$), which indicates that the type of object presented in the sentence did not have an influence on attriters' scores.

However, a main effect of *Article* was shown by subject and a marginal effect by items ($F_1(1, 23) = 7.020$, $p = .014$; $F_2(1, 31) = 3.062$, $p = .090$), revealing that the type of article used in the sentence had a significant influence on attriters' scores, with the *al* article rated higher than the *el*.

As predicted, a highly significant interaction of *Animacy* and *Article* was revealed ($F_1(1, 23) = 215.091$, $p < .001$; $F_2(1, 31) = 354.942$, $p < .001$), confirming that, as for monolinguals and exposed, the type of article used also had a different effect on attriters' scores depending the type of object presented in the stimuli (Figure 6.4).

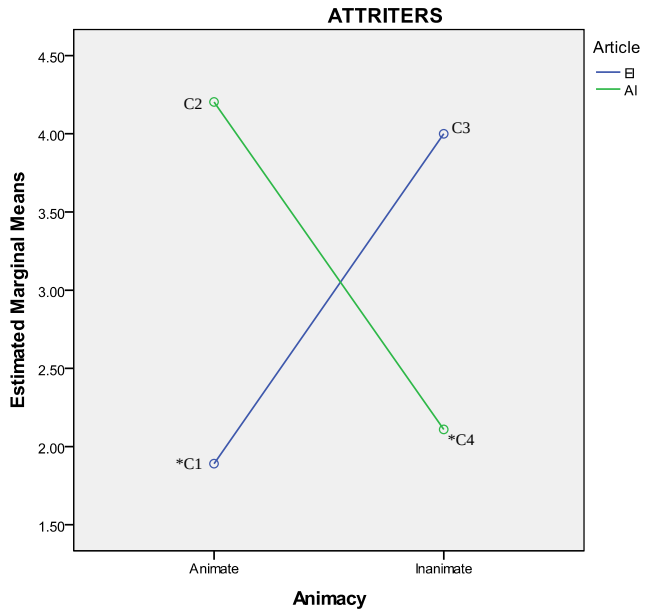

Figure 6.4. Attriters' score means by subjects.

Consequently, a t-test by subjects and another one by items were run. For the animate object ($t_1(23) = -15.808$, $p < .001$; $t(23) = -17.390$, $p < .001$), attriters showed significantly lower scores for the *el* article (M = 1.8906, SD = .74483) than for the *al* article (M = 4.2031, SD = .44814). In contrast, for the inanimate object ($t_1(23) = 10.513$, $p < .001$; $t_2(23) = 9.928$, $p < .001$), they showed significantly higher scores for the *el* article (M = 4.000, SD = .59664) than for the *al* article (M = 2.1094, SD = .85443).

Monolinguals versus Exposed

The ANOVA results revealed a three-way interaction of *Animacy*, *Article*, and *Language Group*, marginal by subjects and significant by items ($F_1(1, 46) = 3.692$, $p = .061$; $F_2(1, 31) = 19.130$, $p < .001$), which indicates some differences between monolinguals and exposed in terms of how they are affected by the type of object and article presented in the stimuli (Figure 6.5). Therefore, in order to see

which group has a stronger two-way interaction effect between *Animacy* and *Article*, the score means of each condition were subtracted for each group (i.e. (C1-C2) – (C3-C4)), and monolinguals showed a stronger Animacy*Article interaction (-4.3801) than exposed (-3.5885) than reacting to the stimuli. It is important to note that because these are scores, with 1 being the least natural and 5 being the most natural, the ungrammatical conditions (i.e. C1 and C4) will have lower scores than the grammatical conditions (i.e. C2 and C3), resulting in negative numbers after the subtraction. Therefore, the bigger the negative number, the strongest the interaction.

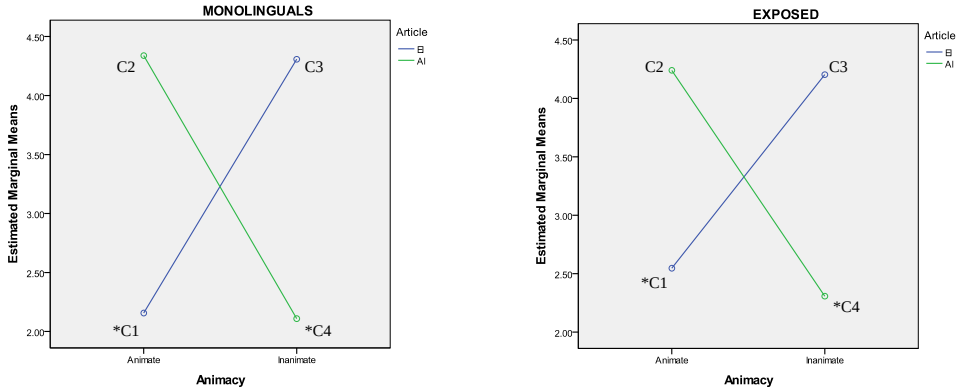

Figure 6.5. Monolinguals and exposed's score means by items.

As a result of the three-way interaction, some tests were run to explore the nature of this effect. For the animate object ($t_1(47) = -14.534$, $p < .001$; $F_2(1, 31) = 9.773$, $p = .004$), monolinguals and exposed showed significantly lower scores for the *el* article (M = 2.3516, SD = .77213) than for the *al* article (M = 4.2891, SD = .46568). In contrast, for the inanimate object ($t_1(47) = 16.707$, $p < .001$; $F_2(1, 31) = 7.325$, $p = .011$), they showed significantly higher scores for the *el* article (M = 4.2552, SD = .46910) than for the *al* article (M = 2.2083, SD = .72765).

Moreover, a highly significant interaction of *Animacy* or *Article* is also shown ($F_1(1, 46) = 374.024$, $p < .001$; $F_2(1, 31) = 292.731$, $p < .001$), but no main effects of *Animacy* or *Article* were seen.

Monolinguals versus Attriters

On the other hand, for monolinguals versus attriters, no three-way interaction of *Animacy*, *Article*, and *Language Group* was shown ($F_1(1, 46) = .171$, $p = .681$; $F_2(1, 31) = .868$, $p = .359$), showing that there are no significant differences between monolinguals and attriters in relation to how they are affected by the type of object and the article presented in the sentences.

Again, a highly significant interaction of *Animacy* and *Article* is revealed ($F_1(1, 46) = 402.118$, $p < .001$; $F_2(1, 31) = 378.784$, $p < .001$), but no main effects of *Animacy* or *Article* were seen.

Attriters versus Exposed

The ANOVA results revealed a three-way interaction of *Animacy*, *Article*, and *Language Group*, but only by items ($F_1(1, 46) = 2.504$, $p = .120$; $F_2(1, 31) = 10.581$, $p = .003$), which indicates some differences between attriters and exposed in terms of how they are affected by the type of object and article presented in the stimuli (Figure 6.6). Thus, after subtracting the score means of each group, attriters showed a stronger Animacy*Article interaction (-4.2031) than exposed (-3.5885) reacting to the sentences.

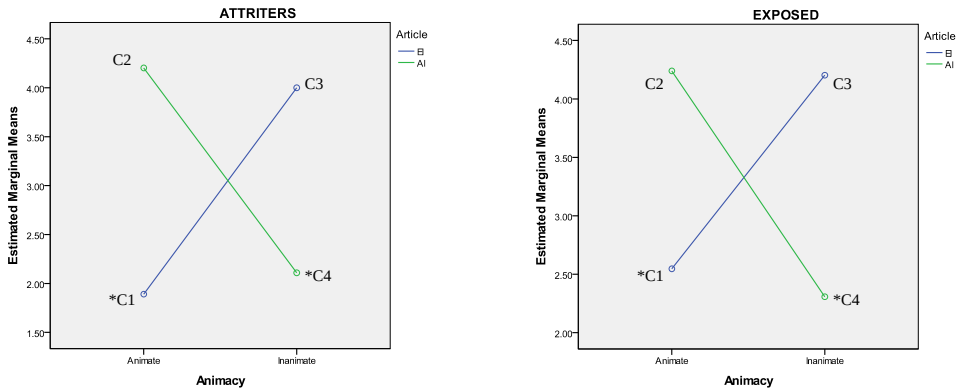

Figure 6.6. Attriters and exposed's score means by items.

As a result of the three-way interaction, some tests were run to explore the nature of this effect. For the animate object ($t_1(47) = -15.352$, $p < .001$; $F_2(1, 31) = 16.927$, $p < .001$), attriters and exposed showed significantly lower scores for the *el* article (M = 2.2188, SD = .80536) than for the *al* article (M = 4.2214, SD = .45198),. On the other hand, for the inanimate object ($t_1(47) = 15.904$, $p < .001$; $F_2(1, 31) = .002$, $p = .969$), they showed significantly higher scores for the *el* article (M = 4.1016, SD = .53262) than for the *al* article (M = 2.2083, SD = .74123).

Moreover, a highly significant interaction of *Animacy* and *Article* is also shown ($F_1(1, 46) = 402.502$, $p < .001$; $F_2(1, 31) = 332.731$, $p < .001$), but no main effects of *Animacy* or *Article* were seen.

6.3.1.7 Discussion

The results presented for Experiment 1C are very straightforward. As predicted, participants from the three groups correctly scored the grammatical sentences in which the animate direct object was preceded by *al* (condition 2) and those in which the inanimate direct object was preceded by *el* (condition 3) as being “natural”, and the ungrammatical sentences in which the animate direct object was preceded by *el* (condition 1) and those in which the inanimate direct object was preceded by *al* (condition 4) as being “not natural”.

Moreover, since the personal preposition *a* is a non-interface structure, following the Interface Hypothesis, no attrition effects and, therefore, no major differences between the group were predicted. Even though some three-way interaction effects were revealed by items between monolinguals and exposed and between attriters and exposed, the fact that all three groups performed as expected and their offline ratings showed the expected mismatch sensitivity with the DOM reveals that non-interface structures do not undergo attrition, which supports the Interface Hypothesis and verifies our first hypothesis.

6.3.2 Experiment 1D

Experiment 1D consisted of an eye-tracking while reading task. The purpose of this experiment was to explore whether participants show online sensitivity when dealing with non-interface structures in real time, in comparison with the processing of an interface structure in real time investigated in Experiment 1B.

6.3.2.1 Participants

The participants were exactly the same as the participants in Experiments 1A, 1B and 1C (see Section 5.3.1.1 in Chapter 5).

6.3.2.2 Materials

The materials were identical to those for Experiment 1C.

6.3.2.3 Procedure

The procedure was the same as that of Experiment 1B (see Section 5.3.2.3 in Chapter 5).

6.3.2.4 Data analysis

Using EyeDoctor.0.5.7 (http://www.psych.umass.edu/eyelab/software/), vertical drift in the position of fixations was corrected, and blinks and fixations that fell very

outside of the boundaries deleted. Extremely short fixations, less than 80 ms, and extremely long fixations, more than 1200 ms were also removed.

Items were divided into five regions, as (6.4) below illustrates. The critical region (region 3) contained the article, el or al, and the noun, animate or inanimate.

(6.4) Juan/ defendió/ el conductor/ que fue/ despedido./

Juan defended the driver that was fired

As for experiment 1B, three different eye-movement measures will be reported: first pass time, go-past time and total time. For first pass and go-past only the critical region, the post-critical region and the final region will be reported, and for total time also the pre-critical will be reported.

As for Experiment 1C, two factors were manipulated, each containing two levels: *Animacy* (animate or inanimate) and *Article* (el or al), which were combined to create a 2x2 factorial design. For each of the three groups, a repeated-measures ANOVA for each measure and region was run.

For the comparison between the groups, the factor *Language Group* (monolinguals, attriters or exposed) was included. A repeated-measures ANOVA with the three factors for each measure and region was run for monolinguals versus attriters, monolinguals versus exposed and attriters versus exposed.

6.3.2.5 Predictions

If the hypothesis in Section 6.2 is correct, I predict to obtain the following results from Experiment 1D:

1. As for Experiment 1C, since this task is testing the processing of a non-interface structure, all groups are expected to perform well and to show no differences between them. Therefore:

(a) All groups will show longer RTs for condition 1 (*animate/el) than for condition 2 (animate/al), and longer RTs for condition 4 (*inanimate/al) than for condition 3 (inanimate/el).
(b) All groups will show significant interaction of Animacy*Article in the critical, post-critical and/or final regions.
(c) No significant three-way interaction of Animacy*Article*Language Group will be seen when comparing MON vs. EXP, MON vs. ATT or ATT vs. EXP.

6.3.2.6 Results

As predicted, participants' RT means in the critical region for all three measures are longer for condition 1 (*animate/el) than for condition 2 (animate/al), and longer for condition 4 (*inanimate/al) than for condition 3 (inanimate/el). This can be seen in Table 6.2, which shows the first pass, go-past and total time RT means of the four conditions in the critical, post-critical and final regions for each of the three groups.

	Critical region el conductor			**Post-critical region** que fue			**Final region** despedido.		
	MON	EXP	ATT	MON	EXP	ATT	MON	EXP	ATT
first pass									
*anim/el	476.46 (202.162)	436.25 (179.107)	475.21 (172.882)	389.79 (150.170)	377.75 (118.154)	381.54 (120.111)	329.21 (108.083)	360.17 (134.339)	302.46 (109.653)
anim/al	397.96 (113.400)	397.83 (128.711)	438.04 (133.264)	403.79 (115.120)	415.75 (145.636)	390.50 (117.160)	343.92 (93.466)	398.71 (150.830)	371.08 (162.826)
inan/el	397.83 (115.404)	411.00 (152.520)	367.92 (106.115)	391.08 (115.571)	388.25 (102.769)	399.25 (100.903)	354.33 (121.323)	375.00 (202.780)	352.17 (126.002)
*inan/al	449.96 (178.625)	503.58 (178.041)	441.17 (176.549)	369.46 (81.737)	378.46 (131.349)	378.63 (105.111)	348.29 (108.309)	392.87 (235.764)	303.42 (82.338)
go-past									
*anim/el	680.04 (295.725)	667.42 (322.384)	704.38 (263.382)	891.38 (356.975)	995.29 (395.087)	956.83 (440.635)	1881.92 (767.099)	2679.63 (1531.212)	2598.92 (1766.571)
anim/al	504.46 (181.229)	508.33 (169.608)	595.62 (246.860)	694.83 (308.094)	946.50 (608.157)	881.08 (533.455)	2137.50 (951.574)	2772.79 (1549.317)	3116.29 (1538.514)
inan/el	493.25 (140.939)	577.50 (260.262)	500.04 (148.612)	596.13 (286.314)	659.04 (315.104)	842.08 (346.757)	2240.04 (1038.327)	2651.12 (1127.299)	3005.00 (1488.894)
*inan/al	597.63 (205.872)	658.79 (220.094)	620.13 (312.770)	732.00 (225.225)	850.96 (352.119)	925.75 (605.848)	2059.63 (925.645)	2455.83 (1326.928)	2354.13 (1156.909)
total time									
*anim/el	1208.04 (374.323)	1488.83 (618.722)	1472.58 (642.392)	916.50 (363.439)	984.79 (376.784)	1174.38 (699.843)	526.83 (180.193)	663.71 (283.446)	602.83 (336.143)
anim/al	984.96 (345.080)	1134.29 (488.772)	1363.67 (504.166)	1005.29 (380.133)	1136.50 (612.469)	1121.92 (383.143)	679.50 (325.748)	892.92 (436.632)	793.88 (382.463)
inan/el	952.50 (344.628)	1074.63 (479.569)	1287.96 (404.612)	953.29 (359.562)	981.50 (348.784)	1123.21 (341.930)	729.29 (366.336)	868.29 (464.417)	819.54 (364.385)
*inan/al	1206.88 (425.253)	1506.25 (650.246)	1425.67 (564.667)	898.50 (272.601)	949.33 (342.390)	957.96 (349.815)	670.21 (279.703)	729.46 (401.440)	604.63 (305.355)

Table 6.2. First pass, go-past and total time RT means and (standard deviations) in critical, post-critical and final regions for the three groups.

Monolinguals

First pass

As in the off-line experiment, no main effects of *Animacy* were shown in the critical ($F_1(1, 23) = .732$, $p = .401$; $F_2(1, 31) = .928$, $p = .343$), post-critical ($F_1(1, 23) = .867$, $p = .361$; $F_2(1, 31) = .953$, $p = .336$) or final regions ($F_1(1, 23) = 1.848$, $p = .187$; $F_2(1, 31) = .402$, $p = .531$), which indicates that the type of object presented in the sentence, either animate or inanimate, did not have a significant influence on monolinguals' s RTs when processing the stimuli.

No main effects of *Article* were shown either in the critical ($F_1(1, 23) = .510$, $p = .482$; $F_2(1, 31) = .099$, $p = .755$), post-critical ($F_1(1, 23) = .051$, $p = .824$; $F_2(1, 31) = .087$, $p = .770$) or final regions ($F_1(1, 23) = .037$, $p = .850$; $F_2(1, 31) = .174$, $p = .680$), revealing that the type of article used in the sentence, either el or al, did not have a significant influence either on monolinguals' RTs when processing the sentences.

However, as predicted, a highly significant interaction of *Animacy* and *Article* was shown in the critical region ($F_1(1, 23) = 11.360$, $p = .003$; $F_2(1, 31) = 18.106$, $p < .001$), which is shown in Figure 6.7, but not in the post-critical ($F_1(1, 23) = 1.859$, $p = .186$; $F_2(1, 31) = .599$, $p = .445$) or final regions ($F_1(1, 23) = .716$, $p = .406$; $F_2(1, 31) = 1.039$, $p = .316$), which shows that when monolinguals were processing the stimuli the type of article included in the sentence had a different effect on their RTs depending on the type of object presented.

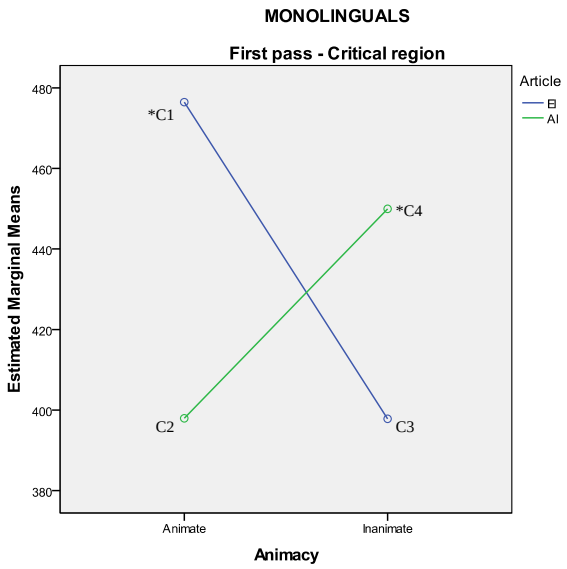

Figure 6.7. Monolinguals' RT means for first pass by subjects in the critical region.

