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Anaphora Resolution In Spanish-English L2 Learners An Analysis Of Different Discourse Context

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ANAPHORA RESOLUTION IN SPANISH-ENGLISH L2 LEARNERS

AN ANALYSIS OF DIFFERENT DISCOURSE

CONTEXT

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ANAPHORA RESOLUTION IN SPANISH-ENGLISH L2 LEARNERS

AN ANALYSIS OF DIFFERENT DISCOURSE

CONTEXT

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THESIS

Presented to the Faculty of the Graduate School of

The University of Texas at El Paso

in Partial Fulfillment

of the Requirements

for the Degree of

MASTER OF ARTS

Department of Languages & Linguistics

THE UNIVERSITY OF TEXAS AT EL PASO

May 2018

ACKNOWLEDGEMENTS

In this section, I will try to refer to all those people that made my journey through the MA Program in Linguistic possible. I would never have been able to finish this thesis without the assistance of my committee members and the support from my family and friends.

Since this is the acknowledgment section of a thesis, it will probably be most appropriate to start with the person made this thesis possible -my advisor Carla Contemori. I have no words to express my deepest gratitude for her support of my research, as well as useful comments, care, and patience. Prof. Contemori thank you so much for all the patience and your belief in my ability to see this through.

I would also like to show my gratitude to Dr. Christine Reyes for helping me recruit my participants. Also, I like to thank my committee from Physiology department Dr. Iva Ivanova, who was helpful with her comments.

I also want to thank all my professors in Linguistic Department, who contributed significantly to my development as a linguist.

Finally, I would like to thank my husband, my family, and my friend. They were always there for me with their best wishes.

ABSTRACT

While in null subject languages, overt pronouns refer to non-salient antecedents and mark a topic-shift, in non-null subject languages, overt pronouns indicate reference maintenance to the current discourse topic.

It has been shown that learners of a null subject language whose L1 is a non-null subject language show some optionality in the interpretation of null and over subjects in the L2. To account for these results, the Interface Hypothesis (e.g., Sorace, 2011) proposed that interface structures between syntax and pragmatics (as in the case of anaphoric expressions) require an increase use of cognitive resources and are therefore less likely to be successfully acquired by bilinguals in comparison to structures without this interface. So far, research on learners of non-null subject languages has shown conflicting results. Some studies have demonstrated no differences between learners of English and monolingual native-English speakers, even at the intermediate/advanced levels of proficiency (Cunnings et al., 2016). Other studies have found reliance on L1 strategies on the interpretation of pronominal forms in the L2 (Roberts et al., 2008) or more reliance on discourse-level cues in the L2 than the native speakers (Schimke & Colonna, 2016). Here we test the interpretation of pronominal forms in learners of English (non-null subject) whose L1 is Spanish (null subject language). With two experiments, I aim at shedding light on which discourse contexts are easy or difficult for the learners to interpret and why. The results of the two experiments show that L2 speakers do not have increased difficulty compared to native speakers in integrating multiple information sources to resolve ambiguous pronouns in anaphora conditions, contra the Interface Hypothesis (e.g., Sorace, 2011). Additionally, the discourse structure has an impact on L2 interpretation of ambiguous pronouns.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

Human communication is a very complex process in which reference is but one of some factors contributing to its complexity. Reference typically refers to the relationship between certain linguistics expression and previous elements presented in the discourse. Within the domain of sentence comprehension, the question whether second language (L2) learners can acquire native-like interpretation of pronouns has been addressed by many researchers. Native speakers are usually efficient at making these choices and keep the flow of conversation. Research on L2 acquisition has shown that L2 learners may show residual indeterminacy in their referential choices (Sorace & Filiaci, 2006).

For instance, consider the following English example.

(1) Henry wrote frequently to Albert when he was lonely in Europe.

The pronoun he in (1) is potentially ambiguous since it could refer to either Henry or Albert. In this case, English native speakers have a preference for interpreting the ambiguous pronoun as referring to the first mentioned noun phrase (NP) in the preceding sentence (NP1, Henry). This preference is also known as the first mention bias. According to this bias, the subject entity tends to be interpreted as the antecedent because it is more salient than the object entity is in the preceding discourse.

However, pronominal systems vary cross-linguistically. While non-null subject languages like English only have overt pronouns or full noun phrases (NPs), null-subject languages like Italian and Spanish have null and overt pronouns and full NPs. In a null subject language, the null pronoun is maximally used to refer to the most discourse-prominent antecedent, while the overt pronoun is used to refer to a non-salient antecedent and mark a topic shift. Consider the following Spanish sentences in example (2) and (3).

(2) Anthony$_i$ fue de vacaciones con Simón. Pro$_i$ (null- subject) Disfrutó mucho de la playa.

Anthony went on vacation with Simon. He enjoyed the beach very much.

(3) Anthony fue de vacaciones con Simón$_i$. Simón /Él$_i$ (explicit pronoun) disfrutó mucho de la playa.

Anthony went on vacation with Simon. He enjoyed the beach very much.

For sentence (2), Spanish native speakers would use a null subject in the second clause to show that Anthony is the subject of the verb disfrutó. On the other hand, Spanish speakers would likely use a NP or an explicit pronoun to indicate that Simón is the subject of the second clause, as in (3).

Anaphora resolution, which is the problem of resolving references to earlier or later items in the discourse, has been investigated in L2 learners to examine the factors that might influence the interpretation of different referring expressions. Anaphora resolution is interesting because it reveals how speakers integrate morphosyntactic and discourse-pragmatic information, a domain that is supposed to be difficult to acquire, as outlined within the Interface Hypothesis (IH; Sorace & Filiaci 2006, Sorace, 2011). The focus of the Interface Hypothesis in second language acquisition has been on the comprehension and production of anaphoric structures that are considered to be structures between the syntactic and pragmatic interface. The Interface Hypothesis claims that linguistic phenomena that integrate syntactic and pragmatic information are a source of optionality and instability for L2 learners and that native-like performance cannot be reached.

