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ORIGINAL

# Prosodic Cues in Relative Clauses Disambiguation: Bilinguals vs. L2 Learners

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**ABSTRACT**
This study investigates the preferences for attachment of a relative clause (RC) to a complex noun phrase (NP) of the type: NP1 of NP2, in Spanish-English bilinguals and advanced learners of Spanish. Spanish speakers show a moderate preference for attaching the RC to the first NP, while speakers of English prefer the second NP. Subjects were presented this construction in written (Experiment 1) and oral (Experiment 2) forms. Results show no group had a preference for either attachment in silent reading, Low Attachment was preferred with a pause after NP1 by learners, and High Attachment was preferred in the absence of any pause by bilinguals and learners. However, the learner group behaved distinctively in Experiment 2 in two ways: their reaction times were shorter, and their choice for the kind of RC attachment was more sensitive to the absence of a pause being more likely to choose Low Attachment, as English monolinguals. These results suggest that advanced learners are influenced by their L1 more heavily in oral comprehension than in reading, while bilinguals take longer for processing prosodic cues. Reasons for a slower bilingual processing are posited. Lastly, implications for prosody teaching are drawn from these results.

**KEYWORDS:** LANGUAGE PROCESSING, INTONATION, AMBIGUITY, BILINGUALISM, SECOND LANGUAGE INSTRUCTION

## 1 INTRODUCTION

Pronunciation, and in particular prosody, is probably the aspect of foreign language teaching that typically gets the least attention. ACTFL guidelines, for instance, mention very little the need to improve pronunciation. Likewise, Oral Proficiency Interviews only evaluate pronunciation in so far as pronunciation is an obstacle for comprehension by native speakers of the target language. Moreover, little or no specific mention is made to its different aspects, such as intonation (Chun, 2002, p. 83). As limited as the suggestions for teaching or evaluating pronunciation are, the time typically dedicated to it in the L2 classroom is even more limited (Omaggio, 1993, p. 5-8).

Several reasons can be pointed at for this lack of attention to pronunciation teaching and learning. Although there was some emphasis in the segmental aspects of pronunciation between the 40ies and the early 60ies, mainly by contrasting the L2 and the L1 phonemic systems (Chun, 2002, p. 81), this attention diluted when the focus on form shifted towards a focus on the communicative function of languages. Then, unless pronunciation was in the way of comprehension, there was no need to teach it or correct it. Another very important reason is the extended idea that pronunciation cannot be learned and therefore cannot be taught. Although there is little empirical evidence for the Critical Period Hypothesis (Snow & Hoefnagel-Höhle, 1977), it is held by many practitioners when it comes to the acquisition of an L2 phonology and Neufeld found evidence of it for L2 phonology (1980) although not for suprasegmental features (1978). Even if there is evidence that suggest that adults are capable of imitating different sounds, when it comes to reproduce these sounds in the target language words, adults have a harder time producing these sounds without an accent. Finally, many factors that have been linked to success (Conrad, 1991; Moyer, 1999), such as personal variations in aptitude, motivation, attitude, personality, or patterns of brain hemisphere specialization, are very individual-dependent. Hence, even if L2 phonology could be acquired at a later age, it seems that the effort and time for teaching it would be too big and the benefits much smaller. All this has led to a relegated place for pronunciation in the general map of foreign language teaching.

In contrast, recent research on intonation and its discourse functions has made the relevance of intonation for communicative purposes more obvious. Also, new technological possibilities make it more possible to teach sounds, by providing speakers with visual input and feedback in the form of sound waves or articulatory simulations in the computer. For example, Loveday (1981) found that the higher pitch produced by female Japanese speakers was much higher, a pitch height that implied more politeness and that English as L1 female speakers would need to reproduce when learning Japanese. Similarly, Gumperz's (1982) study showed how the use of an atypical falling intonation for offerings by Paskistani servers irritated English native speakers who where expecting the more polite and typical in English rising intonation. These studies demonstrate the importance of teaching intonation patterns to L2 students. The communicative and linguistic functions of prosody include for instance: sentence boundaries, topic indication,

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information status of different elements, relevant reply cuing, expectations cuing, etc. (Couper-Kuhlen & Selting, 1996).

Besides the obvious application for teaching, the research of prosody acquisition is helpful in understanding transfer processes between L1 and L2, as well as the role of prosody to mark certain meanings and how this marking can be language specific or universal. This study will focus on the use of prosodic cues to mark a constituent boundary so as to disambiguate the attachment of a relative clause, and hence the general meaning of its sentence. First, I will present the problem and its language specificity and how it has been accounted for through different theories. Following the Implicit Prosody account, I will explain some of its predictions for Spanish as L1 and L2. In order to test these predictions, I conducted two experiments, one with just written sentences, the other oral sentences in both bilingual speakers and L2 learners. The discussion of the results will lead to some conclusions about the acquisition of implicit prosodic patterns in L2 and teaching needs that arise from these findings.