Therefore, to see the nature of the interaction effect, paired samples t-tests were conducted for the critical region. For the animate direct object ($t_1(23) = 2.763$, $p = .011$; $t_2(31) = 2.036$, $p = .050$), monolinguals showed significantly longer RTs for the *el* article (M = 476.46, SD = 202.162) than for the *al* article (M = 397.96, SD = 113.400). For the inanimate object ($t_1(23) = -2.084$, $p = .049$; $t_2(31) = -1.703$, $p = .099$), they showed significantly shorter RTs for the *el* article (M = 397.83, SD = 115.404) than for the *al* article (M = 449.96, SD = 178.625), although only by subjects.

Go-past

Means for go-past times are very similar to those for first pass times. First of all, a main effect of *Animacy* was only shown in the post-critical region ($F_1(1, 23) = 10.288$, $p = .004$; $F_2(1, 31) = 4.145$, $p = .050$), but not in the critical ($F_1(1, 23) = 2.423$, $p = .133$; $F_2(1, 31) = 1.739$, $p = .197$) or final regions ($F_1(1, 23) = .1.993$, $p = .171$; $F_2(1, 31) = .539$, $p = .468$), which indicates that the type of object presented in

the sentence, either animate or inanimate, had some influence on monolinguals' RTs when processing the stimuli.

Moreover, no main effects of *Article* were shown either in the critical ($F_1(1, 23) = 1.082$, $p = .309$; $F_2(1, 31) = 1.097$, $p = .303$), post-critical ($F_1(1, 23) = .745$, $p = .397$; $F_2(1, 31) = .133$, $p = .718$) or final regions ($F_1(1, 23) = .265$, $p = .611$; $F_2(1, 31) = .475$, $p = .496$), revealing that the type of article used in the sentence did not have a significant influence either on monolinguals' RTs when processing the sentences.

The repeated-measures ANOVA showed a significant interaction of *Animacy* and *Article* in the critical region ($F_1(1, 23) = 19.560$, $p < .001$; $F_2(1, 31) = 37.870$, $p < .001$) and in the post-critical region ($F_1(1, 23) = 6.679$, $p = .017$; $F_2(1, 31) = 5.291$, $p = .028$), shown in Figure 6.8, but not in the final region ($F_1(1, 23) = 1.639$, $p = .213$; $F_2(1, 31) = 2.354$, $p = .135$), which shows that when monolinguals processed the stimuli the type of article used had a different effect on their RTs depending on the type of object presented.

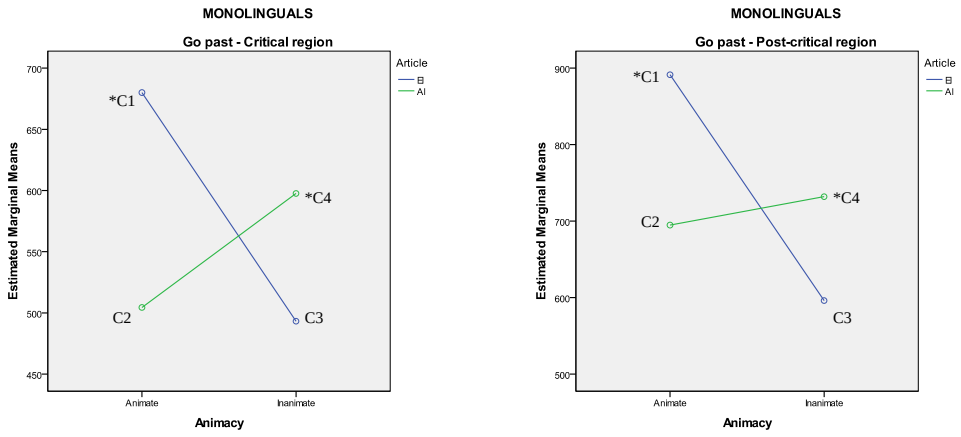

Figure 6.8. Monolinguals' RT means for go-past by subjects in the critical and post-critical regions.

Thus, in order to explore these interactions, two paired samples t-tests were run for each of the two regions. In the critical region, for the animate object ($t_1(23) =$

2.992, p = .007; t(31) = 3.643, p = .001), monolinguals had significantly longer RTs for the *el* article (M = 680.04, SD = 295.725) than for the *al* article (M = 504.46, SD = 181.229), and for the inanimate object ($t_1(23) = -3.474$, p = .002; $t_2(31) = -3.010$, p = .005), they had significantly shorter RTs for the *el* article (M = 493.25, SD = 140.939) than for the *al* article (M = 597.63, SD = 205.872).

In the post-critical region, for the animate object ($t_1(23) = 2.725$, p = .012; $t_2(31) = 1.617$, p = .116), monolinguals had significantly longer RTs for the *el* article (M = 891.38, SD = 356.975) than for the *al* article (M = 694.83, SD = 308.094), although only by subjects. For the inanimate object ($t_1(23) = -1.826$, p = .081; $t_2(31) = -1.406$, p = .170), they had marginally significant shorter RTs for the *el* article (M = 596.13, SD = 286.314) than for the *al* article (M = 732.00, SD = 225.225), although only by subjects.

Total time

The repeated-measures ANOVA revealed a main effect of *Animacy* only in the final region by subjects ($F_1(1, 23) = 4.837$, p = .038; $F_2(1, 31) = 2.736$, p = .108), but not in the critical ($F_1(1, 23) = .211$, p = .650; $F_2(1, 31) = .111$, p = .741) or post-critical regions ($F_1(1, 23) = .877$, p = .359; $F_2(1, 31) = .497$, p = .486), which indicates that the type of object presented in the sentence had a significant influence on monolinguals' s RTs when processing the final region, with the animate object showing shorter RTs than the inanimate.

No main effects of *Article* were shown in the critical ($F_1(1, 23) = .118$, p = .734; $F_2(1, 31) = .106$, p = .747), post-critical ($F_1(1, 23) = .373$, p = .548; $F_2(1, 31) = .144$, p = .707) or final regions ($F_1(1, 23) = 1.699$, p = .250; $F_2(1, 31) = 1.268$, p = .269), revealing that the type of article used in the sentence, either el or al, did not have a significant influence on monolinguals' RTs when processing the sentences.

A highly significant interaction between *Animacy* and *Article* was seen in the critical ($F_1(1, 23) = 21.995$, $p < .001$; $F_2(1, 31) = 15.946$, $p < .001$) and final regions ($F_1(1, 23) = 4.759$, $p = .040$; $F_2(1, 31) = 12.204$, $p < .001$), illustrated in Figure 6.9, and a marginally significant effect was seen in the post-critical region by items ($F_1(1, 23) = 1.511$, $p = .231$; $F_2(1, 31) = 3.049$, $p = .091$), which shows that when monolinguals were processing the stimuli the type of article included in the sentence had a different effect on their RTs depending on the type of object used.

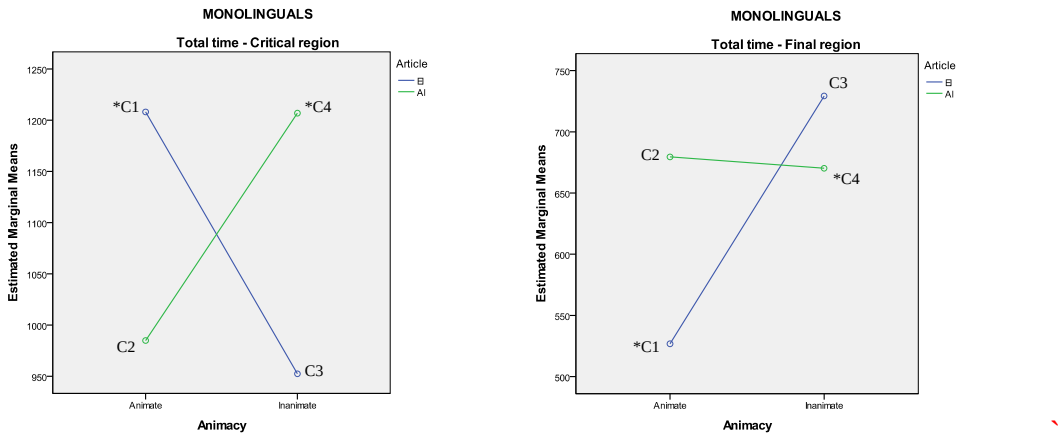

Figure 6.9. Monolinguals' RT means for total time by subjects in the critical and final regions.

Consequently, in order to explore these interactions, two paired samples t-tests were run for each of the two regions. In the critical region, for the animate direct object ($t_1(23) = 3.609$, $p < .001$; $t_2(31) = 2.938$, $p = .006$), monolinguals had significantly longer RTs for the *el* article (M = 1208.04, SD = 374.323) than for the *al* article (M = 984.96, SD = 345.080), and for the inanimate object ($t_1(23) = -3.429$, $p = .002$; $t_2(31) = -3.110$, $p = .004$), they had significantly shorter RTs for the *el* article (M = 952.50, SD = 344.628) than for the *al* article (M = 1206.88, SD = 425.253).

In the final region, although the t-test revealed a significant effect for the animate object ($t_1(23) = -2.601$, $p = .016$; $t_2(31) = -3.460$, $p = .002$), monolinguals

showed means contrary to our predictions, having shorter RTs for the *el* article (M = 526.83, SD = 180.193) than for the *al* article (M = 679.50, SD = 325.748). No significant effects are seen for the inanimate object ($t_1(23) = .953$, $p = .350$; $t_2(31) = 1.378$, $p = .178$), and monolinguals reveal again means that do not follow our predictions, showing longer RTs for the *el* article (M = 729.29, SD = 366.336) than for the *al* article (M = 670.21, SD = 279.703). This inconsistency shown by the monolinguals is only revealed in the final region for total time.

Exposed

First pass

As predicted, the results for the exposed group are similar to the ones obtained for the monolinguals. The ANOVA revealed a main effect of *Animacy* only in the critical region by subject, with a marginal effect by items ($F_1(1, 23) = 5.253$, $p = .031$; $F_2(1, 31) = 3.035$, $p = .091$), with the animate object showing shorter RTs than the inanimate, but no main effect was seen in the post-critical ($F_1(1, 23) = .620$, $p = .439$; $F_2(1, 31) = .051$, $p = .823$) or final regions ($F_1(1, 23) = .024$, $p = .878$; $F_2(1, 31) = .036$, $p = .850$).

No main effects of *Article* were shown in the critical ($F_1(1, 23) = 2.359$, $p = .138$; $F_2(1, 31) = 1.703$, $p = .202$), post-critical ($F_1(1, 23) = .778$, $p = .387$; $F_2(1, 31) = .363$, $p = .551$) or final regions ($F_1(1, 23) = 1.809$, $p = .192$; $F_2(1, 31) = 2.474$, $p = .126$).

However, as it can be seen in Figure 6.10, a significant interaction of *Animacy* and *Article* was revealed in the critical region ($F_1(1, 23) = 11.531$, $p = .002$; $F_2(1, 31) = 4.996$, $p = .033$), but not in the post-critical ($F_1(1, 23) = 1.350$, $p = .257$; $F_2(1, 31) = .918$, $p = .345$) or final regions ($F_1(1, 23) = .169$, $p = .685$; $F_2(1, 31) = .428$, $p = .518$).

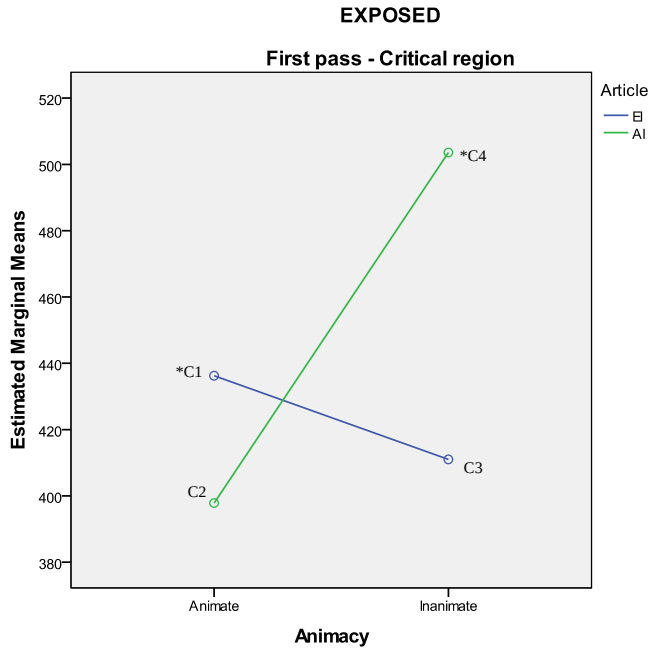

Figure 6.10. Exposed's RT means for first pass by subjects in the critical region.

Thus, two paired samples t-tests were run for the critical region. For the animate object ($t_1(23) = 1.957$, $p = .063$; $t_2(31) = 1.221$, $p = .231$), exposed showed marginally significant longer RTs for the *el* article (M = 436.25, SD = 179.107) than for the *al* article (M = 397.83, SD = 128.711), although only by subjects. However, for the inanimate object ($t_1(23) = -2.957$, $p = .007$; $t_2(31) = -2.200$, $p = .035$), they showed significantly shorter RTs for the *el* article (M = 411.00, SD = 152.520) than for the *al* article (M = 503.58, SD = 178.041).

Go-past

The repeated-measures ANOVA run revealed a main effect of *Animacy* only in the post-critical region ($F_1(1, 23) = 5.878$, $p = .024$; $F_2(1, 31) = 4.712$, $p = .038$), with the animate object showing longer RTs than the inanimate, but not in the critical

($F_1(1, 23) = .619$, $p = .439$; $F_2(1, 31) = 1.017$, $p = .321$) or final regions ($F_1(1, 23) = 1.458$, $p = .240$; $F_2(1, 31) = 1.307$, $p = .262$).

No main effects of *Article* were shown in the critical ($F_1(1, 23) = 1.119$, $p = .301$; $F_2(1, 31) = 1.480$, $p = .233$), post-critical ($F_1(1, 23) = 1.133$, $p = .298$; $F_2(1, 31) = .836$, $p = .368$) or final regions ($F_1(1, 23) = .159$, $p = .694$; $F_2(1, 31) = .052$, $p = .820$).

The repeated-measures ANOVA revealed a significant interaction of *Animacy* and *Article* in the critical region ($F_1(1, 23) = 6.270$, $p = .020$; $F_2(1, 31) = 6.128$, $p = .019$), shown in Figure 6.11, and a marginally significant interaction in the post-critical region by subjects ($F_1(1, 23) = 3.151$, $p = .089$; $F_2(1, 31) = .921$, $p = .345$) and in the final region by items ($F_1(1, 23) = .838$, $p = .369$; $F_2(1, 31) = 3.570$, $p = .068$).

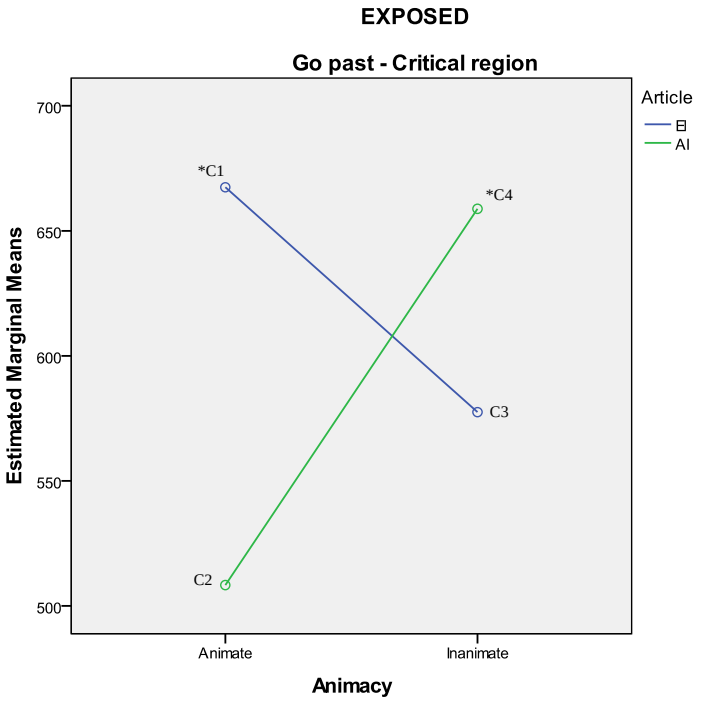

Figure 6.11. Exposed's RT means for go-past by subjects in the critical region.

Two paired samples t-test were then run to explore the interaction effect in the critical region. For the animate object ($t_1(23) = 2.427$, $p = .023$; $t_2(31) = 2.534$, $p = .017$), exposed showed significantly longer RTs for the *el* article (M = 667.42, SD = 322.384) than for the *al* article (M = 508.33, SD = 169.608). For the inanimate object, no significant effects were revealed ($t_1(23) = -1.480$, $p = .152$; $t_2(31) = -1.469$, $p = .152$), although exposed still showed shorter RTs for the *el* article (M = 577.50, SD = 260.262) than for the *al* article (M = 658.79, SD = 220.094).

Total time

The repeated-measures ANOVA run revealed no main effects of *Animacy* in the critical ($F_1(1, 23) = .177$, $p = .678$; $F_2(1, 31) = .179$, $p = .675$), post-critical ($F_1(1, 23) = 2.386$, $p = .136$; $F_2(1, 31) = 2.317$, $p = .138$) or final regions ($F_1(1, 23) = .225$, $p = .639$; $F_2(1, 31) = .038$, $p = .847$).

No main effects of *Article* were shown either in the critical ($F_1(1, 23) = .445$, $p = .512$; $F_2(1, 31) = .094$, $p = .762$), post-critical ($F_1(1, 23) = 1.753$, $p = .199$; $F_2(1, 31) = 1.683$, $p = .204$) or final regions ($F_1(1, 23) = .822$, $p = .374$; $F_2(1, 31) = .970$, $p = .332$).

A highly significant interaction of *Animacy* and *Article* was revealed in the critical ($F_1(1, 23) = 21.641$, $p < .001$; $F_2(1, 31) = 47.465$, $p < .001$) and final regions ($F_1(1, 23) = 8.408$, $p = .008$; $F_2(1, 31) = 14.083$, $p < .001$), as illustrated in Figure 6.12, and a marginally significant interaction in the post-critical region by items ($F_1(1, 23) = 2.533$, $p = .125$; $F_2(1, 31) = 3.976$, $p = .055$).

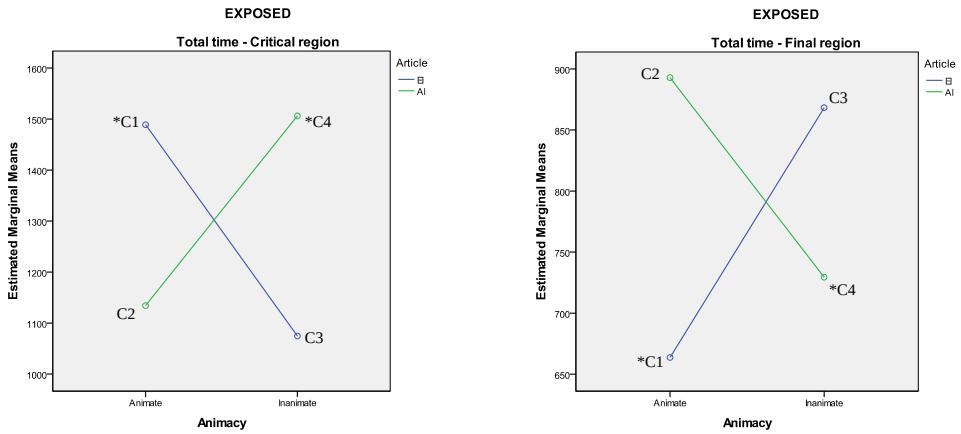

Figure 6.12. Exposed's RT means for total time by subjects in the critical and final regions.