For instance, Sorace & Filiaci (2006) examined how pronominal subjects are interpreted by native Italian-speakers and advanced English L2 speakers of Italian. The study found that native

Italian speakers interpret sentences with null subjects as referring to the subject NP in the previous sentences, whereas the (near-native) L2 speakers, whose L1 is English, accept both sentences with a null subject or an overt subject pronoun to refer to the subject in the preceding sentence. The difference found between native and (near-native) L2 speakers concerns the interpretation of overt pronouns, and not the interpretation of null subjects. This indicates that there is an over-extension of the overt pronoun interpretation in the L2 Italian grammar (Sorace & Filiaci, 2006). Consider the following sentences from Italian in (4a, b) tested by Sorace & Filiaci (2006):

(4a) Mentre $lei_{k/l}$/pro_i (null- explicit subject pronoun)si mette il cappotto, la $mamma_i$ dà un bacio alla $figlia_k$.

While she wears the coat, the mother gives a kiss to the daughter

While she/pro is wearing her coat, the mother kisses her daughter.

(4b) La $mamma_i$ dà un bacio alla $figlia_k$ mentre $lei_{k/l}$ /pro_i si mette il cappotto.

The mother gives a kiss to the daughter, while she wears the coat

The mother kisses her daughter, while she/pro is wearing her coat.

The complex sentences in (4) consist of a main clause and subordinate clause. The subordinate clauses in (4) contain either an overt pronoun or a null pronoun. In 4a, the subordinate clause precedes the main clause and the interpretation of the null/explicit subject depends upon a postcedent referent (cataphora), while in 4b the main clause precedes the subordinate clause and the interpretation of the null/explicit subject depends upon an antecedent expression (anaphora).

To illustrate the results of Sorace & Filiaci (2006), for the embedded sentences in (4) the subject of the matrix clause ('the mother') is interpreted as the antecedent of the null subject by L1 and L2 participants in both the anaphora and the cataphora condition. Based on this result, Sorace & Filiaci (2006) conclude that L2 learners had native-like grammar for the interpretation

3

of null subjects. However, the two groups differed in how they interpreted the explicit pronoun lei. While the native speakers had a preference to refer the pronoun to the object of the previous sentences i.e., la figlia in (4), the L2 speakers sometimes chose the subject of the matrix clause asa possible antecedent for overt subject pronouns, in both anaphora and cataphora conditions. According to Sorace & Filiaci (2006), the results from Italian (near-native) L2 speakers confirm that anaphora resolution is difficult to master even at the highest levels of proficiency.

Similar results were confirmed with learners of other null-subject languages, demonstrating that L2 learners exhibit residual indeterminacy in the L2 referential choice both in comprehension and production (e.g., Belletti et al., 2007; Keating, VanPatten & Jegerski, 2011; Montrul & Rodríguez Louro, 2006; Rothman, 2008, 2009; Sorace & Filiaci, 2006). Previous studies on null subject languages have tested L2 speakers with different levels of proficiency (e.g., intermediate, advanced, near natives). However, it is unclear if the indeterminacy shown in the learners of null subject languages is the result of transfer from the L1. Interestingly, some studies have demonstrated that a similar pattern can be observed in L2 learners whose languages are both null subject (e.g., Spanish-Greek learners: Lozano, 2006; Margaza & Bel, 2006; Spanish-Italian bilingual children: Sorace, Serratrice, Filiaci & Baldo, 2009). Based on the findings from L2 speakers who speak two null-subject languages, Sorace (2011) speculates that the optionality in referential choice exists in L2 grammar regardless of the language combination. Sorace (2011) claims that the observed pattern is the result of a failure to integrate the correct syntactic-pragmatic information in real time.

In the present study, I investigate whether L2 speakers from a null language background can acquire the preferences for pronouns in a non-null subject L2. In the next section, I am going to focus on anaphora resolution in non-null languages.

1.1.   Anaphora resolution in non-null subject languages

Previous research has mostly investigated whether speakers whose L1 is a non-null subject language can acquire interpretation preferences for null and overt pronouns when the L2 is a null subject language. Fewer studies have examined whether L2 learners whose L1 is a null subject language can acquire the constraints for the comprehension and use of pronouns when the L2 is a non-null subject language (Schimke et al., 2016, Cunning et al., 2016, Roberts et al., 2008). Additionally, research on the acquisition of anaphora resolution in non-null subject languages has shown mixed evidence. While some studies have demonstrated no difference between L2 learners and native speakers (e.g. Cunning et al., 2016) other studies have found reliance on the L1 referential preferences during comprehension and online processing of pronouns in the L2 (Roberts et al., 2008) or more reliance than native speakers on discourse cues on the interpretation of pronouns in the L2 (Schimke et al., 2016).

One study that reported effects of L1 on the acquisition of overt pronouns in the L2 was conducted by Roberts et al. (2008). The authors examined the acquisition of overt pronouns in L2 Dutch, by learners of L1 German (a non-null subject language) and L1 Turkish (a null subject language). Roberts et al. (2008) compared the two groups of participants to understand if and to what extent the similarities and differences in L1 referential strategies impact anaphora resolution in the L2. In the study, the authors used two tasks, an offline sentence comprehension task and an eye-tracking task in which sentences like (5a, b) were presented.

(5a) 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"

(5b) **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"

In (5a), the subject of the second sentence (**Peter**) is the only antecedent for the pronoun "he". In (5b), the sentence is manipulated to have both an internal antecedent (**Peter**) and an external antecedent (**Hans**). In the comprehension task, for sentence (5b), L1 German speakers chose the sentence internal referent "**Peter**" for the pronoun "**he**", similarly to the native speakers of Dutch. Instead, Turkish L2 learners showed more variation in their interpretation of the subject pronoun, choosing the referent "Hans" to a higher extent than L1 German speakers and native speakers of Dutch. According to the authors, the pattern of results found in offline comprehension with the Turkish speakers is the result of cross-linguistic interference, with L2 participants using the Turkish interpretation strategy, consisting of associating an explicit pronoun to the preceding object (i.e., **Hans**).