## 1.1 The problem: Ambiguity in complex Head NPs in relatives clauses

Relative clauses (henceforth RCs) in different languages, including Spanish, are known for being acquired later than other structures, at least in their most sophisticated forms (Diessel & Tomasello, 2005) and having processing complexity that varies according to numerous factors (Kidd, 2011) such as specificity or antecedent's and relativizer's functions. More generally, RCs posit a parsing challenge in that the relativizer points to an earlier reference that needs to be planned for by the speaker and tracked by the listener. In some RCs the reference tracking can be particularly difficult because there is a structural ambiguity in the clause. Such is the case of RCs with a compound antecedent or Head NP (henceforth HNP) to which the relativizer directs.

With this research I intend to explore how native speakers of Spanish (Spanish-English adult bilinguals with dominant Spanish) and advanced learners of Spanish (native speakers of English) resolve ambiguities in understanding relative clauses with complex Noun-Phrases (henceforth NP) of the form "NP1 of NP2", for instances such as (1), where the target element is underlined:

(1) Laura visitó a <u>la hija del sastre</u> que vivía en París

| *Laura* | *visit-ó* | *a* | *la* | *hij-a* |
|---|---|---|---|---|
| Laura | visit-3.Sg.Pst.Prf.Ind | acc.spcf | the.F | child of-F.Sg |

| *de-l* | *sastre* | *que* | *viv-ía* | *en* | *París* |
|---|---|---|---|---|---|
| of-the.M.Sg | tailor | that | live-3.Sg.Pst. Imprf.Ind | in | Paris |

*Laura visited the daughter of the tailor that lived in Paris*

where NP1 is "la hija" (the daughter) and NP2 is "el sastre" (the tailor). In sentences including RCs with this kind of complex NPs serving as the antecedent HNP of the relative clause, that RC can have two different interpretations, depending on what NP is decided to be the antecedent. In the case of (1):

1a) the daughter is the one that used to live in Paris

or

1b) the tailor is the one that used to live in Paris

This is where the ambiguity lies.

## 1.2 Linguistic specificity of interpretation preferences of complex Head NPs in relative clauses.

Previous studies (Carreiras & Clifton, 1999; Cuetos & Mitchell, 1988; Dussias, 2003; Fodor, 2002; Jun, 2003) have shown English monolinguals to prefer (1b), called "low attachment preference", while Spanish monolinguals show a moderate preference for (1a) (Carreiras & Clifton, 1999; Cuetos & Mitchell, 1988; Dussias, 2003; Dussias & Sagarra, 2007; Jun, 2003), what is called a "high attachment preference". Some studies, however, have found that Spanish speakers did not show a clear preference (Carreiras & Clifton, 1993; Senn, 2008) and others have linked their preference to other characteristics of the RC such as length (Fernández, 2003 for English but not for Spanish).

### 1.2.1 Theories for attachment decision in ambiguous RCs

The first studies on RC Head NP disambiguation were conducted for English. Given English speakers preference for a low attachment, not only in RCs, but also other constructions, Frazier and Fodor (1978) proposed the Late Closure Theory: new incoming lexical items will be associated with the phrase or clause most recently processed rather than with structures farther back in the sentence. This principle of Late Closure (LC) was assumed to be universal. Cuetos and Mitchell (1988) experiment comparing English and Spanish monolingual speakers, however, found evidence that questioned the LC principle, as Spanish speakers preferred to attach the RC not to the most recently element, the NP2, but to the earlier one, NP1 (high attachment). These authors proposed then an alternative theory, the Linguistic Tuning Hypothesis (Cuetos, Mitchell, & Corley, 1996). According to this hypothesis, crosslinguistic differences between languages when it comes to processing, and in this case ambiguity resolution for attachment, are due to the fact that different languages show different frequencies for each attachment preference. The brain registers this statistical difference and in cases of ambiguity prefers the most frequently used interpretation in cases with no ambiguity and transfer this preference to the ambiguous cases. It is a frequency effect then.

Another proposal, by Carreiras and Clifton (1993) is the Construal Hypothesis. This hypothesis states that it is not a frequency effect, but a paradigmatic effect that is responsible for what ends up being the preferred interpretation: it depends on the availability of other constructions with a specific necessary interpretation. Then, in ambiguity cases, the interpretation not present in other constructions is preferred and becomes default.