Therefore, several t-tests were conducted in order to see the nature of the interaction effect in the critical and final regions. In the critical region, for the animate object ($t_1(23) = 3.892$, $p < .001$; $t_2(31) = 3.953$, $p < .001$), exposed had significantly longer RTs for the *el* article (M = 1488.83, SD = 618.722) than for the *al* article (M = 1134.29, SD = 448.772), and for the inanimate object ($t_1(23) = -3.836$, $p < .001$; $t_2(31) = -3.963$, $p < .001$), they had significantly shorter RTs for the *el* article (M = 1074.63, SD = 479.569) than for the *al* article (M = 1506.25, SD = 650.246).

In the final region, although the t-tests revealed a significant effect for the animate object, the means do not follow our predictions. For the animate object ($t_1(23) = -3.030$, $p = .006$; $t(31) = -2.864$, $p = .007$), exposed showed shorter RTs for the *el* article (M = 633.71, SD = 283.446) than for the *al* article (M = 892.92, SD = 436.632), and for the inanimate object ($t_1(23) = 1.625$, $p = .118$; $t_2(31) = 1.633$, $p = .113$), longer RTs for the *el* article (M = 868.29, SD = 464.417) than for the *al* article (M = 729.46, SD = 401.440). This inconsistency shown by the exposed group is only revealed in the final region for total time, which was also shown by the monolinguals in the same region and for the same measure.

Attriters

First pass

Attriters obtained the same results as the other two groups. The repeated-measures ANOVA revealed a main effect of *Animacy* in the critical region ($F_1(1, 23) = 5.831$, $p = .024$; $F_2(1, 31) = 6.796$, $p = .014$), with the animate object showing longer RTs than the inanimate, but not in the post-critical ($F_1(1, 23) = .025$, $p = .875$; $F_2(1, 31) = .042$, $p = .840$) or final regions ($F_1(1, 23) = .274$, $p = .605$; $F_2(1, 31) = .081$, $p = .778$).

No main effects of *Article* were shown in the critical ($F_1(1, 23) = .755$, $p = .394$; $F_2(1, 31) = .035$, $p = .852$), post-critical ($F_1(1, 23) = .118$, $p = .734$; $F_2(1, 31) = .075$, $p = .787$) or final regions ($F_1(1, 23) = .282$, $p = .600$; $F_2(1, 31) = .020$, $p = .888$).

On the other hand, a highly significant interaction of *Animacy* and *Article* was revealed in the critical ($F_1(1, 23) = 5.164$, $p = .033$; $F_2(1, 31) = 12.390$, $p < .001$) and final regions ($F_1(1, 23) = 11.197$, $p = .003$; $F_2(1, 31) = 5.192$, $p = .030$), as shown in Figure 6.13, but not in the post-critical region ($F_1(1, 23) = .748$, $p = .396$; $F_2(1, 31) = .042$, $p = .838$).

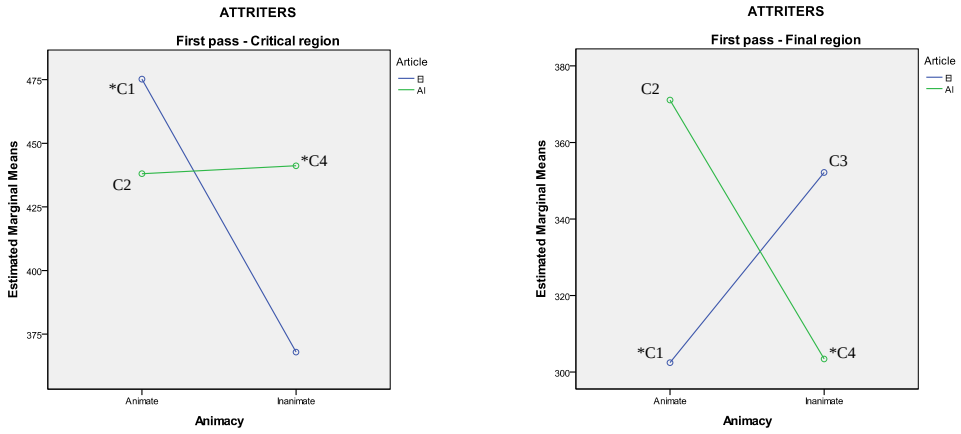

Figure 6.13. Attriters' RT means for first pass by subjects in the critical and final regions.

Thus, t-tests were run to explore these effects in the critical and final regions. In the critical region, for the animate object ($t_1(23) = 1.213$, $p = .237$; $t_2(31) = 2.293$, $p = .029$), attriters showed significantly longer RTs for the *el* article (M = 475.21, SD = 172.882) than for the *al* article (M = 438.04, SD = 133.264), although only by items. For the inanimate object ($t_1(23) = -2.204$, $p = .038$; $t_2(31) = -2.952$, $p = .006$), attriters showed significantly shorter RTs for the *el* article (M = 367.92, SD = 106.115) than for the *al* article (M = 441.17, SD = 176.549).

In the final region, although the t-tests revealed significant effects for both the animate and inanimate objects, the means do not follow our predictions. For the animate object ($t_1(23) = -2.562$, $p = .017$; $t_2(31) = -1.783$, $p = .084$), attriters showed shorter RTs for the *el* article (M = 302.46, SD = 109.653) than for the *al* article (M = 371.08, SD = 162.826), and for the inanimate object ($t_1(23) = 1.993$, $p = .058$; $t_2(31) = 1.977$, $p = .057$), longer RTs for the *el* article (M = 352.17, SD = 126.002) than for the *al* article (M = 303.42, SD = 82.338). This inconsistency was also shown by the monolinguals and the exposed group in the same region but for total time.

Go-past

The repeated-measures ANOVA revealed a main effect of *Animacy* in the critical region ($F_1(1, 23) = 17.160$, $p < .001$; $F_2(1, 31) = 6.810$, $p = .014$), with the animate object showing longer RTs than the inanimate, but not in the post-critical ($F_1(1, 23) = .160$, $p = .693$; $F_2(1, 31) = .150$, $p = .701$) or final regions ($F_1(1, 23) = .593$, $p = .449$; $F_2(1, 31) = .479$, $p = .494$).

No main effects of *Article* were shown in the critical ($F_1(1, 23) = .022$, $p = .882$; $F_2(1, 31) = .293$, $p = .592$), post-critical ($F_1(1, 23) = .003$, $p = .957$; $F_2(1, 31) = .279$, $p = .601$) or final regions ($F_1(1, 23) = .210$, $p = .651$; $F_2(1, 31) = .059$, $p = .810$).

Furthermore, a significant interaction of *Animacy* and *Article* was shown in the critical ($F_1(1, 23) = 8.844$, $p = .007$; $F_2(1, 31) = 18.138$, $p < .001$) and final regions ($F_1(1, 23) = 6.091$, $p = .021$; $F_2(1, 31) = 6.538$, $p = .016$), as it can be seen in Figure 6.14, and a marginal effect in the post-critical region by items ($F_1(1, 23) = .615$, $p = .441$; $F_2(1, 31) = 3.249$, $p = .081$).

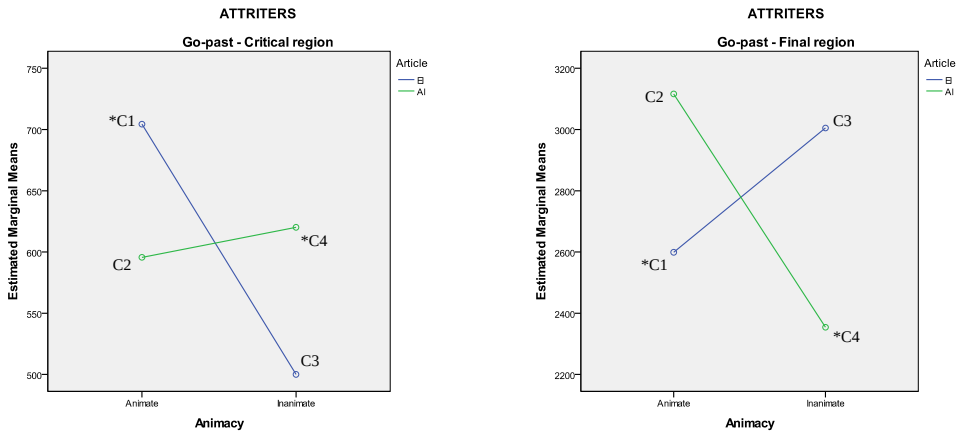

Figure 6.14. Attriters' RT means for go-past by subjects in the critical and final regions.

Paired samples t-tests were then conducted for the critical and final regions. In the final region, for the animate object ($t_1(23) = 2.417$, $p = .024$; $t_2(31) = 4.059$, $p < .001$), attriters showed significantly longer RTs for the *el* article (M = 704.38, SD = 263.382) than for the *al* article (M = 595.63, SD = 246.860), and for the inanimate object ($t_1(23) = -1.948$, $p = .064$; $t_2(31) = -1.958$, $p = .059$), they showed marginally significant shorter RTs for the *el* article (M = 500.04, SD = 148.612) than for the *al* article (M = 620.13, SD = 312.770).

In the final region, although the t-tests revealed significant effects for inanimate object, the means do not follow our predictions. For the animate object ($t_1(23) = -1.597$, $p = .124$; $t_2(31) = -1.690$, $p = .101$), attriters showed shorter RTs for the *el* article (M = 2598.92, SD = 1766.571) than for the *al* article (M = 3116.29, SD = 1538.514), and for the inanimate object ($t_1(23) = 2.929$, $p = .008$; $t_2(31) = 2.421$, p

= .022), longer RTs for the *el* article (M = 3005.00, SD = 1488.894) than for the *al* article (M = 2354.13, SD = 1156.909. Again, attriters reveal an inconsistency in the final region, which they also showed for first pass in the final region and monolinguals and exposed for total time in the final region.

Total time

The repeated-measures ANOVA did not reveal any main effect of *Animacy* in the critical ($F_1(1, 23) = .578$, $p = .455$; $F_2(1, 31) = .362$, $p = .552$), post-critical ($F_1(1, 23) = 2.282$, $p = .145$; $F_2(1, 31) = 1.255$, $p = .271$) or final regions ($F_1(1, 23) = .084$, $p = .775$; $F_2(1, 31) = .022$, $p = .883$).

A marginally significant main effect of *Article* was seen in the post-critical region ($F_1(1, 23) = 3.921$, $p = .060$; $F_2(1, 31) = 2.944$, $p = .096$), with the *el* article showing higher RTs than the *al*, but no main effects were revealed in the critical ($F_1(1, 23) = .036$, $p = .850$; $F_2(1, 31) = .107$, $p = .746$) or final regions ($F_1(1, 23) = .139$, $p = .713$; $F_2(1, 31) = .263$, $p = .612$).

Furthermore, as Figure 6.15 illustrates, a significant interaction of *Animacy* and *Article* was shown only in the final region ($F_1(1, 23) = 13.213$, $p = .001$; $F_2(1, 31) = 9.407$, $p = .004$), but not in the critical ($F_1(1, 23) = 1.681$, $p = .208$; $F_2(1, 31) = 2.711$, $p = .110$) or post-critical regions ($F_1(1, 23) = .590$, $p = .450$; $F_2(1, 31) = 1.608$, $p = .214$).

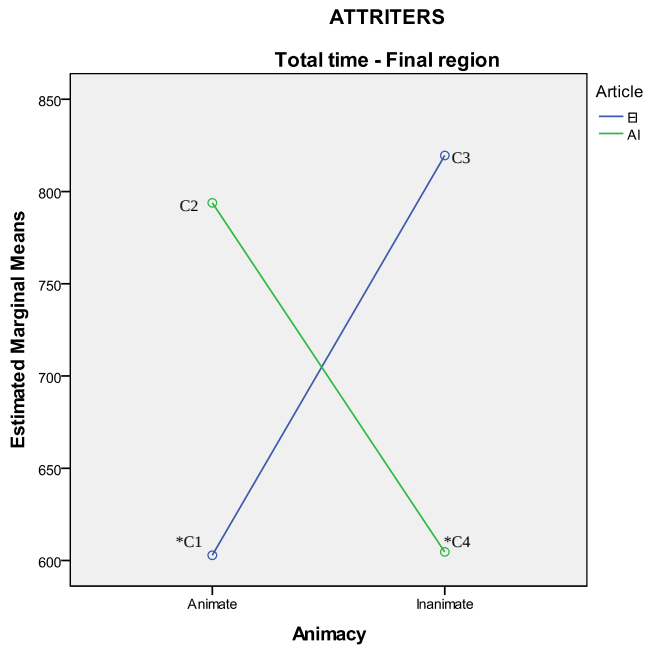

Figure 6.15. Attriters' RT means for total time by subjects in the final region.

In order to explore the interaction effect shown in the final region, a t-test by subject and another one by items were conducted. Both tests revealed the same results obtained previously for first pass and go-past in the final region, hence they revealed significant effects for both animate and inanimate objects, but the means do not follow our predictions. For the animate object, ($t_1(23) = -2.827$, $p = .010$; $t_2(31) = -2.125$, $p = .042$), attriters showed shorter RTs for the *el* article (M = 602.83, SD = 336.143) than for the *al* article (M = 793.88, SD = 382.463), and for the inanimate object ($t_1(23) = 3.523$, $p = .002$; $t_2(31) = 2.626$, $p = .013$), longer RTs for the *el* article (M = 819.54, SD = 364.385) than for the *al* article (M = 604.63, SD = 305.355). Once again, attriters reveal the same inconsistency in the final region, which they also showed for first pass and go-past in the same region and monolinguals and exposed for total time in the final region.

Monolinguals versus Exposed

First pass

As predicted, the repeated-measures ANOVAs run revealed no differences between the three groups. No significant three-way interaction of *Animacy*, *Article* and *Language Group* was shown for first pass in the critical ($F_1(1, 46) = .000$, $p = .995$; $F_2(1, 31) = .167$, $p = .685$), post-critical ($F_1(1, 46) = .062$, $p = .804$; $F_2(1, 31) = .000$, $p = .985$) or final regions ($F_1(1, 46) = .000$, $p = .999$; $F_2(1, 31) = .003$, $p = .955$), revealing that there are no differences between monolinguals and exposed in terms of how they are affected by the type of object and article presented in the stimuli.

No main effects of *Animacy* or *Article* were seen in the critical, post-critical or final regions. However, a significant interaction between *Animacy* and *Article* was shown in the critical region ($F_1(1, 46) = 22.890$, $p < .001$; $F_2(1, 31) = 18.760$, $p < .001$), but not in the post-critical or final regions.

Go-past

The same results were obtained for go-past reading times. No significant three-way interaction of *Animacy*, *Article* and *Language Group* was shown in the critical ($F_1(1, 46) = .119$, $p = .732$; $F_2(1, 31) = 1.183$, $p = .285$), post-critical ($F_1(1, 46) = .241$, $p = .626$; $F_2(1, 31) = .037$, $p = .849$) or final regions ($F_1(1, 46) = .101$, $p = .752$; $F_2(1, 31) = .052$, $p = .821$), showing that there are no differences between monolinguals and exposed in terms of how they are affected by the type of object and article presented in the stimuli.

A main effect of *Animacy* was seen in the post-critical region ($F_1(1, 46) = 12.461$, $p < .001$; $F_2(1, 31) = 5.164$, $p = .030$), with the animate object showing

longer RTs than the inanimate, but not in the critical or final regions. However, no main effects of *Article* were seen in the critical, post-critical or final regions.

Finally, a significant interaction between *Animacy* and *Article* was shown in the critical region ($F_1(1, 46) = 20.478$, $p < .001$; $F_2(1, 31) = 26.499$, $p < .001$), in the post-critical region by subjects ($F_1(1, 46) = 9.403$, $p = .004$; $F_2(1, 31) = 2.727$, $p = .109$) and in the final region by items ($F_1(1, 46) = 2.438$, $p = .125$; $F_2(1, 31) = 6.624$, $p = .015$).

Total time

The repeated-measures ANOVAs revealed no significant three-way interaction of *Animacy*, *Article* and *Language Group* for total time in the critical ($F_1(1, 46) = 2.448$, $p = .125$; $F_2(1, 31) = 2.328$, $p = .137$), post-critical ($F_1(1, 46) = .060$, $p = .807$; $F_2(1, 31) = .111$, $p = .742$) or final regions ($F_1(1, 46) = .957$, $p = .333$; $F_2(1, 31) = 1.869$, $p = .181$), confirming that there are no differences between monolinguals and exposed in terms of how they are affected by the type of object and article presented in the stimuli.

No main effects of *Animacy* or *Article* were seen in the critical, post-critical or final regions. However, a significant interaction between *Animacy* and *Article* was shown in the critical ($F_1(1, 46) = 41.022$, $p < .001$; $F_2(1, 31) = 48.034$, $p < .001$), post-critical ($F_1(1, 46) = 3.973$, $p = .052$; $F_2(1, 31) = 5.704$, $p = .023$) and final regions ($F_1(1, 46) = 13.167$, $p < .001$; $F_2(1, 31) = 21.496$, $p < .001$).

Monolinguals versus Attriters

First pass

The only significant three-way interaction of *Animacy*, *Article* and *Language Group* was shown in the final region, but only by subjects ($F_1(1, 46) = 5.097$, $p = .029$; $F_2(1, 31) = 2.513$, $p = .123$), as illustrated in Figure 6.16, but no three-way interaction effect was seen in the critical ($F_1(1, 46) = .106$, $p = .747$; $F_2(1, 31) = .046$, $p = .832$) or post-critical regions ($F_1(1, 46) = .020$, $p = .889$; $F_2(1, 31) = .214$, $p = .647$), which shows that monolinguals and attriters differ in relation to how they are affected by the type of object and article presented in the stimuli. Therefore, in order to see which group has a stronger two-way interaction effect between *Animacy* and *Article*, the RT means of each condition were subtracted for each group, and monolinguals showed a stronger Animacy*Article interaction (-20.75) than attriters (-117.37).