In the eye-tracking task, Roberts et al. (2008) found that both groups of L2 learners had a difficulty when reading sentence 5(b). The difficulty was a processing cost associated with the interpretation of the ambiguous pronoun, which took the participants longer to read in 5(b) compared to 5(a). In the case of the eye-tracking results, the L1s interpretation biases did not lead to a difficulty integrating syntactic and discourse information to resolve ambiguous pronouns in the eye-tracking experiment, as both groups of L2 speakers (L1 Dutch and L1 Turkish) experienced a processing cost. This supports the Interface Hypothesis by Sorace (2011), which predicts a difficulty in L2 acquisition of structures at linguistic interfaces, independently of the nature of the L1 (null subject vs. non-null subject).

One study that has demonstrated no differences between L1 and L2 learners of English at the intermediate to high levels of proficiency is the study by Cunning et al. (2016). Cunnings et al. investigated the interpretation and processing of overt pronouns in English native speakers and L2 speakers, whose L1 is Greek, a null subject language. In the sentences, gender congruence between a subject pronoun and two antecedents was manipulated, so that in two conditions the pronoun unambiguously referred to the subject in sentence (6a) or the object of the previous sentence as in (6c). In two other conditions, the pronoun was potentially ambiguous, as the two preceding referents were both masculine, as shown in (6b) and (6d). In the ambiguous conditions, participants were expected to use the first mention bias, and prefer the NP1 interpretation for the ambiguous pronoun (he=Peter in 6b; he=Mr. Smith in 6c). The experiment was designed as a visual word study, in which participants saw pictures of the referents and listened to the sentences (as shown in Figure 1). Participants' eye-movements were recorded to ensure that the subject preference for the interpretation of overt subjects in English was not influenced by the interpretive preference of overt pronouns in L1 Greek, in which explicit pronouns would index a topic-shift. For the unambiguous conditions, the continuation of the sentence provided disambiguating information that guided the participant towards a subject (6b) or object (6d) interpretation (in examples 6b and 6d the disambiguating point is ice-cream).

(6a) Subject Bias, Unambiguous

After Peter spoke to Mrs. Jones by the till in the shop, he paid for the expensive ice cream that looked tasty.

(6b) Subject Bias, Ambiguous

After Peter spoke to Mr. Smith by the till in the shop, he paid for the expensive ice cream that looked tasty.

7

(6c) Object Bias, Unambiguous

After Mrs. Jones spoke to Peter by the till in the shop, he paid for the expensive ice cream that looked tasty.

(6d) Object Bias, Ambiguous

After Mr. Smith spoke to Peter by the till in the shop, he paid for the expensive ice cream that looked tasty.
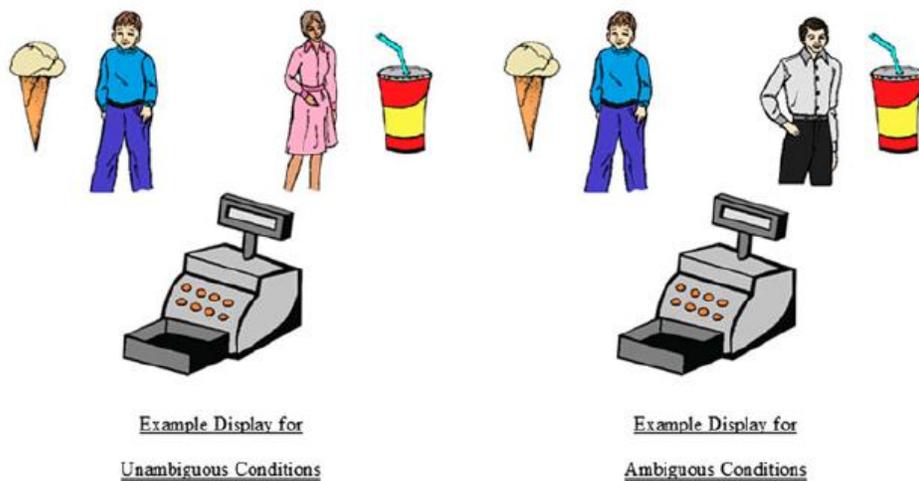
Figure 1. Sample of experimental stimuli by Cunnings et al. (2016)

Cunning et al. (2016) examined if L2 speakers can use semantic gender when they interpret pronouns online (6a, 6c) and whether they can revise an initial (subject) interpretation guided by the first-mention bias when an ambiguous pronoun referred to preceding object (6d).

Cunning et al.'s results indicate that L1 Greek learners of English interpret pronouns in English in a native-like way. Both L1 and L2 English speakers used gender information during pronoun interpretation to a similar extent. Additionally, both groups of participants had a preference for interpreting an ambiguous pronoun as referring to the sentence subject. Also, the authors found that L2 English learners were less likely to revise initial interpretation compared to

native English speakers in the ambiguous sentence, when the referent of a pronoun turned out to be the object (6d), rather than the subject of the preceding sentence. The results by Cunning et al. are not in line with the predictions of the Interface Hypothesis (e.g., Sorace, 2011). While the Interface Hypothesis would predict that L2 speakers have a difficulty in processing overt pronouns L2, the results of the study did not support this hypothesis. L2 demonstrated to be able to interpret and process ambiguous pronouns as successfully as native speakers, even if their L1 displays different anaphoric biases than the L2.

Finally, Schimke et al. (2016) investigated the interpretation of subject pronouns in native speakers of Turkish (a null subject language) that know French (a non-null language) as a L2, focusing on the influence of discourse level cues on the interpretation of pronominal form in L2 French, and demonstrating more reliance on discourse level cues in L2 than native French speakers. Schimke et al. tested the interpretation of pronominal forms in French infinite and nonfinite subordinate clauses using a comprehension task, in which sentences like (7) and (8) were presented. In one condition, the authors tested the explicit pronoun of a subordinate clause such as in sentence (7):

(7) Eric a poignardé Laurent quand il travaillait à Rome.

"Eric stabbed Laurent when he worked in Roma"

The second type of structure that was manipulated in the experiment involves a nonfinite modifier clause such as (8):

(8) Pierre a giflé Jean PRO (null subject) étant jeune.