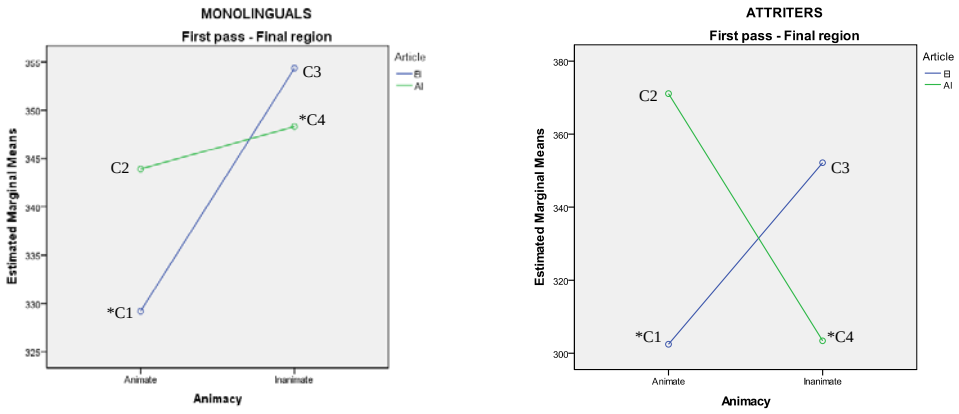

Figure 6.16. Monolinguals and attriters' RT means for first pass by subjects in the final region.

As a result of this three-way interaction, some tests were conducted to explore the nature of this effect in the final region. Although monolinguals and attriters showed a significant effect for the animate object by subjects ($t_1(47) = -2.185$, $p = .034$; $F_2(1, 31) = .957$, $p = .336$), the means do not follow our predictions,

revealing shorter RTs for the *el* article (M = 315.83, SD = 108.551) than for the *al* article (M = 357.50, SD = 132.051). For the inanimate object ($t_1(47) = 1.560$, $p = .126$; $F_2(1, 31) = 1.706$, $p = .201$), they showed longer RTs for the *el* article (M = 353.25, SD = 122.367) than for the *al* article (M = 325.85, SD = 97.838). This opposite effect was revealed for all three groups in the final region.

A main effect of *Animacy* was seen in the critical region ($F_1(1, 46) = 6.047$, $p = .018$; $F_2(1, 31) = 5.521$, $p = .025$), with the animate object showing longer RTs than the inanimate, but not in the post-critical or final regions. However, no main effects of *Article* were seen in the critical, post-critical or final regions.

Finally, a significant interaction between *Animacy* and *Article* was shown in the critical ($F_1(1, 46) = 15.041$, $p < .001$; $F_2(1, 31) = 30.671$, $p < .001$) and final regions ($F_1(1, 46) = 10.416$, $p = .002$; $F_2(1, 31) = 4.397$, $p = .044$), but not in the post-critical region.

Go- past

The repeated-measures ANOVAs did not show any three-way interactions of *Animacy*, *Article* and *Language Group* in the critical ($F_1(1, 46) = .263$, $p = .610$; $F_2(1, 31) = 1.389$, $p = .247$), post-critical ($F_1(1, 46) = .517$, $p = .476$; $F_2(1, 31) = .037$, $p = .849$) or final regions ($F_1(1, 46) = 1.577$, $p = .216$; $F_2(1, 31) = 2.623$, $p = .115$), which shows that monolinguals and attriters do not differ in the way they are affected by the type of object and article presented in the stimuli.

A main effect of *Animacy* is seen in the critical region ($F_1(1, 46) = 13.589$, $p < .001$; $F_2(1, 31) = 5.442$, $p = .026$), with the animate object showing longer RTs than the inanimate, but not in the post-critical or final regions. However, no main effects of *Article* were shown in the critical, post-critical or final regions.

Finally, a significant interaction between *Animacy* and *Article* was revealed in the critical ($F_1(1, 46) = 26.074$, $p < .001$; $F_2(1, 31) = 45.700$, $p < .001$), post-critical ($F_1(1, 46) = 4.179$, $p = .047$; $F_2(1, 31) = 7.588$, $p = .010$) and final regions ($F_1(1, 46) = 7.567$, $p = .008$; $F_2(1, 31) = 7.219$, $p = .011$).

Total time

The repeated-measures ANOVAs did not show any three-way interactions of *Animacy*, *Article* and *Language Group* in the critical ($F_1(1, 46) = 1.144$, $p = .290$; $F_2(1, 31) = 2.794$, $p = .105$), post-critical ($F_1(1, 46) = .027$, $p = .870$; $F_2(1, 31) = .004$, $p = .948$) or final regions ($F_1(1, 46) = 1.723$, $p = .196$; $F_2(1, 31) = 1.723$, $p = .199$), which shows that monolinguals and attriters do not differ in the way they are affected by the type of object and article presented in the stimuli.

No main effects of *Animacy* or *Article* were seen in the critical, post-critical or final regions. However, a significant interaction between *Animacy* and *Article* was shown in the critical ($F_1(1, 46) = 11.261$, $p = .002$; $F_2(1, 31) = 10.631$, $p = .003$) and final regions ($F_1(1, 46) = 17.428$, $p < .001$; $F_2(1, 31) = 13.533$, $p < .001$), but not in the post-critical region.

Attriters versus Exposed

First pass

The repeated-measures ANOVAs did not show any three-way interactions of *Animacy*, *Article* and *Language Group* in the critical ($F_1(1, 46) = .110$, $p = .742$; $F_2(1, 31) = .046$, $p = .832$), post-critical ($F_1(1, 46) = .116$, $p = .735$; $F_2(1, 31) = .266$, $p = .610$) or final regions ($F_1(1, 46) = 2.489$, $p = .121$; $F_2(1, 31) = 1.152$, $p = .291$),

which shows that attriters and exposed do not differ in the way they are affected by the type of object and article presented in the stimuli.

No main effects of *Animacy* or *Article* were seen in the critical, post-critical or final regions. However, a significant interaction between *Animacy* and *Article* was revealed in the critical ($F_1(1, 46) = 15.142$, $p < .001$; $F_2(1, 31) = 19.851$, $p < .001$) and final regions ($F_1(1, 46) = 5.072$, $p = .029$; $F_2(1, 31) = 5.126$, $p = .031$), but not in the post-critical region.

Go-past

The repeated-measures ANOVAs did not show any three-way interactions of *Animacy*, *Article* and *Language Group* in the critical ($F_1(1, 46) = .009$, $p = .926$; $F_2(1, 31) = .060$, $p = .808$), post-critical ($F_1(1, 46) = .111$, $p = .741$; $F_2(1, 31) = .099$, $p = .756$) or final regions ($F_1(1, 46) = 2.394$, $p = .129$; $F_2(1, 31) = 2.085$, $p = .159$), which shows that attriters and exposed do not differ in the way they are affected by the type of object and article presented in the stimuli.

No main effects of *Animacy* or *Article* were seen in the critical, post-critical or final regions. However, a significant interaction between *Animacy* and *Article* was revealed in the critical ($F_1(1, 46) = 14.545$, $p < .001$; $F_2(1, 31) = 18.084$, $p < .001$) and final regions ($F_1(1, 46) = 6.562$, $p = .014$; $F_2(1, 31) = 7.986$, $p = .008$), but not in the post-critical region.

Total time

The only significant three-way interaction of *Animacy*, *Article* and *Language Group* was shown in the critical region ($F_1(1, 46) = 4.496$, $p = .039$; $F_2(1, 31) = 10.597$, $p = .003$), as shown in Figure 6.17, but no three-way interaction effects were

seen in the post-critical ($F_1(1, 46) = .145$, $p = .705$; $F_2(1, 31) = .049$, $p = .826$) or final regions ($F_1(1, 46) = .050$, $p = .824$; $F_2(1, 31) = .005$, $p = .944$), which shows that attriters and exposed differ in relation to how they are affected by the type of object and article presented in the stimuli. Therefore, in order to see which group has a stronger two-way interaction effect between *Animacy* and *Article*, the RT means of each condition were subtracted for each group, and exposed showed a stronger Animacy*Article interaction (786.16) than attriters (246.62).

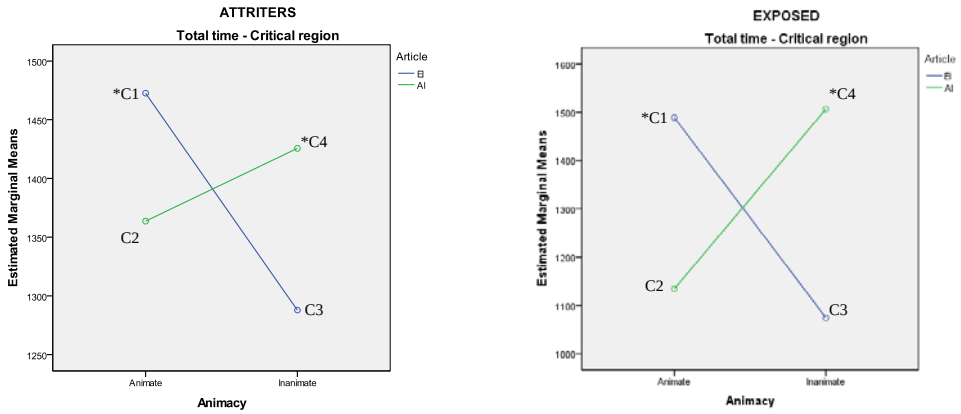

Figure 6.17. Attriters and exposed's RT means for total time by subjects in the critical region.

As a result of this three-way interaction, some tests were conducted to explore the nature of this effect. For the animate object ($t_1(47) = 2.989$, $p = .004$; $F_2(1, 31) = 3.969$, $p = .055$), attriters and exposed showed significantly longer RTs for the *el* article (M = 1480.71, SD = 623.977) than for the *al* article (M = 1248.98, SD = 504.706), and for the inanimate object ($t_1(47) = -3.376$, $p < .001$; $F_2(1, 31) = 4.233$, $p = .048$), they showed significantly shorter RTs for the *el* article (M = 1181.29, SD = 451.974) than for the *al* article (M = 1465.96, SD = 603.823).

A main effect of *Animacy* was seen in the post-critical region by subjects ($F_1(1, 46) = 4.636$, $p = .037$; $F_2(1, 31) = 2.469$, $p = .126$), with the animate object showing longer RTs than the inanimate, but not in the post-critical or final regions.

However, no main effects of *Article* were seen in the critical, post-critical or final regions.

Finally, a significant interaction between *Animacy* and *Article* was shown in the critical ($F_1(1, 46) = 16.473$, $p < .001$; $F_2(1, 31) = 21.284$, $p < .001$) and final regions ($F_1(1, 46) = 20.959$, $p < .001$; $F_2(1, 31) = 20.927$, $p < .001$), but not in the post-critical region.

6.3.2.7 Discussion

As in Experiment 1C, the results presented for Experiment 1D are also very clear. As predicted in Section 6.3.2.5, in the critical all three groups of participants showed longer RTs with the ungrammatical sentences in which the animate direct object was preceded by *el* (condition 1) than with the grammatical sentences in which the animate direct object was preceded by *al* (condition 2), as well as longer RTs with the ungrammatical sentences in which the inanimate direct object was preceded by *al* (condition 4) than with the grammatical sentences in which the inanimate direct object was preceded by *el* (condition 3).

Moreover, since the personal preposition *a* is not an interface structure, following the Interface Hypothesis, no attrition effects and, consequently, no difference between the groups were predicted. The results showed that all three groups performed as expected and did not show major differences between them. The only significant three-way interaction effect of *Animacy*Article*Language Group* was seen between attriters and exposed in the critical region for total time. However, since the direction was the expected one (i.e. longer RTs for the animate/el condition than for the animate/al condition, and shorter RTs for the inanimate/el condition for the inanimate/al condition) and this effect was not replicated in any other region or measure, we can still conclude that groups performed similarly with the personal preposition.

Some unexpected results were obtained in the final region for all three groups, in which the opposite effect to the expected was obtained (i.e. the animate/el condition showed shorter RTs than the animate/al condition, and the inanimate/el condition longer RTs than the inanimate/al condition). This effect can be easily explained if we take into consideration the kind of structure that participants are dealing with, which makes really clear ungrammatical sentences for the animate/el and the inanimate/al conditions. Therefore, by the time participants enter the final region of one of these ungrammatical conditions, it is already very clear they need to make a judgment of low acceptability, as they are dealing with an ungrammatical sentence. The ease of making this judgment results in very few fixations in the final region, which causes this opposite effect.

Overall, the results from Experiment 1D are consistent with those of Experiment 1C, with all three groups showing similar off-line and on-line sensitivity to the personal preposition mismatch. These findings reveal that non-interface structures, such as the DOM, do not undergo attrition, which supports the Interface Hypothesis and verifies our first hypothesis.

CHAPTER 7

Discussion and conclusions

7.1 Introduction

In Chapter 7, I summarize the findings of the present thesis and the conclusions drawn from them. First, I present a summary of the results obtained from the experiments carried out, experiment by experiment. In Section 7.3, I discuss these results analyzing them all together. Finally, I introduce the conclusions and implications drawn from the findings and possible directions for future work.

7.2 Summary of the results

A set of experiments were run in order to address the research questions proposed in this thesis:

(i) Following the Interface Hypothesis (Sorace & Filiaci 2006), will attriters show indeterminacy with an interface structure but not with a non-interface structure?

(ii) If they do, does attrition affect online sensitivity when processing these structures in real time or is it due to permanent changes in attriters' L1 grammatical representations?

(iii) Following the Activation Threshold Hypothesis (Paradis 1993) and the Interface Hypothesis (Sorace 2011), does attrition decrease or disappear due to frequency and recency of (re)exposure to the L1?

In order to answer these questions, a large experiment was designed and run, which was then divided into four different experiments so that it could be easily reported and analyzed. Two structures, an interface structure (pronominal subjects) and a non-interface structure (the Spanish personal preposition *a*), were included for comparison in the experiment, which consisted of two tasks, an offline naturalness task and an online eye-tracking experiment.

Both structures under investigation were presented together in a single experiment, so each of the experiments reported as Experiments 1A, 1B, 1C and 1D are part of the same experiment and were carried out simultaneously by each participant in a single session. The session was designed to be carried out as a single task, in which participants had to read the sentence that was shown in the computer screen (a sentence containing a pronoun, a sentence containing a personal preposition or a filler), which was used as the online eye-tracking-while-reading data, and then rate each sentence in terms of its naturalness, which was used as the off-line judgment data. However, since the data were analysed separately (online and offline tasks for each of the two structures) they were reported as four independent experiments: 1A (offline results for pronouns), 1B (online results for pronouns), 1C (offline results for the personal preposition) and 1D (online results for the personal preposition).

Three different groups of participants took part in the experiment: a control group of native Spanish speakers who had just arrived to the UK (monolinguals), a group of native Spanish speakers who had been living in the UK for a minimum of five years (attriters), and a group with the same characteristics as the attriters who were exposed exclusively to Spanish for a minimum of a week (exposed).

Finally, due to some unexpected results obtained from the experiments on pronouns, Experiments 1A and 1B, another experiment (Experiment 2) was conducted in order to try to explain these unpredicted findings.

7.2.1 Experiment 1A

Experiment 1A investigated the interpretation of overt versus null subject pronouns in Spanish using an offline naturalness judgment task. Participants from the three groups were presented with anaphoric sentences in which the predicted antecedent preferences, based on Carminati's (2002) Position of Antecedent Hypothesis (i.e. null pronoun: subject preference; overt pronoun: object preference), were disambiguated with number cues matching or mismatching these predicted antecedent preferences. Participants were asked to rate each sentence on a 5-point scale in terms on their perceived naturalness, with 5 being totally natural and 1 being not natural at all.

The results obtained in this experiment revealed that all three groups of participants showed equal sensitivity to the pronoun mismatch. All groups scored the sentences in which the overt pronoun correctly matched the object antecedent as being more "natural" than those in which the overt pronoun matched in number the subject antecedent, and the sentences in which the null pronoun correctly matched the subject antecedent as being more "natural" than those in which the null pronoun matched in number the object antecedent. However, the preference of the null pronoun for the subject antecedent was not as reliable as the preference of the overt pronoun for the object antecedent, which was very clear. This difference between the pronouns was found in the three groups of participants.

7.2.2 Experiment 1B

Experiment 1B investigated the online interpretation of overt versus null subject pronouns in Spanish using an eye-tracking-while-reading task, to explore whether participants showed online sensitivity when dealing with interface structures in real time. As for Experiment 1A, participants from the three groups were presented with anaphoric sentences in which the predicted antecedent preferences were disambiguated with number cues matching or mismatching these predicted antecedent preferences. This experiment was run using an Eyelink 1000 tower-mounted eye-tracking system, and participants were asked to read the sentences that appeared on the screen and press a button on a game pad once they had understood the sentence.

The results obtained from Experiment 1B revealed that monolinguals and exposed were reliably more sensitive than attriters to the pronoun mismatch, and that these two groups' performance (i.e. monolinguals vs. exposed) did not differ. Monolinguals and exposed read faster and processed more easily (i.e. showed shorter RTs) the sentences in which the overt pronoun correctly matched the object antecedent than those in which the number information forced the overt pronoun to match the subject, as well as the sentences in which the null pronoun correctly matched the subject antecedent than those in which the number features forced the null pronoun to match the object. This was not the case for the attriters, who did not show this sensitivity to the pronoun mismatch, and whose results differed from the monolinguals', which reveals attriters' "insensitivity" when processing pronominal subjects in real time. However, although attriters and monolinguals did differ significantly, when attriters and exposed were compared, their results did not show significant differences. These group differences will be discussed in detail in Section 7.3.

Also, as it was found in Experiment 1A, participants from the three groups showed again a clear preference for the object as the antecedent for the overt

pronoun, but for the null pronoun, their preference for the subject as its antecedent was weaker. This difference found between the pronouns was further explored in Experiment 2.

7.2.3 Experiment 2

Experiments 1A and 1B both revealed an interesting unexpected result, with all groups of participants showing a clear preference for the object as the antecedent for the overt pronoun, and a weaker preference for the subject as the antecedent for the null pronoun. Since the anaphoric sentences presented to the participants were disambiguated with number features, in order to rule out the possibility that this extra information of the number, in addition to the pronoun information, might have led participants to be biased towards the object antecedent and reveal this difference between the pronouns, Experiment 2 consisted of ambiguous anaphors, without number cues. This experiment was an off-line judgment task in which participants were presented with ambiguous anaphors and they were asked to choose their preferred antecedent. The purpose of this experiment was to investigate whether participants would also show a stronger preference for the object as the antecedent of the overt pronoun and a weaker preference for the subject as the antecedent of the null if they were presented with ambiguous sentences instead of sentences in which verb agreement caused the disambiguation. Since the results from Experiments 1A and 1B were consistent for the three groups of participants, only one group of monolinguals was recruited for this experiment.

The results obtained from Experiment 2 were consistent with those from Experiments 1A and 1B. Participants consistently assigned an object as the antecedent for overt pronouns, whereas their antecedent preference appears to be more random when they are dealing with null pronouns. Moreover, there seems to be an overall bias towards the object as the preferred referent, due to the fact that

participants selected the object more often than the subject as the antecedent for both pronouns. This unpredicted finding will be further discussed in Section 7.3.

7.2.4 Experiment 1C

Experiment 1C tested the interpretation of the Spanish personal preposition using the same offline naturalness judgment task used for Experiment 1A. Testing this non-interface structure allowed us to test our first hypothesis completely, which predicted that attrition would occur with the interface structure (pronominal subjects) but not with this non-interface structure. In this experiment, participants from the three groups were given sentences in which the animate direct object could be correctly introduced by a personal preposition *a* or ungrammatically lacking the preposition, and sentences in which the inanimate direct object could be correctly lacking the preposition or ungrammatically introduced by it. Participants were asked to read each sentence and rate it on a 5-point scale in terms on their perceived naturalness, with 5 being totally natural and 1 being not natural at all.

The results obtained from Experiment 1C revealed equal mismatch sensitivity for all groups of participants with the personal preposition. All three groups correctly scored the grammatical sentences in which the animate direct object was preceded by the preposition and those in which the inanimate direct object was not preceded by the preposition as being “natural”, and the ungrammatical sentences in which the animate direct object was not preceded by the preposition and those in which the inanimate direct object was preceded by the preposition as being “not natural”.

7.2.5 Experiment 1D

Experiment 1D tested the online interpretation of the Spanish personal preposition using an eye-tracking while reading task, to explore whether participants showed online sensitivity when dealing with non-interface structures in real time, in comparison with the online processing of the interface structure investigated in Experiment 1B. As for Experiment 1C, participants from the three groups were presented with sentences in which the animate direct object could be correctly introduced by a personal preposition *a* or ungrammatically lacking the preposition, and sentences in which the inanimate direct object could be correctly lacking the preposition or ungrammatically introduced by it. As in Experiment 1B, this experiment was run using an Eyelink 1000 tower-mounted eye-tracking system, and participants were asked to read the sentences that appeared on the screen and press a button on a game pad once they had understood the sentence.

As in Experiment 1C, the results obtained from Experiment 1D reveal that all groups of participants showed equal on-line sensitivity to the personal preposition mismatch. All three groups read faster and processed more easily (i.e. showed shorter RTs) the grammatical sentences in which the animate direct object was preceded by the preposition than the ungrammatical sentences in which the animate direct object was not preceded by the preposition, as well as the grammatical sentences in which the inanimate direct object was not preceded by the preposition than the ungrammatical sentences in which the inanimate direct object was preceded by the preposition.

7.3 Discussion of the findings

7.3.1 Processing of interface versus non-interface structures

The results revealed by the attrited group in the experiments conducted in this work answer the first question addressed in the present thesis, whether attriters show indeterminacy with an interface structure but not with a non-interface structure.

The offline ratings revealed equal mismatch sensitivity for all groups of participants with both structures. On the other hand, the eye-tracking measures revealed that whereas all groups showed equal on-line sensitivity to the personal preposition mismatch, monolinguals (and exposed) were reliably more sensitive than attriters to the pronoun mismatch. Therefore, we can conclude that L1 Spanish attrited speakers show less online sensitivity than monolinguals when processing pronominal subjects in real time, but not with the personal preposition, which reveals that attrition affects interface structures, but not non-interface structures.

7.3.2 Effect of recent (re)exposure to L1 input on attrition

The third question addressed in this thesis aimed to explore a novel issue on the research of L1 attrition: whether attrition effects decrease or disappear due to frequency and recency of (re)exposure to the L1.

As mentioned before, our results reveal that whereas the group of attriters did not show online sensitivity with pronominal subjects, the exposed group performed as expected and did show online sensitivity with this interface structure (i.e. they showed a reliable sensitivity to the pronoun mismatch). Moreover, while monolinguals and attriters did reveal significant differences in their performance, when the exposed group was compared to the monolinguals, no significant

differences between these two groups were revealed, which suggests that attrition effects diminish after recent exposure to the L1.

However, an unexpected result was obtained. When the exposed group was compared to the attriters, no significant differences between the groups were shown either. Therefore, given the significant difference between monolinguals and attriters, it might be the case that the exposed group is somewhere in between the attriters and the monolinguals; that is, their attrition effects have clearly diminished after having been reexposed to the L1 for a prolonged period of time, but not to the point of behaving native-like. The question that remains is whether attrition effects with interface structures such as subject pronouns just cannot be completely overcome or whether it is a matter of the length of exposure to L1 input, so that a longer exposure might be needed for attriters to totally overcome their attrition and behave like unattrited speakers.

Based on the offline data, which shows no significant differences between the three groups, and on the fact that monolinguals and exposed do not reveal significant differences in their online results, it is clear that no permanent change in the attriters' L1 grammatical representations takes place, which answers our second research question. On the one hand, it was revealed that although attriters did not show online sensitivity with the pronoun in the online task, they behaved like monolinguals and exposed in the offline task, with all groups of participants showing an equal sensitivity to the pronoun mismatch. On the other hand, it was found that monolinguals and exposed did not show significant differences in their online results, which reveals that the exposed group was able to overcome their attrition with recent reexposure to their L1.

Considering all the findings obtained from this thesis, we can conclude that attrition effects decrease as a result of L1 exposure. This reveals that bilinguals are sensitive to input changes and that attrition affects online sensitivity rather than

causing a permanent change in speakers' L1 grammatical representations (at least at a first stage).

7.3.3 Antecedent preferences: null versus overt pronouns

The results obtained from Experiments 1A, 1B and 2 all revealed an unpredicted finding, which suggested a difference between the null and the overt pronouns in terms of their antecedent preferences. It was found that participants from the three groups had a clear preference for the object as the antecedent for the overt pronoun, but for the null pronoun, their preference for the subject as its antecedent was weaker.

Other studies in Spanish have also found a strong preference of the object as the antecedent for the overt pronoun and a weaker subject bias for the null pronoun, which supports the results obtained in the present thesis. Filiaci (2010) conducted two experiments in which she only tested Main-Subordinate anaphora with Spanish and Italian native speakers and her results revealed a strong bias of the overt pronoun for the object antecedent and a weak preference of the null pronoun for the subject antecedent. Moreover, sentences containing a null pronoun did not reveal any significant antecedent preference, especially in Spanish (see Section 5.3.2.7 in Chapter 5).

Moreover, a rigid preference for the subject as the antecedent for the null pronoun has not been found for Italian either in other studies. Carminati (2002) conducted a questionnaire study to explore participants' antecedent preferences in ambiguous Main-Subordinate Italian anaphora and her results showed that in anaphora with temporal clauses, which are exactly the kind of anaphora used in this thesis, more object antecedents were assigned to null pronouns that in other type of clauses. Therefore, for Main-Subordinate anaphora with temporal clauses, Carminati predicted a weaker subject preference with null pronouns than for other types of

anaphora, whereas the overt pronoun bias should remain the same. Sorace & Filiaci (2006) investigated the interpretation of null versus overt subject pronouns in Italian with English-speaking near-native speakers of Italian (see Section 4.2.1 in Chapter 4), and their results revealed that null pronouns were accepted to refer to either the subject or the object antecedent in forward anaphora, which is the type of anaphora that the participants in our experiments were presented with. Fedele & Kaiser (2012) also show the same stronger antecedent preference of the overt pronoun that was revealed in the present study. They studied the comprehension of anaphora and cataphora in Italian comparing null and overt pronouns, and they used the same type of anaphora presented in this study (see Section 5.3.2.7 in Chapter 5). Fedele & Kaiser's results revealed that whereas for the null pronoun there is a general subject preference, it is more likely to be assigned to the object antecedent in anaphora than in cataphora. On the other hand, the overt pronoun clearly prefers the object antecedent in anaphora, being this strong object bias of the overt pronoun weaker in cataphora.

Finally, Bosch et al. (2003, 2007) and Bosch & Umbach (2007) also found a distinction in terms of the antecedent preferences of two types of pronouns in German: personal pronouns (*er, sie, es*) and demonstrative pronouns (*der, die, das*). They tested German native speakers to explore their antecedent preferences for these two pronouns using both corpus studies and psycholinguistic experiments, and reported that while personal pronouns show a slight preference for subject antecedents, demonstrative pronouns reveal a clear strong bias for object antecedents (see Section 5.3.2.7 in Chapter 5).

An explanation was proposed to explain this referential bias of the overt versus the null pronoun, which was related to the recency factor. That is, given the position of the object antecedent in Main-Subordinate anaphora, the fact that the object is the more recent antecedent might favor the strong bias of the overt pronoun for the object antecedent and weaken the bias of the null pronoun for the subject antecedent. However, due to the fact that the subject is still the preferred antecedent

for the null pronoun, a more accurate proposal is that although when speakers parse this type of sentence they retrieve the syntactic information (i.e. null pronouns refer to the most prominent antecedent whereas overt pronouns refer to the non-prominent antecedent), the recency factor plays a more important role than the syntactic information. This explanation accounts for the strong bias of the overt pronoun, since speakers rely on the syntactic information plus the recency factor, and the weaker bias of the null pronoun, since the syntactic information alone might not be enough for a strong subject preference.

Moreover, other studies have shown that the use of overt pronouns increases in contexts in which ambiguity exists, so speakers opt to use an overt pronoun to avoid confusion or miscommunication, even when it may be considered to be redundant (Cameron 1992, Serratrice 2007, Sorace et al. 2009, Lapidus & Smith 2009, Posio 2011).

7.4 Future work

Two main questions remain open after analyzing the results obtained from the experiments conducted in this thesis which need further research. First, it was found that the exposed group overcame their attrition after having been reexposed to their L1 for a prolonged period of time, but not to the point of completely behaving like an unattrited speaker. The question that this finding raises is whether attrition with interface structures such as subject pronouns just cannot be completely overcome or whether it is a matter of the length of exposure to the L1. Future work is required to explore whether longer exposure is needed for attriters to totally overcome attrition and behave just like a native speaker again. A group of attriters could be tested after being exposed to their L1 at different stages of their reexposure, to investigate whether longer L1 exposure equals more “native-likeness”, whether becoming totally “native-like” again is possible at all for attrited speakers, and if so, how much

exposure is needed. This could also shed some light on the stability of "native competence" which, as the present study reveals, seems to be a more unstable state than previously assumed by researchers.

Moreover, it was suggested that the exposed group might be somewhere in between monolinguals and attriters, since although significant differences were found between monolinguals and attriters, exposed did not differ from monolinguals, which was expected, but they did not show significant differences from attriters either. Therefore, a different methodology could be used in the future, one that is more sensitive than eye-tracking, which might show where the exposed group exactly stands in relation to the monolinguals and the attriters; that is, are exposed closer (i.e. behave more similar) to monolinguals or to attriters?

Secondly, further research is required to explore the difference found between the null and the overt pronouns in relation to their antecedent preferences. The results obtained from the present thesis clearly showed that all three groups of participants consistently prefer the object as the antecedent for overt pronouns, whereas their antecedent preference for the null pronoun is more variable. However, the explanation for this phenomenon remains unclear, so future work is needed to explore whether it is due to a strategy for dealing with ambiguity or whether it depends on the type of stimuli or tasks used in the investigation.

APPENDIX A

Materials for Experiment 1

A.1 Instructions

Querido/a participante,

¡Muchas gracias por colaborar en este estudio! El experimento requiere el uso de un *eye-tracker*, utilizado para grabar el movimiento del ojo. No hay riesgos asociados con este procedimiento. El experimento dura aproximadamente 30 minutos, así que ponte cómodo, ya que si te mueves la precisión del aparato podría verse afectada. Habrá un descanso durante el experimento, pero si necesitas parar en cualquier otro momento sólo tienes que decírmelo.

Durante el experimento es necesario que leas para ti mismo una serie de frases en español que aparecerán en la pantalla, y que después contestes en voz alta a la pregunta que aparecerá a continuación. Por favor, lee todas las frases con cuidado, a una velocidad normal, y asegurándote de entender su significado. Después de cada enunciado aparecerá la pregunta '¿Cómo de natural te suena esta frase?', donde tendrás que evaluar la frase en función de cómo de correcta te suena, es decir, cómo de normal/correcta (natural) o extraña/incorrecta (no natural) te suena como hispanoparlante. **No te preocupes del vocabulario o la ortografía, evalúa las frases en función de la gramática y las estructuras utilizadas** de 1 a 5:

1- nada natural / incorrecta
2- muy poco natural
3- más o menos natural
4- muy natural
5- totalmente natural

Antes de empezar el experimento, llevaremos a cabo un breve procedimiento de calibración de la máquina durante el cual tienes que mirar a un punto blanco que salta de una posición a otra de la pantalla. A continuación empezará el experimento, y verás un cuadradito negro a la izquierda de la pantalla. Por favor, mira a este

cuadrado, esto hará que aparezcan las frases. Las frases se mostrarán de una en una, así que una vez que las hayas leído y comprendido presiona la X del mando y la pregunta aparecerá. Una vez hayas contestado a la pregunta en voz alta, presiona el gatillo izquierdo y una nueva frase se mostrará. La sesión empezará con tres frases de práctica para que te familiarices con el procedimiento y por si tienes alguna pregunta sobre el experimento.

Eres libre de abandonar el experimento en todo momento. Todos los datos recogidos serán tratados de forma anónima. Si lo deseas, puedes solicitar que se te envíe información sobre el experimento una vez haya finalizado.

☐ **He leído la información anterior y confirmo que participo en el experimento voluntariamente.**

Nombre:

Firma: **Fecha:**

Dear participant,

Thank you very much for taking part in this study! The experiment involves the use of an eye-tracker to record the movement of your eye while you read a series of sentences. There are not risks associated with this procedure. The experiment will last 30 minutes approximately, so please make sure you sit comfortably and as still as possible, so that you do not need to move throughout the duration of the experiment as this might compromise the measurement accuracy. There will be a break during the experiment, but if you need to stop at any other point please let me know.

For this experiment, you are required to read silently a series of sentences in Spanish that will appear in the screen in front of you, and then answer out loud the question that follows. Please, read every sentence carefully, at normal speed, trying to fully comprehend it. After each sentence, the question '¿Cómo de natural te suena esta frase?' will follow. Here, you are being asked to rate the sentence previous to the question in terms of how accurate it sounds to you, that is, how normal (natural) or odd (not natural) it sounds to you as a Spanish speaker. You will be asked to rate the sentences from 1 to 5:

1- *not natural at all*
2- *not very natural*
3- *more or less natural*

4- very natural
5- totally natural

Before the experiment starts, we will run through a brief calibration procedure during which you have to look at a dot that jumps to various positions of the screen. Then, the experiment will start. Each trial starts with the presentation of a small black square on the left side of the screen. Please, look at this square; this will trigger the display of each sentence. You will only see one sentence at a time in the screen. After you have read and comprehended it, please press the X button on the controller and the question will appear. After you have answered the question out loud, press the left front button and a new sentence will be shown. The experiment will start with three practice trials in order to familiarize you with the procedure, so if you have any questions when doing the practice trials, please ask them at that point.

You are free to withdraw from the experiment at any time. All data will be treated anonymously. If you wish, you can request information about the experiment to be sent to you once the experiment is completed.

By signing below, you are indicating that you have reviewed the consent information and voluntarily agree to participate.

Printed Name:

Signature: ***Date:***

A.2 Experimental items for Experiments 1A and 1B

1. Ov/S. La anciana despidió a las mujeres cuando ella iba a casa de su hija.
   Ov/O. Las ancianas despidieron a la mujer cuando ella iba a casa de su hija.
   N/S. La anciana despidió a las mujeres cuando iba a casa de su hija.
   N/O. Las ancianas despidieron a la mujer cuando iba a casa de su hija.

The old woman/women said goodbye to the women/woman when she/pro was going to her daughter's house

2. Ov/S. La madre saludó a las chicas cuando ella cruzaba una calle con mucho tráfico.
   Ov/O. Las madres saludaron a la chica cuando ella cruzaba una calle con mucho tráfico.

N/S. La madre saludó a las chicas cuando cruzaba una calle con mucho tráfico.
N/O. Las madres saludaron a la chica cuando cruzaba una calle con mucho tráfico.

The mother/mothers greeted the girls/girl when she/pro was crossing a street with a lot of traffic

3. Ov/S. La señora sonrió a las invitadas cuando ella abrió la puerta de la casa.
Ov/O. Las señoras sonrieron a la invitada cuando ella abrió la puerta de la casa.
N/S. La señora sonrió a las invitadas cuando abrió la puerta de la casa.
N/O. Las señoras sonrieron a la invitada cuando abrió la puerta de la casa.

The lady/ladies smiled at the guests/guest when she/pro opened the door of the house

4. Ov/S. La abuela besó a las nietas cuando ella volvió a casa después del viaje.
Ov/O. Las abuelas besaron a la nieta cuando ella volvió a casa después del viaje.
N/S. La abuela besó a las nietas cuando volvió a casa después del viaje.
N/O. Las abuelas besaron a la nieta cuando volvió a casa después del viaje.

The grandmother/grandmothers kissed the granddaughters/granddaughter when she/pro came back home after the trip

5. Ov/S. La abogada defendió a las acusadas cuando ella tuvo el juicio el año pasado.
Ov/O. Las abogadas defendieron a la acusada cuando ella tuvo el juicio el año pasado.
N/S. La abogada defendió a las acusadas cuando tuvo el juicio el año pasado.
N/O. Las abogadas defendieron a la acusada cuando tuvo el juicio el año pasado.

The layer/layers defended the defendants/defendant when she/pro had the trial last year

6. Ov/S. La jubilada observó a las chicas cuando ella daba un paseo por el parque.
Ov/O. Las jubiladas observaron a la chica cuando ella daba un paseo por el parque.
N/S. La jubilada observó a las chicas cuando daba un paseo por el parque.
N/O. Las jubiladas observaron a la chica cuando daba un paseo por el parque.

The retired woman/women observed the girls/girl when she/pro was going for a walk at the park

7. Ov/S. La profesora felicitó a las licenciadas cuando ella salió del evento en la universidad.
Ov/O. Las profesoras felicitaron a la licenciada cuando ella salió del evento en la universidad.

N/S. La profesora felicitó a las licenciadas cuando salió del evento en la universidad.
N/O. Las profesoras felicitaron a la licenciada cuando salió del evento en la universidad.

The professor/professors congratulated the graduates/graduate when she/pro left the event at the university

8. Ov/S. La presentadora abrazó a las actrices cuando ella salió del evento que se celebró.
Ov/O. Las presentadoras abrazaron a la actriz cuando ella salió del evento que se celebró.
N/S. La presentadora abrazó a las actrices cuando salió del evento que se celebró.
N/O. Las presentadoras abrazaron a la actriz cuando salió del evento que se celebró.

The presenter/presenters hugged the actresses/actress when she/pro left the event that was celebrated

9. Ov/S. La señora piropeó a las famosas cuando ella fue al teatro la semana pasada.
Ov/O. Las señoras piropearon a la famosa cuando ella fue al teatro la semana pasada.
N/S. La señora piropeó a las famosas cuando fue al teatro la semana pasada.
N/O. Las señoras piropearon a la famosa cuando fue al teatro la semana pasada.

The lady/ladies complimented the celebrities/celebrity when she/pro went to the theatre last week

10. Ov/S. La diseñadora midió a las modelos cuando ella asistió al pase de modelos anoche.
Ov/O. Las diseñadoras midieron a la modelo cuando ella asistió al pase de modelos anoche.
N/S. La diseñadora midió a las modelos cuando asistió al pase de modelos anoche.
N/O. Las diseñadoras midieron a la modelo cuando asistió al pase de modelos anoche.