 "Peter slapped John PRO (null subject) being young"

The purpose of the manipulation was to analyze whether participants chose the first mention referent (NP1) or second noun (NP2) as the antecedent of the ambiguous pronominal

form. In the study, they present six experiments, looking at the preferences of French native speakers and Turkish leaners of French, and testing the interpretation biases of native speakers of Turkish. Two experiments test native speakers of French interpreting overt subjects in French finite clause, like (7) and interpreting null subject [Pro] in French nonfinite clause, such as (8). Two experiments test native speakers of Turkish interpreting overt subject in Turkish finite clause and interpreting null subject [pro] in Turkish nonfinite clause (i.e., translations of the French sentences). The last two experiments were conducted with Turkish learners of French that interpreted French overt pronouns (7) and [Pro] (8) in French. The authors found that native speakers of French were influenced by a discourse level cue, i.e., the initial position of the patient, when interpreting a null subject pronoun of a finite clause (7), while native Turkish speakers were influenced by a syntactic cue - subjecthood- when there is a null subject in the finite clause (i.e., the corresponding Turkish translation of example 3). When interpreting [Pro] (8), both native speakers of French and native speakers of Turkish were influenced by subjecthood. Contrary to native speakers, Turkish learners of French showed more NP1 interpretations for the pronouns in finite clauses (7) and infinitive sentences (8) when interpreting the French sentences. Turkish learners seemed to ignore the syntactic constraints for interpreting the [Pro] in infinitive sentences in French. Furthermore, they did not rely on L1 strategies, given that Turkish shows a similar pattern of interpretation as French for the infinitive [Pro] clauses, and instead showed more reliance on discourse level cues (i.e., the position of the patient).

To conclude, previous studies on non-null subject languages have shown mixed evidence. Cunnings et al. (2016) demonstrated no differences between L2 learners of English and monolinguals. Other studies have found either differences between L2 learners and natives on the

10

processing and interpretation of pronominal forms (e.g. Roberts, 2008), or over-reliance on L1 on discourse levels-cues than native speakers (e.g., Schimke & Colonna, 2016).

In the present study, I will present two experiments that test pronoun interpretation in L2 English. In Experiment 1, I will use similar contexts as Sorace and Filiaci (2006). The task is a sentence comprehension task that tests the interpretation of overt subject pronouns in the context of anaphora and cataphora, as shown in example 9 (a, b).

(9a) Anaphora: Mary met Julie when she was traveling.

(9b) Cataphora: When she is traveling, Mary met Julie.

Native speakers of English and English L2 speakers whose L1 is Spanish participated in Experiment 1. The manipulation aims to test the validity of the Interface Hypothesis, i.e., test if L2 learners differ from native speakers when interpreting pronouns in English. In the anaphora condition (9a), according to the Interface Hypothesis, L2 leaners of English should interpret the pronoun to refer to the NP2 (e.g., Julie) more often than the native speakers of English, hence showing more optionality than native speakers. In the cataphora condition (9b), L2 learners should also experience some difficulty in interpreting the pronoun according to the Interface Hypothesis. L2 leaners may chose the NP2 more often than native speakers as a referent for the pronoun. Alternatively, L2 leaners may choose the external referent (someone else) for the cataphora condition, a strategy that they may adopt in their L1 (Sorace & Filiaci, 2006; Serratrice, 2007).

In experiment 2, I investigate anaphora resolution further by manipulating the discourse context. I will use stimuli more similar to Robert et al. (2008), in which the salience of the NP2 is manipulated. In Experiment 2, I expect that L2 learners may differ from L1 speakers and may be affected by the discourse manipulation, showing a pattern of interpretation resulting from L2 interference. In the next section, the predictions of the experimental studies are further outlined.

1.2. Aims and predictions

Based on the conflicting results present in the literature on anaphora resolution in learners of non-null subject language, the current study aims to reconcile the previous evidence and tests the validity of the Interface Hypothesis, by manipulating the context in which pronouns are represented. In two experiments, I investigate how L2 speakers of a non-null language (English) whose first language L1 (Spanish) interpret pronouns in English. In Experiment 1, the participants are presented with complex sentences consisting of a main clause and a subordinate clause. In half of the sentences, the main clause precedes the subordinate clause (anaphora) as illustrated in 10 and in the other half, the subordinate clause preceded the main clause (cataphora) as exemplified in 11

(10) Anaphora: Mary met Julie when she was travelling.

(11) Cataphora: When she is travelling, Mary met Julie.

In the anaphora condition, the proper names appear in the first clause and the pronoun appears in the second clause. For the cataphora condition, the pronoun appears in the first clause, and the proper names in the second clause. Following each sentence, a question is asked about the referent of the pronoun, and three possible answers are presented: the NP1, the NP2 and someone else (i.e. an extra linguistic referent), as shown in 12.

(12) Who was travelling?

(a) Mary

(b) Julie

(c) Someone else

As pronouns have a subject preference in English, I expect native speakers of English to choose the sentence subject in most of the cases both in the anaphora and in the cataphora

condition. For L2 speakers, one possibility is that Spanish native speakers who learn English as L2 may show a difficulty in acquiring native-like preferences for English pronouns. In this case scenario, they may be more likely to interpret a pronoun as signaling a topic shift as a result of L1 transfer, as suggested by Roberts et al. (2008) and Sorace (2011). In this case, we expect that the L2 speakers choose the NP2 referent more often than native speakers both in the anaphora and cataphora conditions. These results would be in line with the Interface Hypothesis, claiming that L2 learners find it more difficult to integrate syntactic and pragmatic information when there is a syntactic ambiguity to resolve. Alternatively, if L2 speakers from a null subject language background can acquire native-like interpretation of referring expressions in the L2, they might perform similarly to native English speakers. In this case, the assumptions of the Interface Hypothesis would not be supported. English proficiency may also influence how L2 speakers process and interpret pronouns. If proficiency influences L1 transfer, we might observe that the l2 learners tested in the present study may not perform like native speakers because they are at the intermediate level of proficiency.

In Experiment 2, the same L2 learners as in Experiment 1 participated. Similarly, to experiment one, I used a sentence comprehension task that manipulated the discourse context and the salience of the two possible referents. I explored the ability to choose the appropriate referential forms when two referents with different degree of prominence are introduced in the preceding discourse. I created three conditions in which I operationalized topic, by manipulating the salience of the referents presented in the preceding context. In the first condition, I made two referents (Erick, John) equally prominent, as in the sentences tested by Roberts et al. (2008) as shown in example (13). In the second condition, I made the second referent (John) more prominent by repeating reference to the NP2 in the preceding discourse, as shown in (14). In this case, even

though the participants should show a preference for interpreting the pronoun as referring to the local antecedent (NP1, Eric), the second referent (NP2, John) mentioned in the discourse should be more highly activated, as it is mentioned twice in the preceding context, and may potentially compete as a possible referent for the pronoun *he*. In the third condition (15), the second referent is referred by using a pronoun in preceding context, making it more prominent than in the other two conditions. With increased prominence to the second referent (NP2 John), we may expect more choices towards interpreting the NP2 as the antecedent of the pronoun in the L2 speakers

(13) Equal Prominence condition:

Eric and John are at the office. While Eric is working, he is eating a sandwich.

(14) NP2 Repetition Condition:

Eric and John are at the office. John is one of the best employees in the company. While Eric is working, he is eating a sandwich.

(15) NP2 Pronoun Condition:

Eric and John are at the office. John is one of the best employees in the company, he won the best employee of the month award. While Eric is working, he is eating a sandwich.

In Experiment 2, I expect that Spanish L2 speakers will exhibit more difficulty in their interpretation of pronouns in English in condition, as shown by Roberts et al. (2008) for Turkish learners of Dutch. Additionally, Experiment 2 explores the possibility that L2 learners may have a problem evaluating the prominence of the referents presented in the contexts and may be more likely to use L1 strategies (i.e., interpret the pronoun as signaling a topic shift) when the NP2 introduced in the discourse is highly salient. In this case, I would expect that L2 speakers produce more NP2 interpretations in the NP2 Repetition Condition compared to the Equal Prominence condition, and in the NP2 Pronoun Condition compared the NP2 Repetition Condition and the

Equal Prominence condition. Thus, as topic of the NP2 is manipulated, an increase in difficulty may be observed in L2 leaners' interpretations, if L2 learners have a problem evaluating who is the most salient referent in the preceding context. In the next section, I present the method and results for Experiment 1.

2. EXPERIMENT 1

2.1. Participants

Twenty-four native English monolingual speakers (7 females and 17 males; mean age: 31.57; SD: 2.53) and 31 intermediate proficient learners of English (L1 Spanish) (12 Females; 20 Males; mean age: 20; SD: 3.3) were recruited. Native English speakers were recruited using Amazon Mechanical Turk platform, which allows researchers to recruit participants online. Participants received a 1$ payment for their participation. Only participants who indicated no prior experience with other languages could take the online survey.

The L2 participants were recruited in intermediate level English as a Second Language (ESOL) classes at the University of Texas at El Paso. The L2 participants were born in a Spanish-speaking country (Mexico) and moved to the US at different times in their lives. They were first exposed to English at different times during childhood, with some participants having early exposure. L2 participants completed a subsection of the English Language test (MELICET). The subsection of MELICET contained 50 multiple- choice questions divided in two sections: 30 grammar questions and 20 cloze question from a reading passage. The results of the MELICET confirm that L2 participants are intermediate learners (Table 1).

Table 1 shows information about the language background of the L2 learners collected with a Language History Questionnaire (LHQ; Marian, Blumenfeld, & Kaushanskaya, 2007).

Table 1. Participant information: Mean (SD).

	Spanish – L1	English – L2
Age of exposure (in years)	0.84 (0.8)	7.47 (4.9)
Became Fluent Speaking (age in years)	3.06 (2.8)	11.81 (6.0)
length of resident in a country where the language is spoking (in years)	16 (6.3)	4.72 (5.9)
Speaking Proficiency (1-10)	8.96 (2.9)	7.30 (2.6)
Listening Proficiency (1-10)	9.03 (2.9)	7.80 (3.1)
Reading Proficiency (1-10)	9.06 (2.9)	7.77 (3)
Average daily exposure %	62.94 (15)	40.31 (16)
Language dominance (number of participant)	32/32	0/32
MELICET Score (out of 50)	-	28.91 (8.22)

2.2. Materials

The data were collected using a sentence comprehension task. The experiment was designed to test the interpretation of English pronouns in the context of anaphora and cataphora. I constructed 24 set of experimental sentences containing ambiguous pronouns either in anaphoric (16) or cataphoric position (17).

The experimental sentences consisted of a main clause and a subordinate clause, as shown in (16) and (17). The main clause included an animate subject NP, a transitive verb and animate object NP. The two NPs were always proper nouns and had same gender. The subordinate clause was introduced by "when" and included an ambiguous pronoun that could either refer to the subject (NP1) or object (NP2) noun phrase in the discourse.

Twelve experimental sentences were in the anaphoric condition. In the anaphoric condition, the proper names appeared in the first clause, and the pronoun appeared in the second clause, as in (16). Twelve experimental sentences included a cataphoric pronoun. For the cataphoric condition, the pronoun appeared in the first clause, and the proper names appeared in the second clause, as in (17).

(16) Mary met Julie when she was travelling.

(17) When he was lonely in Europe, Henry wrote frequently to Albert.

Additionally, I constructed 24 filler sentences, where a pronoun was never ambiguous. The purpose of the filler items was to distract participants from the aim of the experiment. An example of a filler sentence is provided in (18).

(18) Holly believed Dean because she saw the evidence.

Each experimental sentence was followed by a question and three choices appearing with the question, as illustrated in (20).

(20) Mary met Julie when she was traveling.

Who was traveling?

    (a) Mary

    (b) Julie

    (c) Someone else

Among the three choices, one corresponded to the NP1 (Mary), one corresponded to the NP2 (Julie), and one corresponded to an external referent (Someone else). The position of the three referents in the multiple-choice question was counterbalanced across the experiment.