The designer/designers measured the models/model when she/pro attended the runway show last night

11. Ov/S. La artista contempló a las musas cuando ella acudió al estudio de fotografía ayer.
Ov/O. Las artistas contemplaron a la musa cuando ella acudió al estudio de fotografía ayer.
N/S. La artista contempló a las musas cuando acudió al estudio de fotografía ayer.

N/O. Las artistas contemplaron a la musa cuando acudió al estudio de fotografía ayer.

The artist/artists contemplated the muses/muse when she/pro attended the photography studio yesterday

12. Ov/S. La camarera atendió a las señoritas cuando ella llegó al restaurante por la tarde.
Ov/O. Las camareras atendieron a la señorita cuando ella llegó al restaurante por la tarde.
N/S. La camarera atendió a las señoritas cuando llegó al restaurante por la tarde.
N/O. Las camareras atendieron a la señorita cuando llegó al restaurante por la tarde.

The waitress/waitresses served the ladies/lady when she/pro arrived at the restaurant in the afternoon

13. Ov/S. La vendedora guiñó a las muchachas cuando ella salía del establecimiento tras su conversación.
Ov/O. Las vendedoras guiñaron a la muchacha cuando ella salía del establecimiento tras su conversación.
N/S. La vendedora guiñó a las muchachas cuando salía del establecimiento tras su conversación.
N/O. Las vendedoras guiñaron a la muchacha cuando salía del establecimiento tras su conversación.

The seller/sellers winked at the girls/girl when she/pro was leaving the establishment after their conversation

14. Ov/S. La entrenadora animó a las jugadoras cuando ella hablaba del partido que se jugó.
Ov/O. Las entrenadoras animaron a la jugadora cuando ella hablaba del partido que se jugó.
N/S. La entrenadora animó a las jugadoras cuando hablaba del partido que se jugó.
N/O. Las entrenadoras animaron a la jugadora cuando hablaba del partido que se jugó.

The trainer/trainers cheered the players/player up when she/pro was talking about the game that was played

15. Ov/S. La maquilladora pintó a las novias cuando ella asistió al hotel donde habían quedado.
Ov/O. Las maquilladoras pintaron a la novia cuando ella asistió al hotel donde habían quedado.
N/S. La maquilladora pintó a las novias cuando asistió al hotel donde habían quedado.

N/O. Las maquilladoras pintaron a la novia cuando asistió al hotel donde habían quedado.

The make-up artist/artists made up the brides/bride when she/pro went to the hotel where they were meeting

16. Ov/S. La peluquera peinó a las señoritas cuando ella fue al salón de belleza ayer.
Ov/O. Las peluqueras peinaron a la señorita cuando ella fue al salón de belleza ayer.
N/S. La peluquera peinó a las señoritas cuando fue al salón de belleza ayer.
N/O. Las peluqueras peinaron a la señorita cuando fue al salón de belleza ayer.

The hairdresser/hairdressers did the hair of the ladies/lady when she/pro went to the beauty salon

17. Ov/S. El enfermero consultó con los doctores cuando él salió del hospital tras la operación.
Ov/O. Los enfermeros consultaron con el doctor cuando él salió del hospital tras la operación.
N/S. El enfermero consultó con los doctores cuando salió del hospital tras la operación.
N/O. Los enfermeros consultaron con el doctor cuando salió del hospital tras la operación.

The nurse/nurses consulted with the doctors/doctor when he/pro left the hospital after the operation

18. Ov/S. El estudiante habló con los profesores cuando él salió de clase por la tarde.
Ov/O. Los estudiantes hablaron con el profesor cuando él salió de clase por la tarde.
N/S. El estudiante habló con los profesores cuando salió de clase por la tarde.
N/O. Los estudiantes hablaron con el profesor cuando salió de clase por la tarde.

The student/students visited the professors/professor when he/pro finished the class in the afternoon

19. Ov/S. El padre discutió con los muchachos cuando él salía de casa por la noche.
Ov/O. Los padres discutieron con el muchacho cuando él salía de casa por la noche.
N/S. El padre discutió con los muchachos cuando salía de casa por la noche.
N/O. Los padres discutieron con el muchacho cuando salía de casa por la noche.

The father/fathers argued with the kids/kid when he/pro was leaving home at night

20. Ov/S. El maestro conversó con los alumnos cuando él entró en clase por la mañana.
    Ov/O. Los maestros conversaron con el alumno cuando él entró en clase por la mañana.
    N/S. El maestro conversó con los alumnos cuando entró en clase por la mañana.
    N/O. Los maestros conversaron con el alumno cuando entró en clase por la mañana.

The teacher/teachers conversed with the pupils/pupil when he/pro came in the classroom in the morning

21. Ov/S. El novio esperaba con los padrinos cuando él vio al sacerdote acercarse al altar.
    Ov/O. Los novios esperaban con el padrino cuando él vio al sacerdote acercarse al altar.
    N/S. El novio esperaba con los padrinos cuando vio al sacerdote acercarse al altar.
    N/O. Los novios esperaban con el padrino cuando vio al sacerdote acercarse al altar.

The bridegroom/bridegrooms waited with the best man/men when he/pro saw the priest approaching the altar

22. Ov/S. El arquitecto consultó con los ingenieros cuando él controlaba la obra de la autopista.
    Ov/O. Los arquitectos consultaron con el ingeniero cuando él controlaba la obra de la autopista.
    N/S. El arquitecto consultó con los ingenieros cuando controlaba la obra de la autopista.
    N/O. Los arquitectos consultaron con el ingeniero cuando controlaba la obra de la autopista.

The architect/architects consulted the engineers/engineer when he/pro was checking the works in the highway

23. Ov/S. El informático conversaba con los ayudantes cuando él arreglaba el ordenador que estaba roto.
    Ov/O. Los informáticos conversaban con el ayudante cuando él arreglaba el ordenador que estaba roto.
    N/S. El informático conversaba con los ayudantes cuando arreglaba el ordenador que estaba roto.
    N/O. Los informáticos conversaban con el ayudante cuando arreglaba el ordenador que estaba roto.

The computer technician/technicians conversed with the assistants/assistant when he /pro fixed the computer that was broken

24. Ov/S. El pintor reflexionó con los caseros cuando él elegía el color de las paredes.
Ov/O. Los pintores reflexionaron con el casero cuando él elegía el color de las paredes.
N/S. El pintor reflexionó con los caseros cuando elegía el color de las paredes.
N/O. Los pintores reflexionaron con el casero cuando elegía el color de las paredes.

The painter/painters reflected with the landlords/landlord when he/pro was choosing the color of the walls

25. Ov/S. El guía quedó con los turistas cuando él llegó al hotel después del almuerzo.
Ov/O. Los guías quedaron con el turista cuando él llegó al hotel después del almuerzo.
N/S. El guía quedó con los turistas cuando llegó al hotel después del almuerzo.
N/O. Los guías quedaron con el turista cuando llegó al hotel después del almuerzo.

The guide/guides met the tourists/tourist when he/pro arrived to the hotel after lunch

26. Ov/S. El enfermo dialogó con los cirujanos cuando él asistió al hospital tras la intervención.
Ov/O. Los enfermos dialogaron con el cirujano cuando él asistió al hospital tras la intervención.
N/S. El enfermo dialogó con los cirujanos cuando asistió al hospital tras la intervención.
N/O. Los enfermos dialogaron con el cirujano cuando asistió al hospital tras la intervención.

The patient/patients talked to the surgeons/surgeon when he/pro attended the hospital after the intervention

27. Ov/S. El anciano estaba con los chicos cuando él tuvo el accidente en la carretera.
Ov/O. Los ancianos estaban con el chico cuando él tuvo el accidente en la carretera.
N/S. El anciano estaba con los chicos cuando tuvo el accidente en la carretera.
N/O. Los ancianos estaban con el chico cuando tuvo el accidente en la carretera.

The old man/men was/were with the boys/boy when he/pro had the accident in the road

28. Ov/S. El empresario negoció con los músicos cuando él salió del concierto la semana pasada.

Ov/O. Los empresarios negociaron con el músico cuando él salió del concierto la semana pasada.
N/S. El empresario negoció con los músicos cuando salió del concierto la semana pasada.
N/O. Los empresarios negociaron con el músico cuando salió del concierto la semana pasada.

The businessman/businessmen negotiated with the musicians/musician when he/pro left the concert last week

29. Ov/S. El científico razonó con los inventores cuando él asistió al laboratorio de ciencias físicas.
Ov/O. Los científicos razonaron con el inventor cuando él asistió al laboratorio de ciencias físicas.
N/S. El científico razonó con los inventores cuando asistió al laboratorio de ciencias físicas.
N/O. Los científicos razonaron con el inventor cuando asistió al laboratorio de ciencias físicas.

The scientist/scientists reasoned with the inventors/inventor when he/pro attended the laboratory of physical sciences

30. Ov/S. El político pactó con los ciudadanos cuando él fue al ayuntamiento de la capital.
Ov/O. Los políticos pactaron con el ciudadano cuando él fue al ayuntamiento de la capital.
N/S. El político pactó con los ciudadanos cuando fue al ayuntamiento de la capital.
N/O. Los políticos pactaron con el ciudadano cuando fue al ayuntamiento de la capital.

The politician/politicians made a pact with the citizens/citizen when he/pro when to the city hall in the capital

31. Ov/S. El deportista apostó con los entrenadores cuando él dudaba de las posibilidades de ganar.
Ov/O. Los deportistas apostaron con el entrenador cuando él dudaba de las posibilidades de ganar.
N/S. El deportista apostó con los entrenadores cuando dudaba de las posibilidades de ganar.
N/O. Los deportistas apostaron con el entrenador cuando dudaba de las posibilidades de ganar.

The sportsman/sportsmen bet with the trainers/trainer when he/pro doubted about the possibilities of winning

32. Ov/S. El ponente debatió con los asistentes cuando él acudió a la conferencia sobre filosofía.

Ov/O. Los ponentes debatieron con el asistente cuando él acudió a la conferencia sobre filosofía.
N/S. El ponente debatió con los asistentes cuando acudió a la conferencia sobre filosofía.
N/O. Los ponentes debatieron con el asistente cuando acudió a la conferencia sobre filosofía.
The speaker/speakers debated with the audience when he/pro attended the conference on philosophy

A.3 Experimental items for Experiments 1C and 1D

1. EL/AN. María abrazó el alumno que tanto lloraba. 515[1]
AL/AN. María abrazó al alumno que tanto lloraba.
María hugged the student who cried so much

EL/IN. María abrazó el regalo pensando en él. 438
AL/IN. María abrazó al regalo pensando en él.
María hugged the present thinking of him

2. EL/AN. Juan defendió el conductor que fue despedido. 393
AL/AN. Juan defendió al conductor que fue despedido.
Juan defended the driver that was fired

EL/IN. Juan defendió el argumento de forma efusiva. 437
AL/IN. Juan defendió al argumento de forma efusiva.
Juan defended the argument in an effusive way

3. EL/AN. Clara besó el cartero cuando trajo noticias. 37
AL/AN. Clara besó al cartero cuando trajo noticias.
Clara kissed mailer when he brought news

EL/IN. Clara besó el amuleto antes del examen. 10
AL/IN. Clara besó al amuleto antes del examen.
Clara kissed the amulet before the exam

4. EL/AN. Pedro señaló el joven que estaba camuflado. 3132
AL/AN. Pedro señaló al joven que estaba camuflado.
Pedro pointed the young man that was camouflaged

[1] The number shown in each pair of sentences corresponds with the frequency (i.e. the number of occurrences) of the critical word in Davis' (2002) corpus.

EL/IN. Pedro señaló el libro de la estantería. 3647
AL/IN. Pedro señaló al libro de la estantería.
Pedro pointed the book from the shelf

5. EL/AN. Marta culpó el médico de cometer errores. 1653
AL/AN. Marta culpó al médico de cometer errores.
Marta blamed the doctor of making mistakes

EL/IN. Marta culpó el empleo por su estrés. 1027
AL/IN. Marta culpó al empleo por su estrés.
Marta blamed the job for her stress

6. EL/AN. Alberto robó el anciano sin ningún remordimiento. 435
AL/AN. Alberto robó al anciano sin ningún remordimiento.
Alberto robbed the old man without any concern

EL/IN. Alberto robó el retrato de un museo. 585
AL/IN. Alberto robó al retrato de un museo.
Alberto robbed the portrait from a museum

7. EL/AN. Elena maldijo el ladrón que le robó. 255
AL/AN. Elena maldijo al ladrón que le robó.
Elena condemned the thief who robbed her

EL/IN. Elena maldijo el correo con malas noticias. 323
AL/IN. Elena maldijo al correo con malas noticias.
Elena condemned the mail with bad news

8. EL/AN. Marcos suspendió el alumno por haber copiado. 515
AL/AN. Marcos suspendió al alumno por haber copiado.
Marcos failed the student for cheating

EL/IN. Marcos suspendió el evento por mala organización. 374
AL/IN. Marcos suspendió al evento por mala organización.
Marcos suspended the event for bad organization

9. EL/AN. Carmen salvó el abogado del difícil juicio. 1082
AL/AN. Carmen salvó al abogado del difícil juicio.
Carmen saved the layer from the difficult trial

EL/IN. Carmen salvó el negocio de la quiebra. 939
AL/IN. Carmen salvó al negocio de la quiebra.
Carmen saved the business from bankruptcy

10. EL/AN. Mario observó el profesor cuando daba clase. 1789

AL/AN. Mario observó al profesor cuando daba clase.
Mario observed the professor when he was teaching

EL/IN. Mario observó el recuerdo del último viaje. 2450
AL/IN. Mario observó al recuerdo del último viaje.
Mario observed the souvenir from his last trip

11. EL/AN. Carla vio el chico de su clase. 887
AL/AN. Carla vio al chico de su clase.
Carla saw the boy from her class

EL/IN. Carla vio el barco alejándose del puerto. 914
AL/IN. Carla vio al barco alejándose del puerto.
Carla saw the boat leaving the harbor

12. EL/AN. Rafael admiraba el señor que hablaba animadamente. 5244
AL/AN. Rafael admiraba al señor que hablaba animadamente.
Rafael admired the gentleman who spoke cheerfully

EL/IN. Rafael admiraba el papel que ella desempeñaba. 3770
AL/IN. Rafael admiraba al papel que ella desempeñaba.
Rafael admired the role she carried out

13. EL/AN. Beatriz visitó el amigo de su hermana. 2379
AL/AN. Beatriz visitó al amigo de su hermana.
Beatriz visited the friend of her sister

EL/IN. Beatriz visitó el hotel y reservó habitación. 1223
AL/IN. Beatriz visitó al hotel y reservó habitación.
Beatriz visited the hotel and reserved a room

14. EL/AN. Armando estudió el poeta que escribía sonetos. 1683
AL/AN. Armando estudió al poeta que escribía sonetos.
Armando studies the poet that wrote sonnets

EL/IN. Armando estudió el coche antes de comprarlo. 803
AL/IN. Armando estudió al coche antes de comprarlo.
Armando studied the car before buying it

15. EL/AN. Alba pidió el actor un autógrafo dedicado. 347
AL/AN. Alba pidió al actor un autógrafo dedicado.
Alba asked the actor for a dedicated autograph

EL/IN. Alba pidió el lápiz para tomar apuntes. 218
AL/IN. Alba pidió al lápiz para tomar apuntes.

Alba asked for the pencil to take notes

16. EL/AN. Miguel condujo el editor hasta la editorial. 203
AL/AN. Miguel condujo al editor hasta la editorial.
Miguel took the editor to the publishing house

EL/IN. Miguel condujo el camión durante cinco horas. 373
AL/IN. Miguel condujo al camión durante cinco horas.
Miguel drove the track for five hours

17. EL/AN. Él sirvió el cantante un exquisito champán. 394
AL/AN. Él sirvió al cantante un exquisito champán
He served the singer an exquisite champagne

EL/IN. Él sirvió el almuerzo para los invitados. 416
AL/IN. Él sirvió al almuerzo para los invitados.
He served lunch for the guests

18. EL/AN. Ella presentó el muchacho a sus padres. 1112
AL/AN. Ella presentó al muchacho a sus padres.
She introduced the guy to her parents

EL/IN. Ella presentó el teléfono de última generación. 1333
AL/IN. Ella presentó el teléfono de última generación.
She presented the last generation telephone

19. EL/AN. Ellos trataron el doctor con mucho respeto. 2417
AL/AN. Ellos trataron al doctor con mucho respeto.
They treated the doctor with a lot of respect

EL/IN. Ellos trataron el asunto con mucha delicadeza. 1858
AL/IN. Ellos trataron al asunto con mucha delicadeza.
They treated the matter delicately

20. EL/AN. Ellas revelaron el maestro un gran secreto. 1427
AL/AN. Ellas revelaron al maestro un gran secreto.
They revealed the master a big secret

EL/IN. Ellas revelaron el mensaje cuando lo recibieron. 891
AL/IN. Ellas revelaron al mensaje cuando lo recibieron.
They revealed the message when they received it

21. EL/AN. Él ofreció el enfermero toda su ayuda. 33
AL/AN. Él ofreció al enfermero toda su ayuda.
He offered the nurse all his help

EL/IN. Él ofreció el aperitivo antes del almuerzo. 35
AL/IN. Él ofreció al aperitivo antes del almuerzo.
He offered the snack before the lunch

22. EL/AN. Ella reconoció el caballero que llevaba corbata. 780
AL/AN. Ella reconoció al caballero que llevaba corbata.
She recognized the gentleman who was wearing a tie

EL/IN. Ella reconoció el escándalo delante del público. 606
AL/IN. Ella reconoció al escándalo delante del público.
She recognized the scandal in front of the public

23. EL/AN. Ellos encontraron el marinero que había desaparecido. 95
AL/AN. Ellos encontraron al marinero que había desaparecido.
They found the sailor who was disappeared

EL/IN. Ellos encontraron el equipaje que estaba perdido. 103
AL/IN. Ellos encontraron al equipaje que estaba perdido.
They found the luggage that was lost

24. EL/AN. Ellas escucharon el detective revelando sus hallazgos. 178
AL/AN. Ellas escucharon al detective revelando sus hallazgos.
They listened to the detective revealing his findings

EL/IN. Ellas escucharon el televisor mientras estaban cenando. 189
AL/IN. Ellas escucharon al televisor mientras estaban cenando.
They listened to the television while they were having dinner

25. EL/AN. Él evitó el nieto de su amigo. 276
AL/AN. Él evitó al nieto de su amigo.
He avoided the grandson of his friend

EL/IN. Él evitó el balón que le lanzaron. 425
AL/IN. Él evitó al balón que le lanzaron.
He avoided the ball they threw to him

26. EL/AN. Ella criticó el marido de su hermana. 1416
AL/AN. Ella criticó al marido de su hermana.
She criticized the husband of her sister

EL/IN. Ella criticó el cuento que Miguel escribió. 1160
AL/IN. Ella criticó al cuento que Miguel escribió.
She criticized the story that Miguel wrote

27. EL/AN. Ellos prepararon el pariente una gran comilona.161
AL/AN. Ellos prepararon al pariente una gran comilona.
They prepared the relative a huge feast