2.3. Procedure

Native English monolingual participants were recruited remotely through the Amazon Mechanical Turk web-based survey. The participants were provided with instructions about the task and given one sentence practice before the main experiment. They were asked to read the sentences and answer the questions by choosing one of three provided options. The task was designed as a Qualtrics survey.

L2 participants were tested in the ESOL classroom at the University of Texas at El Paso. Prior to starting of the test, they received a consent form, had a chance to read it and ask questions,

and returned their signed consent to the researcher. L2 participants were given a hard copy of the sentence comprehension task. Additionally, they completed the LHQ language background questionnaire and the MELICET English proficiency test. The entire experiment lasted 45-60 minutes.

2.4. Results

Figure 2 illustrates the proportion of NP1 interpretations given by the native speakers and the L2 participants out of the total number of NP1, NP2 and external referent interpretations.
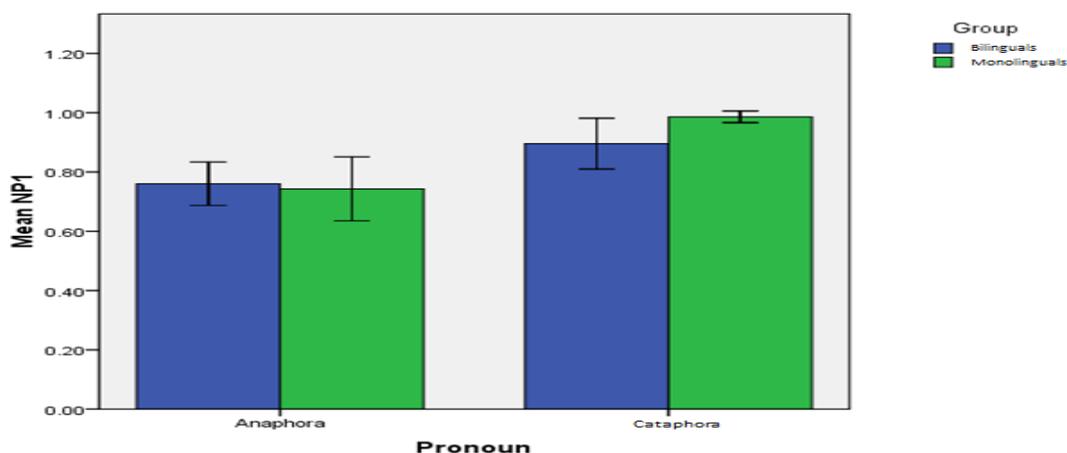

Figure 2. Proportion of NP1 responses in the anaphora and cataphora condition for the native speaker and L2 group.

Two variables were manipulated in the experiment: Condition (Anaphora vs. Cataphora) as within-subjects factor and Group (native vs. L2 speakers) as between-subjects factor. In the statistical analysis, I analyzed the number of NP1 interpretations produced by the two groups in the two conditions. I used mixed-effects logistic regression (Jaeger, 2008) with and Group and Condition as fixed effects, random intercepts for participant and item and participant and item random slope. The number of NP1 interpretations per each subject and item was coded as 1 or 0 and analyzed using glmer (lme4 library, Bates & Sarkar, 2007). I used a stepwise backward inclusion procedure and tested both first-level effects and the interactions between the fixed-effect factors. I performed pairwise comparisons using mixed-effects logistic regression with Group as a

main factor to compare the two groups on the two conditions. Table 2 shows the results of the full model.

In the analysis, a main effect of Condition, a main effect of Group and an interaction between Group and Condition were found. The pairwise comparisons for the main effect of Condition shows that participants gave more NP1 responses for the cataphora conditions (mean 0.75) compared to the anaphora condition (mean 0.93) (ß= 3.16, SE= 0.99, t= 3.180, p<.001). The pairwise comparisons for the main effect of Group did not show any difference between native speaker and L2 (ß= 0.2, SE= 0.3, t= 0.735, p=.46). The pairwise comparisons for the interaction between Condition and Group showed that the L2 and the native speakers did not differ significantly on the anaphora condition (ß= -0.12, SE= 0.27, t= -0. 440, p=.66), but they differ significantly on the cataphora condition (ß= 2.8, SE= 0.9, t= 2.920, p=.003), with the monolingual participants choosing NP1 responses significantly more often (mean=0.98) than the L2 speakers (mean=0.89).

Table 2. Experiment 1: Full model statistics.

Fixed effects:				
	Estimate	Std. Error	t value	P value
(Intercept)	2.3011	0.2545	9.042	0.0001
Group	0.9998	0.3958	2.526	0.01
Condition	2.1862	0.3947	5.539	0.0001
Group*Condition	2.2512	0.7854	2.866	0.004

Notes:
The maximal random effect structure leading to convergence includes by subject and by item random intercepts, and by subject random slope.

2.5.   Interim discussion

The sentence comprehension task aimed to test whether the interpretation of subject pronouns in context of anaphora and cataphora by Spanish L2 speakers of English is different from that of native English speakers. The results of the anaphora condition indicate that L2 speakers of

English interpret pronouns in a native-like manner. L1 and L2 English speakers chose the NP1 and interpret ambiguous pronouns as referring to sentence subject and current discourse topic. These similar results suggest that L2 speakers from a null subject have acquired the first-mention bias in English and can successfully use it in a context of anaphora resolution. This result is not in line with the predictions of the Interface Hypothesis (Sorace, 2011). The Interface Hypothesis predicts that L2 speakers should show difficulties compared to L1 speakers in integrating multiple information to resolve an ambiguous pronoun, even at the highest levels of proficiency. More generally, these results confirm the results from Cunning et al. (2016), suggesting similar preferences between L1 and L2 speakers in anaphora resolution in English.