EL/IN. Ellos prepararon el desayuno con ingredientes naturales. 297
AL/IN. Ellos prepararon al desayuno con ingredientes naturals.
They prepared breakfast with natural ingredients

28. EL/AN. Ellas apoyaron el primo de su amiga. 425
AL/AN. Ellas apoyaron al primo de su amiga.
They supported the cousin of their friend

EL/IN. Ellas apoyaron el pacto que allí propusieron. 515
AL/IN. Ellas apoyaron al pacto que allí propusieron.
They supported the pact they proposed there

29. EL/AN. Él miraba el asesino con mucho desprecio. 166
AL/AN. Él miraba al asesino con mucho desprecio.
He looked at the murdered with a lot of detestation

EL/IN. Él miraba el armario hecho de caoba. 112
AL/IN. Él miraba al armario hecho de caoba.
He looked at the closet made of mahogany

30. EL/AN. Ella consultó el escritor sobre su artículo. 1240
AL/AN. Ella consultó al escritor sobre su artículo.
She consulted the writer about his article

EL/IN. Ella consultó el cuaderno después de clase. 3770
AL/IN. Ella consultó al cuaderno después de clase.
She consulted the notebook after class

31. EL/AN. Ellos admiraron el abuelo por su vitalidad. 884
AL/AN. Ellos admiraron al abuelo por su vitalidad.
They admired the grandfather due to his vitality

EL/IN. Ellos admiraron el cuadro de aquella exposición. 1254
AL/IN. Ellos admiraron al cuadro de aquella exposición.
They admired the painting from that exposition

32. EL/AN. Ellas anunciaron el ministro a su llegada. 3024
AL/AN. Ellas anunciaron al ministro a su llegada.
They announced the minister when he arrived

EL/IN. Ellas anunciaron el problema en la reunión. 5739
AL/IN. Ellas anunciaron al problema en la reunión.
They announced the problem at the meeting

A.4 Fillers

1. El novio besó a la novia en el altar.
   The bridegroom kissed the bride in the altar

2. El policía vio a la asesina cuando intentaba escapar.
   The policeman saw the murderer when pro was trying to escape

3. La profesora castigó a la alumna por su mal comportamiento en clase.
   The professor punished the student her bad behavior in class

4. Ella insultó a la carnicera que le vendió la carne en mal estado.
   She insulted the butcher that sold her the meat in bad condition

5. La niña observó la señorita que llevaba un rojo vestido.
   The girl observed the lady that was wearing a red dress

6. Matías recogió a la colilla del suelo.
   Matías picked the cigarette butts from the floor

7. Ellas aclamaron la actriz que ganó el Óscar.
   They acclaimed the actress that won the Oscar

8. Berta sirvió a la comida.
   Berta served the food

9. El examinador aprobó las estudiantes de último curso.
   The examiner passed the last year students

10. Mis vecinos de arriba golpearon a la puerta.
    My neighbors upstairs hit the door

11. La dueña de la casa pagó la sirvienta por adelantado.
    The owner of the house paid the servant in advance

12. El empresario compró a la compañía por una gran suma de dinero.
    The businessman bought the company for a big sum of money

13. Los inquilinos agradecieron la mensajera al traer el paquete.
The tenants thanked the messenger when she brought the package

14. Mis amigos escucharon la radio mientras jugaron a las cartas.
My friends listened to the radio while they were playing cards

15. Luis y Susana aplaudieron a la cantante.
Luis and Susana applauded the singer

16. El café que sirvieron en el banquete era muy malo.
The coffee that was served at the reception was very bad

17. Los niños del coro cantaban como los ángeles.
The kids in the choir singed like angels

18. Los asistentes estaban impacientes por que empezara el evento.
The audience was impatient for the event to start

19. Cada ordenador de la universidad estaba ocupado.
Every computer in the university was taken

20. El presidente de la república protagonizó el debate.
The president of the republic took part in the debate

21. La televisión que compraron era muy bien de precio.
The television they bought had a very good price

22. El sillón de la tienda de antigüedades era de negro cuero.
The armchair in the antique shop was made of black leather

23. Marcos habló con su hermano por teléfono.
Marcos talked with his brother on the phone

24. Mi abogado defendió el caso y finalmente lo ganó.
The layer defended the case and finally won it

25. Mi hermano llamó a su médico a la consulta varias veces.
My brother called his doctor to the office several times

26. El investigador hizo muchas preguntas a la acusada.
The investigator made many questions to the defendant

27. Las revistas de moda se vendieron a la quiosquera a primera hora de la mañana.
The fashion magazines were sold to the vendor early in the morning

28. Mi abuelo hablaba con sus nietos mientras ellos leían un libro.
My grandfather talked with his grandsons while they were reading a book

29. Los vendedores negociaron con los compradores hasta que ofrecieron la cantidad mínima.
The sellers negotiated with the buyers until pro offered the minimum amount

30. La madre discutió con sus hijos porque ellos no le hacían caso.
The mother argued with her sons because they didn't do what she said

31. Los arquitectos presentaron el proyecto mientras todos escuchaban atentamente.
The architects presented the project while everybody was listening attentively

32. Laura presentó a Pedro a sus amigas mientras estaban en la discoteca.
Laura presented Peter to her girlfriends while pro were in the club

33. Alejandro sorprendió a Miguel mientras trabajaban en su oficina.
Alejandro surprised Miguel while pro were working in their office

34. Los representantes de la actriz denunciaron a la cadena después de que ella acabara la serie.
The agents of the actress denounced the channel after she finished the show

35. Luisa y Ana se fueron de casa mientras ellas eran menor de edad todavía.
Luisa and Ana left home while they were still under age

36. Esteban se rió de las señoras porque ellas estaban borrachas.
Esteban laughed at the ladies because they were drunk

37. Los jardineros del parque podaron los árboles mientras era todavía primavera.
The gardeners of the park pruned the trees while it was still spring

38. Los socorristas salvaron la vida a los bañistas cuyo barco se hundió en alta mar.
The lifeguards saved the life to the swimmers whose boat sank on the high seas

39. Fernando llamó a Carlos porque ellos habían quedado.
Fernando called Carlos because they were meeting

40. Los veterinarios que trabajaban en aquella clínica salvaron la vida a muchos animales.
The veterinarians that worked at that clinic saved the life of many animals

41. Ellos se quejaron de la película porque ésta fue demasiado larga.
They complained about the movie because it was too long

42. Los padres de la novia recibían a los invitados mientras éstos llegaban a la iglesia.
The bride's parents received the guests while they were arriving at the church

43. El destino turístico que los universitarios eligieron se encontraba al otro lado del Atlántico.
The tourist destination that the university students picked was at the other side of the Atlantic

44. Agustín y su acompañante se quedaron dormidos porque la ópera les pareció insoportable.
Agustín and his companion felt asleep because they thought the opera was unbearable

45. El perro se peleó con el gato cuando éstos se encontraron.
The dog fought with the cat when they met

46. El niño se aburrió del libro tan pronto como empezó a leer.
The boy got bored of the book as soon as he started to read

47. El periódico del fin de semana contenía noticias malas.
The weekend newspaper contained bad news

48. Cuando Paula abrió el baúl que contenía recuerdos de su infancia, encontró bonitas fotografías e íntimas cartas.
When Paula opened the chest that contained mementos from her childhood, she found beautiful pictures and intimate letters

49. La ventana que daba al jardín de atrás la rompieron los jóvenes mientras ellos jugaban a la pelota.
The window that gave onto the backyard was broken by the young kids while they were playing with the ball

50. El deporte favorito de la mayoría de los adolescentes es el fútbol.
The favorite sport for most of adolescents is soccer

51. La clase de literatura que impartían en el colegio era importante pero muy aburrida.
The literature class that was taught at school was important but very boring

52. Mientras las chicas jugaban al escondite, los chicos jugaban a las canicas.

While the girls were playing hide-and-seek, they boys played with marbles

53. Los enemigos del político sobornaron a la prensa para que ésta publicara una serie de calumnias.
The enemies of the politician bribed the press so that they published a series of libels

54. Después de que los decoradores vieran el apartamento, éstos se dieron cuenta de que el trabajo sería duro.
After the decorators saw the apartment, they realized that the work would be hard

55. Cuando ellos entraron en la sala, los asistentes les miraron.
When they arrived in the room, those present looked at them

56. Mientras comían en un restaurante francés, Juan se declaró a María.
While they were eating at a French restaurant, Juan proposed to María

57. Ellas hablaron con las amigas de Natalia porque ellas sabían que ella tenía un problema.
They talked with Natalia's friends because they knew she had a problem

58. Al acabar la obra de teatro, los actores saludaron mientras todo el mundo aplaudía.
When the play finished, they actors greeted while everybody was applauding

59. Los libros que Manuel sacó de la biblioteca estaban muy grandes y pesados.
The books that Manuel took from the library were very big and heavy

60. Las escultoras, cuyo talento era tan admirado por los aficionados, presentaron algunas de sus obras en una famosa galería.
The sculptors, whose talent was so admired by the fans, presented some of their pieces in a famous gallery

61. El cazador prefirió tomar el corto camino en lugar del largo camino.
The hunter preferred to take the short way instead of the long way

62. Justo antes de que terminara el espectáculo, los técnicos tuvieron un problema con el sonido.
Just before the show finished, the technicians had a problem with the sound

63. Las novelas de cuyo escritor no se sabía nada se hicieron famosas rápidamente.
The novels from whose author nothing was known became popular very fast

64. El fotógrafo que había publicado tantas polémicas fotografías se vio de repente implicado en un pleito.
The photographer who had published so many controversial pictures suddenly saw himself involved in a lawsuit

A.5 Questionnaire for the monolingual group

Cuestionario Personal

Información de contacto

Nombre:

Correo electrónico:

Teléfono:

Información personal

Edad:

Sexo: ☐ Mujer ☐ Hombre

Profesión:

Educación:

- ☐ Educación primaria
- ☐ Educación secundaria
- ☐ Estudios universitarios

  Estudios de posgrado: ☐ Máster ☐ Doctorado

Lugar de nacimiento:

Lugar de residencia:

Por favor, contesta a las siguientes preguntas tan detalladamente como sea posible:

1. ¿Con qué edad empezaste a aprender inglés? ¿Dónde y cómo lo aprendiste?

2. ¿Durante cuánto tiempo has vivido en el Reino Unido? (Por favor, especifica si has vivido en otro país de habla inglesa)

3. ¿En qué contextos y con qué frecuencia hablas español e inglés? Por favor, evalúa en una escala de 1 a 5 la frecuencia con la que utilizas cada idioma en cada contexto:

1 – Nunca; **2** – Casi nunca; **3** – A veces; **4** – A menudo; **5** – Siempre

	Español	Inglés
En casa		
En tu círculo social		
En el trabajo y/o ámbito profesional/educativo		

4. ¿Hablas otros idiomas? (Si la respuesta es sí, por favor especifica qué otros idiomas hablas y cuál es tu nivel)

¡Muchísimas gracias!

A.6 Questionnaire for the attrited and exposed groups

Cuestionario Personal

Información de contacto

Nombre:

Correo electrónico:

Teléfono:

Información personal

Edad:

Sexo: ☐ Mujer ☐ Hombre

Profesión:

Educación:

☐ Educación primaria

☐ Educación secundaria

☐ Estudios universitarios

Estudios de posgrado: ☐ Máster ☐ Doctorado

Lugar de nacimiento:

Lugar de residencia:

Por favor, contesta a las siguientes preguntas tan detalladamente como sea posible:

1. ¿Con qué edad empezaste a aprender inglés? ¿Dónde y cómo lo aprendiste?

2. ¿Durante cuánto tiempo has vivido en el Reino Unido? (Por favor, especifica si has vivido en otro país de habla inglesa)

3. ¿En qué contextos y con qué frecuencia hablas español e inglés? Por favor, evalúa en una escala de 1 a 5 la frecuencia con la que utilizas cada idioma en cada contexto:

1 – Nunca; **2** – Casi nunca; **3** – A veces; **4** – A menudo; **5** – Siempre

	Español	Inglés
En casa		
En tu círculo social		
En el trabajo y/o ámbito profesional/educativo		

4. ¿Con qué idioma te sientes más seguro…?

	Español	Inglés
Hablando		
Escuchando		
Escribiendo		
Leyendo		

5. ¿Hablas otros idiomas? (Si la respuesta es sí, por favor especifica qué otros idiomas hablas y cuál es tu nivel)

¡Muchísimas gracias!

APPENDIX B

Materials for Experiment 2

B.1 Instructions

Querido/a participante,

¡Muchas gracias por colaborar en este estudio! El experimento dura aproximadamente 20 minutos, y sólo tendrás que leer una serie frases en español y contestar a la pregunta que aparece después de cada frase. Por favor, lee todas las frases con cuidado, a una velocidad normal, y asegurándote de entender su significado, y marca la respuesta o respuestas que coincidan con tu primera interpretación de la frase. Esto no es una prueba de gramática, y no hay respuestas correctas o incorrectas.

Eres libre de abandonar el experimento en todo momento. Todos los datos recogidos serán tratados de forma anónima. Si lo deseas, puedes solicitar que se te envíe información sobre el experimento una vez haya finalizado.

☐ **He leído la información anterior y confirmo que participo en el experimento voluntariamente.**

Nombre:

Firma: **Fecha:**

Dear participant,

Thank you very much for taking part in this study! The experiment will last 20 minutes approximately, and you will only be required to read a series of sentences in Spanish and then answer the question that follows each sentence. Please, read every sentence carefully, at a normal speed, trying to fully comprehend it, and choose the answer or answers that match your first interpretation. This is not a grammatical test, and there are no right or wrong answers.

You are free to withdraw from the experiment at any time. All data will be treated anonymously. If you wish, you can request information about the experiment to be sent to you once the experiment is completed.

By signing below, you are indicating that you have reviewed the consent information and voluntarily agree to participate.

Printed Name:

Signature: ***Date:***

B.2 Experimental items

1. (a) La anciana despidió a la mujer cuando ella iba a casa de su hija.
   ¿Quién iba a casa de su hija?
   a. La anciana
   b. La mujer
   c. Una tercera persona

   (b) La anciana despidió a la mujer cuando iba a casa de su hija.
   ¿Quién iba a casa de su hija?
   a. La anciana
   b. La mujer
   c. Una tercera persona

2. (a) La madre saludó a la chica cuando ella cruzaba una calle con mucho tráfico.
   ¿Quién cruzaba una calle con mucho tráfico?
   a. La chica

b. La madre
c. Una tercera persona

(b) La madre saludó a la chica cuando cruzaba una calle con mucho tráfico.
¿Quién cruzaba una calle con mucho tráfico?
a. La chica
b. La madre
c. Una tercera persona

3. (a) La señora sonrió a la invitada cuando ella abrió la puerta de la casa.
¿Quién abrió la puerta de la casa?
a. La señora
b. La invitada
c. Una tercera persona

(b) La señora sonrió a la invitada cuando abrió la puerta de la casa.
¿Quién abrió la puerta de la casa?
a. La señora
b. La invitada
c. Una tercera persona

4. (a) La abuela besó a la nieta cuando ella volvió a casa después del viaje.
¿Quién volvió a casa después del viaje?
a. La nieta
b. La abuela
c. Una tercera persona

(b) La abuela besó a la nieta cuando volvió a casa después del viaje.
¿Quién volvió a casa después del viaje?
a. La nieta
b. La abuela
c. Una tercera persona

5. (a) La abogada defendió a la acusada cuando ella tuvo el juicio el año pasado.
¿Quién tuvo el juicio?
a. La abogada
b. La acusada
c. Una tercera persona

(b) La abogada defendió a las acusadas cuando tuvo el juicio el año pasado.
¿Quién tuvo el juicio?
a. La abogada
b. La acusada
c. Una tercera persona

6. (a) La jubilada observó a la chica cuando ella daba un paseo por el parque.
   ¿Quién daba un paseo por el parque?
   a. La chica
   b. La jubilada
   c. Una tercera persona

   (b) La jubilada observó a la chica cuando daba un paseo por el parque.
   ¿Quién daba un paseo por el parque?
   a. La chica
   b. La jubilada
   c. Una tercera persona

7. (a) La profesora felicitó a la licenciada cuando ella salió del evento en la universidad.
   ¿Quién salió del evento en la universidad?
   a. La profesora
   b. La licenciada
   c. Una tercera persona

   (b) La profesora felicitó a la licenciada cuando salió del evento en la universidad.
   ¿Quién salió del evento en la universidad?
   a. La profesora
   b. La licenciada
   c. Una tercera persona

8. (a) La presentadora abrazó a la actriz cuando ella salió del evento que se celebró.
   ¿Quién salió del evento?
   a. La actriz
   b. La presentadora
   c. Una tercera persona

   (b) La presentadora abrazó a la actriz cuando salió del evento que se celebró.
   ¿Quién salió del evento?
   a. La actriz
   b. La presentadora
   c. Una tercera persona

9. (a) La señora piropeó a la famosa cuando ella fue al teatro la semana pasada.
   ¿Quién fue al teatro la semana pasada?
   a. La señora
   b. La famosa
   c. Una tercera persona

(b) La señora piropeó a la famosa cuando fue al teatro la semana pasada.
¿Quién fue al teatro la semana pasada?
a. La señora
b. La famosa
c. Una tercera persona

10. (a) La diseñadora midió a la modelo cuando ella asistió al pase de modelos anoche.
¿Quién asistió al pase de modelos?
a. La modelo
b. La diseñadora
c. Una tercera persona

(b) La diseñadora midió a la modelo cuando asistió al pase de modelos anoche.
¿Quién asistió al pase de modelos?
a. La modelo
b. La diseñadora
c. Una tercera persona

11. (a) La artista contempló a la musa cuando ella acudió al estudio de fotografía ayer.
¿Quién acudió al estudio de fotografía?
a. La artista
b. La musa
c. Una tercera persona

(b) La artista contempló a la musa cuando acudió al estudio de fotografía ayer.
¿Quién acudió al estudio de fotografía?
a. La artista
b. La musa
c. Una tercera persona

12. (a) La camarera atendió a la señorita cuando ella llegó al restaurante por la tarde.
¿Quién llegó al restaurante por la tarde?
a. La señorita
b. La camarera
c. Una tercera persona

(b) La camarera atendió a la señorita cuando llegó al restaurante por la tarde.
¿Quién llegó al restaurante por la tarde?
a. La señorita
b. La camarera

c. Una tercera persona

13. (a) La vendedora guiñó a la muchacha cuando ella salía del establecimiento tras su conversación.
¿Quién salía del establecimiento?
a. La vendedora
b. La muchacha
c. Una tercera persona

(b) La vendedora guiñó a la muchacha cuando salía del establecimiento tras su conversación.
¿Quién salía del establecimiento?
a. La vendedora
b. La muchacha
c. Una tercera persona

14. (a) La entrenadora animó a la jugadora cuando ella hablaba del partido que se jugó.
¿Quién hablaba del partido?
a. La jugadora
b. La entrenadora
c. Una tercera persona

(b) La entrenadora animó a la jugadora cuando hablaba del partido que se jugó.
¿Quién hablaba del partido?
a. La jugadora
b. La entrenadora
c. Una tercera persona

15. (a) La maquilladora pintó a la novia cuando ella asistió al hotel donde habían quedado.
¿Quién asistió al hotel?
a. La maquilladora
b. La novia
c. Una tercera persona

(b) La maquilladora pintó a la novia cuando asistió al hotel donde habían quedado.
¿Quién asistió al hotel?
a. La maquilladora
b. La novia
c. Una tercera persona

16. (a) La peluquera peinó a la señorita cuando ella fue al salón de belleza ayer.