The results of the cataphora condition show that native speakers overwhelmingly chose the subject antecedent and regard the complement and extra-linguistic referent as unlikely possibilities. The L2 English speakers show a different pattern of preference in comparison to the native speakers in the cataphora condition. Unlike the native speakers, the L2 speakers allow the object to be the possible antecedent in cataphora condition, as shown by the Condition by Group interaction. While no difference was found between the patterns of interpretation in the anaphora condition, L2 participants demonstrate more optionality on the interpretation of cataphora. There are two possible interpretations for this result. One possibility is that the difference on cataphora emerges because the native speakers are at ceiling on this condition (100% of subject responses). The second possibility is that intermediate-proficiency L2 speakers are not familiar with cataphoric pronouns as they are less frequent in the input. For instance, Trnavac & Taboada (2016) conducted a spoken corpus analysis and found only 59 cases of cataphora over 11,636 pronouns being used, showing that cataphora is indeed a rare phenomenon in naturally-occurring discourse.

In the next section, I am going to present Experiment 2. In Experiment 2, I tested stimuli

similar to Roberts et al. (2008), to observe if any difference in anaphora interpretation emerges in the native and L2 group when two entities are introduced in the preceding context that are equally salient. Additionally, I am going to manipulate the saliency of the two referents to further investigate what type of discourse structure has an impact on L2 interpretation of ambiguous pronouns.

3. EXPERIMENT 2

3.1. Participants

Thirty native speakers of English were recruited through Amazon Turk Mechanical Turk (mean age: 35.44; SD: 7.16). Participants received a 1$ payment for their participation.

Twenty-eight intermediate proficient learners of English (L1 Spanish) (mean age: 20; SD: 3.3) were also recruited. The L2 participants who participate in Experiment 1 were invited to participate in Experiment 2; however only 28 of the original participant returned (11 females and 17 males).

3.2. Materials

Similarly, to Experiment 1, in Experiment 2 I used a sentence comprehension task in which participants identified the referent of an ambiguous pronoun. The experiment was designed to manipulate the discourse context and the salience of the referents presented in the preceding context.

I constructed 12 sets of experimental sentences. Each experimental sentence was manipulated in three conditions. In the first condition, I operationalized prominence by making two referents (Erick, John) equally prominent in the preceding context, as shown in (21). In the second condition, I made the second referent more prominent, by using a repeated NP2 reference in the preceding discourse, as shown in (22). In the third condition, the second referent is not only repeated, but also referred to by using a pronoun, as illustrated in (23), therefore making the NP2 more salient in comparison to the other conditions.

(21) Equal prominence condition:

Eric and John are at the office. While Erick is working, he is eating a sandwich.

(22) NP2 Repetition Condition:

23

Eric and John are at the office. John is one of the best employees in the company. While Eric is working, he is eating a sandwich.

(23) NP2 pronoun Condition:

Eric and John are at the office. John is one of the best employees in the company, he won the best employees of the month. While Eric is working, he is eating a sandwich.

Each experimental sentence was followed by a comprehension question and three choices were presented as illustrated in (24).

(24) Who is eating a sandwich?

(a) Eric

(b) John

(c) Someone else

Among the three choices, one corresponded to the NP1 interpretation (Erick), one corresponded to a NP2 interpretation (John) and one corresponded to an external referent interpretation (Someone else). The position of the three referents in the multiple-choice question was counterbalanced across the experiment.

Additionally, I constructed 12 fillers sentence, in which a pronoun was presented that was never ambiguous. The purpose of the filler items was to distract participants from the aim of the experiment.

3.3. Procedure

Native English monolingual participants were given the task and had one sentence practice before the main experiment. Participants were recruited remotely using the Amazon Mechanical Turk web-based platform. The task was designed as a Qualtrics survey.

L2 participants were tested in an intermediate-level ESOL classroom at the University of Texas at El Paso. Prior to the task, L2 participants received a consent form, had a chance to read it and ask questions, and returned their signed consent form to the researcher. L2 participants were given a hard copy of the sentence comprehension task. The entire experiment lasted 15-20 minutes.

3.4. Results

Figure 3 illustrates the proportion of NP1 interpretations chosen by the native speakers and the L2 participants out of the total number of NP1, NP2 and external NP interpretations.
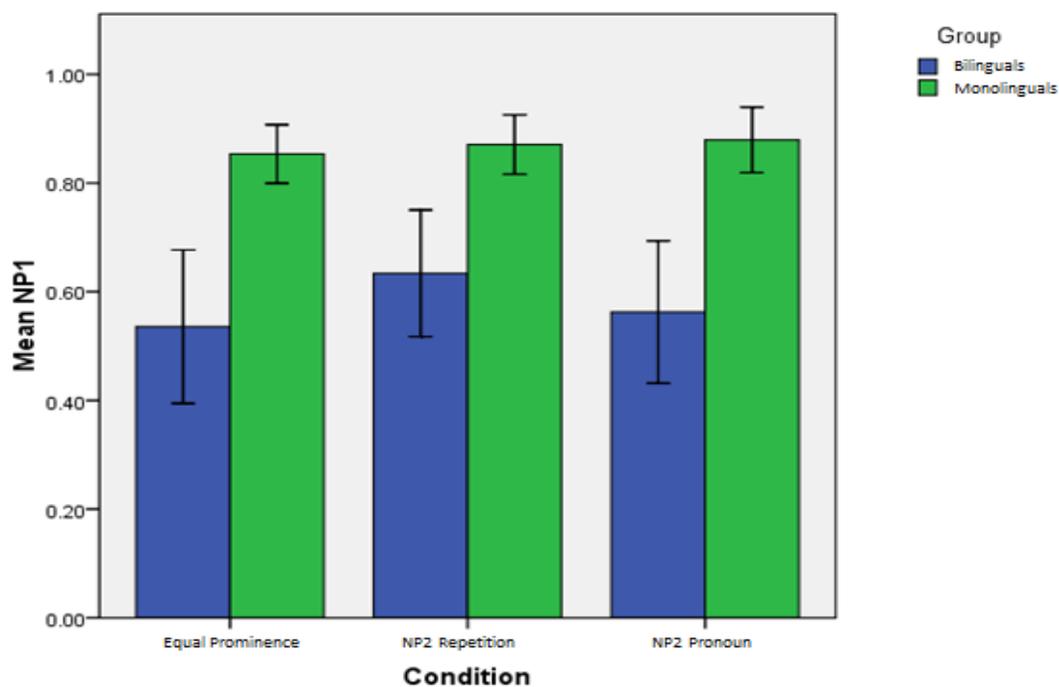
Figure 3. Proportion of NP1 responses in the three conditions for the native speaker and L2 group.