¿Quién fue al salón de belleza?
a. La señorita
b. La peluquera
c. Una tercera persona

(b) La peluquera peinó a la señorita cuando fue al salón de belleza ayer.
¿Quién fue al salón de belleza?
a. La señorita
b. La peluquera
c. Una tercera persona

17. (a) El ponente debatió con el asistente cuando él acudió a la conferencia sobre filosofía.
¿Quién acudió a la conferencia?
a. El asistente
b. El ponente
c. Una tercera persona

(b) El ponente debatió con el asistente cuando acudió a la conferencia sobre filosofía.
¿Quién acudió a la conferencia?
a. El asistente
b. El ponente
c. Una tercera persona

18. (a) El enfermero consultó con el doctor cuando él salió del hospital tras la operación.
¿Quién salió del hospital?
a. El enfermero
b. El doctor
c. Una tercera persona

(b) El enfermero consultó con los doctores cuando salió del hospital tras la operación.
¿Quién salió del hospital?
a. El enfermero
b. El doctor
c. Una tercera persona

19. (a) El estudiante habló con el profesor cuando él salió de clase por la tarde.
¿Quién salió de clase?
a. El profesor
b. El estudiante
c. Una tercera persona

(b) El estudiante habló con el profesor cuando salió de clase por la tarde.
¿Quién salió de clase?
a. El profesor
b. El estudiante
c. Una tercera persona

20. (a) El padre discutió con el muchacho cuando él salía de casa por la noche.
¿Quién salía de casa?
a. El estudiante
b. El profesor
c. Una tercera persona

(b) El padre discutió con el muchacho cuando salía de casa por la noche.
¿Quién salía de casa?
a. El estudiante
b. El profesor
c. Una tercera persona

21. (a) El maestro conversó con el alumno cuando él entró en clase por la mañana.
¿Quién entró en clase?
a. El alumno
b. El maestro
c. Una tercera persona

(b) El maestro conversó con el alumno cuando entró en clase por la mañana.
¿Quién entró en clase?
a. El alumno
b. El maestro
c. Una tercera persona

22. (a) El novio esperaba con el padrino cuando él vio al sacerdote acercarse al altar.
¿Quién vio al sacerdote acercarse al altar?
a. El novio
b. El padrino
c. Una tercera persona

(b) El novio esperaba con el padrino cuando vio al sacerdote acercarse al altar.
¿Quién vio al sacerdote acercarse al altar?
a. El novio
b. El padrino
c. Una tercera persona

23. (a) El arquitecto consultó con el ingeniero cuando él controlaba la obra de la autopista.
    ¿Quién controlaba la obra?
    a. El ingeniero
    b. El arquitecto
    c. Una tercera persona

    (b) El arquitecto consultó con el ingeniero cuando controlaba la obra de la autopista.
    ¿Quién controlaba la obra?
    a. El ingeniero
    b. El arquitecto
    c. Una tercera persona

24. (a) El informático conversaba con el ayudante cuando él arreglaba el ordenador que estaba roto.
    ¿Quién arreglaba el ordenador?
    a. El informático
    b. El ayudante
    c. Una tercera persona

    (b) El informático conversaba con el ayudante cuando arreglaba el ordenador que estaba roto.
    ¿Quién arreglaba el ordenador?
    a. El informático
    b. El ayudante
    c. Una tercera persona

25. (a) El pintor reflexionó con el casero cuando él elegía el color de las paredes.
    ¿Quién elegía el color de las paredes?
    a. El casero
    b. El pintor
    c. Una tercera persona

    (b) El pintor reflexionó con el casero cuando elegía el color de las paredes.
    ¿Quién elegía el color de las paredes?
    a. El casero
    b. El pintor
    c. Una tercera persona

26. (a) El guía quedó con el turista cuando él llegó al hotel después del almuerzo.
    ¿Quién llegó al hotel?
    a. El guía
    b. El turista
    c. Una tercera persona

(b) El guía quedó con el turista cuando llegó al hotel después del almuerzo.
¿Quién llegó al hotel?
a. El guía
b. El turista
c. Una tercera persona

27. (a) El enfermo dialogó con el cirujano cuando él asistió al hospital tras la intervención.
¿Quién asistió al hospital?
a. El cirujano
b. El enfermero
c. Una tercera persona

(b) El enfermo dialogó con el cirujano cuando asistió al hospital tras la intervención.
¿Quién asistió al hospital?
a. El cirujano
b. El enfermero
c. Una tercera persona

28. (a) El anciano estaba con el chico cuando él tuvo el accidente en la carretera.
¿Quién tuvo el accidente?
a. El anciano
b. El chico
c. Una tercera persona

(b) El anciano estaba con el chico cuando tuvo el accidente en la carretera.
¿Quién tuvo el accidente?
a. El anciano
b. El chico
c. Una tercera persona

29. (a) El empresario negoció con el músico cuando él salió del concierto la semana pasada.
¿Quién salió del concierto?
a. El músico
b. El empresario
c. Una tercera persona

(b) El empresario negoció con el músico cuando salió del concierto la semana pasada.
¿Quién salió del concierto?
a. El músico
b. El empresario
c. Una tercera persona

30. (a) El científico razonó con el inventor cuando él asistió al laboratorio de ciencias físicas.
    ¿Quién asistió al laboratorio?
    a. El científico
    b. El inventor
    c. Una tercera persona

    (b) El científico razonó con el inventor cuando asistió al laboratorio de ciencias físicas.
    ¿Quién asistió al laboratorio?
    a. El científico
    b. El inventor
    c. Una tercera persona

31. (a) El político pactó con el ciudadano cuando él fue al ayuntamiento de la capital.
    ¿Quién fue al ayuntamiento?
    a. El ciudadano
    b. El político
    c. Una tercera persona

    (b) El político pactó con el ciudadano cuando fue al ayuntamiento de la capital.
    ¿Quién fue al ayuntamiento?
    a. El ciudadano
    b. El político
    c. Una tercera persona

32. (a) El deportista apostó con el entrenador cuando él dudaba de las posibilidades de ganar.
    ¿Quién dudaba de las posibilidades de ganar?
    a. El deportista
    b. El entrenador
    c. Una tercera persona

    (b) El deportista apostó con el entrenador cuando dudaba de las posibilidades de ganar.
    ¿Quién dudaba de las posibilidades de ganar?
    a. El deportista
    b. El entrenador
    c. Una tercera persona

B.3 Fillers

1. El novio besó a la novia en el altar.
   ¿Quién estaba en el altar?
   a. La novia
   b. El novio
   c. Una tercera persona

2. El policía vio a la asesina cuando intentaba escapar.
   ¿Quién intentaba escapar?
   a. El policía
   b. La asesina
   c. Una tercera persona

3. La profesora castigó a la alumna por su mal comportamiento en clase.
   ¿Quién tuvo un mal comportamiento?
   a. La alumna
   b. La profesora
   c. Una tercera persona

4. La señora insultó a la carnicera que le vendió la carne en mal estado.
   ¿Quién compró la carne en mal estado?
   a. La señora
   b. La carnicera
   c. Una tercera persona

5. La niña observó a la señorita que llevaba un rojo vestido.
   ¿Quién llevaba un vestido rojo?
   a. La señorita
   b. La niña
   c. Una tercera persona

6. La dueña de la casa pagó a la sirvienta por adelantado.
   ¿Quién recibió dinero por adelantado?
   a. La dueña
   b. La sirvienta
   c. Una tercera persona

7. El empresario compró la compañía por una gran suma de dinero.
   ¿Quién pagó una gran suma de dinero?
   a. La compañía
   b. El empresario
   c. Una tercera persona

8. Los inquilinos agradecieron a la mensajera al traer el paquete.
¿Quién trajo el paquete?
a. Los inquilinos
b. La mensajera
c. Una tercera persona

9. El café que sirvieron en el banquete era muy malo.
¿Qué era muy malo?
a. El banquete
b. La café
c. Una tercera persona

10. El abuelo hablaba con sus nietos mientras ellos leían un libro.
¿Quién leía un libro?
a. El abuelo
b. Los nietos
c. Una tercera persona

11. Los vendedores negociaron con los compradores hasta que ofrecieron la cantidad mínima.
¿Quién ofreció la cantidad mínima?
a. Los compradores
b. Los vendedores
c. Una tercera persona

12. Los arquitectos presentaron el proyecto mientras los empresarios escuchaban atentamente.
¿Quién escuchaba atentamente?
a. Los arquitectos
b. Los empresarios
c. Una tercera persona

13. Laura presentó a Pedro a sus amigos mientras ellos estaban en la discoteca.
¿Quién estaba en la discoteca?
a. Pedro
b. Laura
c. Una tercera persona

14. Alejandro sorprendió a Miguel mientras trabajaban en su oficina.
¿Quién trabajaba en la oficina?
a. Alejandro
b. Miguel
c. Una tercera persona

15. Los representantes de la actriz denunciaron a la cadena después de que acabara la serie.
¿Quién denunció a la cadena?
a. La actriz
b. Los representantes
c. Una tercera persona

16. Esteban se rió de las señoras porque ellas estaban borrachas.
¿Quién se reía?
a. Esteban
b. Las señoras
c. Una tercera persona

17. Los socorristas salvaron la vida a los bañistas cuyo barco se hundió en alta mar.
¿Qué se hundió en alta mar?
a. El barco
b. Los bañistas
c. Una tercera persona

18. Fernando llamó a Carlos porque ellos habían quedado.
¿Quién había quedado?
a. Fernando
b. Carlos
c. Una tercera persona

19. Los padres de la novia recibían a los invitados mientras éstos llegaban a la iglesia.
¿Quién llegaba a la iglesia?
a. Los invitados
b. Los padres de la novia
c. Una tercera persona

20. El destino turístico que los universitarios eligieron se encontraba al otro lado del Atlántico.
¿Qué se encontraba al otro lado del Atlántico?
a. El destino turístico
b. Los universitarios
c. Una tercera persona

21. La ventana que daba al jardín de atrás la rompieron los jóvenes mientras ellos jugaban a la pelota.
¿Qué se rompió?
a. La pelota
b. La ventana

c. Una tercera persona

22. La clase de literatura que impartían en el colegio era importante pero poco interesante.
¿Qué era importante?
a. La clase
b. El colegio
c. Una tercera persona

23. Mientras las chicas jugaban al escondite, los chicos jugaban a las canicas.
¿Quién jugaba?
a. Los chicos
b. Las chicas
c. Una tercera persona

24. Los enemigos del político sobornaron a la prensa para que ésta publicara una serie de calumnias.
¿Quién publicó una serie de calumnias?
a. Los enemigos del político
b. La prensa
c. Una tercera persona

25. Cuando los periodistas entraron en la sala, los asistentes les miraron.
¿Quién entró en la sala?
a. Los asistentes
b. Los periodistas
c. Una tercera persona

26. Mientras comían en un restaurante francés, Juan se declaró a María.
¿Quién comía en un restaurante francés?
a. Juan
b. María
c. Una tercera persona

27. Ellas hablaron con las amigas de Natalia porque ellas sabían que ella tenía un problema.
¿Quién tenía un problema?
a. Natalia
b. Las amigas de Natalia
c. Una tercera persona

28. Al acabar la obra de teatro, los actores saludaron mientras todo el mundo aplaudía.
¿Cuándo saludaron los actores?
a. Al acabar la obra

b. Mientras todo el mundo aplaudía
c. Una tercera persona

29. Justo antes de que terminara el espectáculo, los técnicos tuvieron un problema con el sonido.
¿Qué provocó el problema?
a. El sonido
b. Los técnicos
c. Una tercera persona

30. El libro de cuyo escritor no se sabía nada se hizo famoso rápidamente.
¿Qué se hizo famoso?
a. El libro
b. El escritor
c. Una tercera persona

31. El fotógrafo que había publicado polémicas fotografías se vio de repente implicado en un pleito.
¿Qué estaba implicado en un pleito?
a. Las polémicas fotografías
b. El fotógrafo
c. Una tercera persona

32. La madre discutió con sus hijos porque ellos no le hacían caso.
¿Quién discutía?
a. La madre
b. Los hijos
c. Una tercera persona

33. El delincuente robó el retrato de una tienda de antigüedades.
¿Qué robó el delincuente?
a. La tienda de antigüedades
b. El retrato
c. Una tercera persona

34. Mario observaba al profesor cuando daba clase.
¿Quién daba clase?
a. Mario
b. El profesor
c. Una tercera persona

35. El aprendiz admiraba el papel que su jefe desempeñaba.
¿Qué admiraba el aprendiz?
a. Su jefe
b. El papel

c. Una tercera persona

36. Beatriz visitó el hotel antes de reservar habitación.
¿Qué visitó Beatriz?
a. El hotel
b. La habitación
c. Una tercera persona

37. El taxista condujo al editor hasta la editorial.
¿Quién condujo hasta la editorial?
a. El editor
b. El taxista
c. Una tercera persona

38. Ella criticó el cuento que Miguel escribió.
¿Qué fue criticado?
a. El cuento
b. Miguel
c. Una tercera persona

39. Los nietos prepararon al abuelo una gran comilona.
¿Quién preparó una gran comilona?
a. El abuelo
b. Los nietos
c. Una tercera persona

40. Ella consultó al escritor sobre el artículo que había escrito.
¿Qué consultó ella?
a. El escritor
b. El artículo
c. Una tercera persona

41. Los pacientes trataron al doctor con mucho respeto.
¿Quién fue tratado con respeto?
a. El doctor
b. Los pacientes
c. Una tercera persona

42. El anfitrión sirvió la cena a los comensales mientras se sentaban en la mesa.
¿Quién se sentaba en la mesa?
a. El anfitrión
b. Los comensales
c. Una tercera persona

43. Armando estudió al poeta que escribía sonetos.
¿Quién escribía sonetos?
a. El poeta
b. Armando
c. Una tercera persona

44. Marcos hablaba con su hermano por teléfono varias veces al día.
¿Quién hablaba por teléfono?
a. Marcos
b. Su hermano
c. Una tercera persona

45. El investigador hizo muchas preguntas a la sospechosa durante el interrogatorio.
¿Quién hizo muchas preguntas?
a. La sospechosa
b. El investigador
c. Una tercera persona

46. Agustín y su acompañante se quedaron dormidos durante la ópera porque el tenor les pareció insoportable.
¿Qué era insoportable?
a. La ópera
b. El tenor
c. Una tercera persona

47. El libro que Manuel sacó de la biblioteca era muy grande.
¿Qué era muy grande?
a. La biblioteca
b. El libro
c. Una tercera persona

48. Las escultoras, cuyo talento era tan admirado por los aficionados, presentaron algunas de sus obras en una famosa galería.
¿Qué se presentó en la galería?
a. Las escultoras
b. Sus obras
c. Una tercera persona

49. Los artículos que había en la papelería eran demasiado caros.
¿Qué era caro?
a. La papelería
b. Los artículos
c. Una tercera persona

50. Los ganaderos vendieron a los granjeros vacas, cerdos y gallinas.
¿Quién vendió vacas, cerdos y gallinas?
a. Los ganaderos
b. Los granjeros
c. Una tercera persona

51. La quiosquera vendió todas las revistas a primera hora y tuvo que encargar más a la editorial.
¿Quién encargó más revistas?
a. La editorial
b. La quiosquera
c. Una tercera persona

52. La nueva canción que sacó el cantante tuvo un gran éxito entre las adolescentes.
¿Qué tuvo un gran éxito?
a. La canción
b. El cantante
c. Una tercera persona

53. El manager del actor discutió con el director acerca de una arriesgada escena de la película.
¿Quién discutió con el director?
a. El actor
b. El manager
c. Una tercera persona

54. El capitán del equipo sancionó a un jugador por su agresividad.
¿Quién era agresivo?
a. El capitán
b. El jugador
c. Una tercera persona

55. Los clientes felicitaron a los cocineros mientras éstos comían.
¿Quién comía?
a. Los cocineros
b. Los clientes
c. Una tercera persona

56. El gato arañó al perro mientras estaba durmiendo.
¿Quién estaba durmiendo?
a. El gato
b. El perro
c. Una tercera persona

57. El sustituto del profesor supervisaba el examen en el que el estudiante copió.
¿Quién supervisaba el examen?
a. El profesor
b. El sustituto
c. Una tercera persona

58. Los conductores se pusieron en huelga porque la empresa no les pagaba.
¿Quién se puso en huelga?
a. Los conductores
b. La empresa
c. Una tercera persona

59. Los niños abrazaron a su madre cuando entraban en casa.
¿Quién entraba en casa?
a. La madre
b. Los niños
c. Una tercera persona

60. El lobo tomó el camino corto para adelantar a su presa.
¿Quién tomó el camino corto?
a. El lobo
b. Su presa
c. Una tercera persona

61. El detective vio a la chica mientras estaba en el coche.
¿Quién estaba en el coche?
a. La chica
b. El detective
c. Una tercera persona

62. Enrique le hizo un regalo a su hermana el día de su boda.
¿De quién era la boda?
a. Enrique
b. Su hermana
c. Una tercera persona

63. En el concesionario había un descapotable y parecía nuevo.
¿Qué parecía nuevo?
a. El descapotable
b. El concesionario
c. Una tercera persona

64. Los detenidos atacaron a los policías mientras salían de comisaría.
¿Quién salía de comisaría?
a. Los detenidos

b. Los policías
c. Una tercera persona

B.4 Questionnaire

Cuestionario Personal

Información de contacto

Nombre:

Correo electrónico:

Teléfono:

Información personal

Edad:

Sexo: ☐ Mujer ☐ Hombre

Profesión:

Educación:

- ☐ Educación primaria
- ☐ Educación secundaria
- ☐ Estudios universitarios

  Estudios de posgrado: ☐ Máster ☐ Doctorado

Lugar de nacimiento:

Lugar de residencia:

Por favor, contesta a las siguientes preguntas tan detalladamente como sea posible:

1. ¿Con qué edad empezaste a aprender inglés? ¿Dónde y cómo lo aprendiste?

2. ¿Durante cuánto tiempo has vivido en el Reino Unido? (Por favor, especifica si has vivido en otro país de habla inglesa)

3. ¿En qué contextos y con qué frecuencia hablas español e inglés? Por favor, evalúa en una escala de 1 a 5 la frecuencia con la que utilizas cada idioma en cada contexto:

1 – Nunca; **2** – Casi nunca; **3** – A veces; **4** – A menudo; **5** – Siempre

	Español	Inglés
En casa		
En tu círculo social		
En el trabajo y/o ámbito profesional/educativo		

4. ¿Hablas otros idiomas? (Si la respuesta es sí, por favor especifica qué otros idiomas hablas y cuál es tu nivel)

¡Muchísimas gracias!

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