Two variables were manipulated in the experiment: Condition (Equal Prominence vs. NP2 repetition vs. NP2 Pronoun) as within-subjects factor and Group (native vs. L2 speakers) as between-subjects factor. In the statistical analysis, we analyzed the number of NP1 interpretations produced by each group in the three conditions. We used mixed-effects logistic regression (Jaeger, 2008) with and Group as fixed effects, random intercepts for participant and item and participant

and item random slope. The number of NP1 interpretations per each subject and item was coded as 1 or 0 and analyzed using glmer (lme4 library, Bates & Sarkar, 2007). We used a stepwise backward inclusion procedure and tested both first-level effects and the interactions between the fixed-effect factors. We performed pairwise comparisons using mixed-effects logistic regression. Table 3 shows the results of the full model.

In the analysis a main effect of Group was found. No other main effects or interaction emerged. The pairwise comparisons for the main effect of Group shows that native speakers gave significantly more NP1 responses (Equal Prominence: 0.87; NP2 repetition: 0.85; NP2 Pronoun: 0.87) in all three conditions compared to the L2 speakers (Equal Prominence: 0.59; NP2 repetition: 0.53; NP2 Pronoun: 0.59) (Equal Prominence: ß= 3.3, SE= 0.69, t= 4.758, p<.0001; NP2 repetition: ß= 2.5, SE= 0.50, t= 5.046, p<.0001; NP2 Pronoun: ß= 2.02, SE= 0.44, t= 4.548, p<.0001).

Table 3. Experiment 2: Full model statistics

Fixed effects:				
	Estimate	Std. Error	t value	p value
(Intercept)	0.07105	0.57068	0.125	0.901
Group	2.4646	0.44051	5.595	0.0001
Condition	0.24836	0.33302	0.746	0.456
Group*Condition	0.32104	0.63101	0.509	0.611

Notes:
The maximal random effect structure leading to convergence includes by subject and by item random intercepts, and by subject random slope.

3.5. Discussion

In Experiment 2, I manipulated the discourse context and the salience of the two referents in contexts in which an ambiguous pronoun was presented. In one condition, I operationalized topichood in the preceding context by making the two referents (Eric and John) in the discourse equally prominent (Equal Prominence condition). In a second condition, I made the second referent

(John) increasingly prominent with repeated reference in the preceding discourse (NP2 Repetition Condition). In a third condition, the second referent is referred to by using a pronoun in the context, hence making it more salient in comparison to the other two conditions (NP2 Pronoun Condition). A group of native speakers and a subgroup of the same ESOL students as in Experiment 1 participated in the sentence comprehension task. The analysis revealed a main effect of Group, showing more NP1 responses in the native speakers in all three conditions, compared to the L2 learners. While native speakers overwhelmingly chose NP1 as a reference for the pronoun in all three conditions, the Spanish L2 speakers show more variation in their interpretation for the subject pronouns when the salience of two possible references was manipulated. L2 learners experienced more difficulties in all three conditions: when two referents (Erick, John) were equally prominent and when the second referent was increasingly prominent, due to repeated NP2 reference and pronominalization. In all three conditions, L2 speakers show more object interpretations in comparison to L1 speakers.

The results of the current study are in line with Robert et al. (2008). Robert et al. used a reading eye tracking method to examine local vs. disjointed interpretation of Dutch pronouns in their study. In the study, the condition in which L2 speakers had more difficulties contained an ambiguous pronoun and two entities in the preceding discourse (e.g., Peter and Hans are in the office. While Peter is working, he is eating a sandwich). While native speakers of Dutch resolved the pronoun locally (i.e., he=Peter), native speakers of Turkish whose L2 is Dutch chose the object interpretation significantly more often. The authors interpreted this result (and the results of the eye-tracking study) as a problem with the integration of multiple types of information (syntactic, discourse, pragmatic) for L2 learners, and the interference from L1 pronoun interpretation strategies. Interestingly, our results show that the presence of an equally prominent referent in the

27

preceding context created more optionality in the interpretation of the L2 speakers in comparison to the anaphoric contexts tested in Experiment 1. However, the increased prominence of the NP2 in the NP2 Repetition Condition and in the NP2 Pronoun Condition does not seem to deteriorate the L2 speakers' performance, as no difference was found between these two conditions and the Equal Prominence Condition (i.e., no Condition*Group interaction emerged). This result indicates that L2 speakers may not have a specific problem evaluating the prominence of the referents in the preceding discourse, leading to the use of L1 strategies.

4. CONCLUSION

The L2 speakers in the present study did not have increased difficulty compared to native speakers in integrating multiple sources of information to resolve ambiguous pronouns in anaphora condition, contra the Interface Hypothesis (e.g., Sorace, 2011). L2 speakers presented more optionality in the interpretation of cataphora, in which native speakers overwhelmingly chose the NP1 interpretation, probably due to the lack of experience with this infrequent structure.

As shown in Experiment 2, the discourse structure has an impact on L2 interpretation of ambiguous pronouns. L2 speakers perform significantly less accurately in comparison to native speakers in conditions in which two referents that are equally salient are presented in the previous discourse, and when the NP2 has increased salience. Additionally, more research is needed to explore if L2 speakers have a specific difficulty in evaluating the discourse prominence of referents introduced in the discourse.

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CURRICULUM VITA

Ohood Asiri was born in July 1990 in Saudi Arabia. She graduated from Addarb high school in 2009 and entered King Khalid University.

She holds a Bachelor degree in the English Language accomplished in the year of 2012 from King Khalid University, Abha, in the Kingdom of Saudi Arabia. During the last semester of her undergraduate, she had the opportunity to teach English in her region for four months. Despite the short period of this experience, she glad to have gained valuable skills

In 2013, she recruited to be a teacher to teach English in a well-known high school in her region for one year. In 2014, since she got a scholarship, she studies English in Tampa, Florida for two years. In Fall 2017, she entered a graduate school of University of Texas at El Paso.

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