There is still one more explanation that has been proposed. Fodor (2002) presented the Implicit Prosody Hypothesis. Even in cases of silent reading, with no prosodic cues available, speakers impose an implicit prosody. Which implicit prosody is used determines which reading is preferred. If an implicit prosody is used that favors high attachment, then the interpretation will be high attachment. If, on the other hand, an implicit prosody is used that favors a low attachment, then the interpretation favored will be low attachment, the NP2. What implicit prosody is used can be influenced by several factors. In a similar vein, Jun (2003) claims that each language has a preferred prosody for a certain structure, that she calls "Default Phrasing." This default intonation pattern is used for silent

reading unless other factors (such as contrastive focus, for instance) come into play that change this silent, implicit prosody. Languages vary in their default phrasing for ambiguous RCs with complex NPs. The evidence for this theory and in general for prosody as a key factor in interpretation, both explicit and implicit, is explored in the next section.

### 1.3 Prosodic cues use in ambiguous relative clauses processing

As commented in the introduction, one of the usual functions of prosody is to aid processing, often by resolving ambiguity. In the case of RC Head NP attachment, several studies have demonstrated the impact of explicit prosody on attachment preference. Some of these studies have shown how other factors take preference, such as preposition selection in the Head NP (Papadopoulou & Clahsen, 2003), focus marking (Schafer, Carter, Clifton, & Frazier, 1996) or relative clause length (De la Cruz-Pavía, 2010 for Spanish) and, obviously, RC semantic type (Garro & Parker, 1983 for Spanish restrictive vs. non-restrictive RCs). Furthermore, Pynte (2010), for instance, proposes that prosody has an effect very early on in the processing.

For the particular case of ambiguous RCs with complex Head NPs, Fodor (2002) predicts the effect of prosodic boundaries, or pauses, as it follows:

- Pause after NP1: Low attachment
- Pause after NP2: High attachment
- No pause: either or low attachment

Results for different languages are usually, but not always, consistent with these predictions. In a production experiment, Jun (2003) finds that a forced interpretation for NP1 triggers no pause in the reading outloud production, while a forced interpretation for NP2 triggers a pause in both Spanish and English, as well as other languages. More importantly, Jun finds that if a speaker produced the pause after NP1, regardless of language or speakers, regardless of the consistency of the speaker or the language in doing so, the interpretation of the attachment will be low, while pause after NP2 will trigger the high attachment interpretation. That is to say, even in cases like Greek, where the default phrasing is 50% pause after one NP and 50% after the other, the implicit prosody chosen determines with no exception which of the readings will be preferred. Fromont, Biau and Soto-Faraco (2010) obtained similar results for Spanish. Lack of a pause however inclined speakers to choose a low attachment, though not significantly.

#### 1.3.1 Prosodic cues use by bilinguals and L2 learners: results and relevance

Besides monolinguals, several studies on RC ambiguity resolution have studied bilingual populations and a few have studied L2 learners. However, there are at least two important reasons to study the attachment preferences of these populations. One is that such study can illuminate transfer processes, particularly in processing. The other is that we can determine if the acquisition timing and difficulty of certain processing strategies. In order to do so, it is interesting to compare the attachment preferences that involve speakers of languages with different preferences, such is usually the case with English (low preference) and Spanish (moderate high preference).

The studies focused on bilinguals usually compare these to monolinguals and divide the bilinguals according to their dominant language or the length of their bilingual status (short vs. long term). Senn (2008) studied Spanish monolinguals and dominant Spanish bilinguals short and long term and found that no group had a preference for one attachment or the other that was statistically significant. Fernández (2003) found faster readings times for high attachment forced interpretations in Spanish dominant speakers but only if the RC was longer, and no effect for English speakers. In contrast, Dussias and Sagarra (2007) found that both Spanish monolinguals and short-term bilinguals preferred high attachment, while long-term bilinguals showed a preference for low attachment like English. In a different previous study Dussias (2003) had found that English dominant bilinguals and English monolinguals preferred low attachment while the Spanish groups differed in their preferences: the bilinguals preferred also low attachment in contrast to the monolinguals that preferred high attachment. These results have been interpreted as showing a transfer effect. Bilinguals in longer period of contact (Dussias & Sagarra, 2007) or currently still in contact with the other language (Dussias, 2003; Dussias, 2004), will transfer their L2 attachment preference into their L1 interpretations, a transfer that Dussias thinks due to the Linguistic Tuning Hypothesis. Another factor beyond language contact seems to be RC length, perhaps complexity, so the more difficult the processing, the least likely the transfer from the new acquired language. A similar length effect was found by De la Cruz-Pavía (2010) for Spanish and Basque bilinguals, together with a lesser frequency of pauses and less clear boundaries for bilinguals.

There have been fewer studies on L2 learners and RC disambiguation and none dealing with prosodic cues. Hemforth, Konieczny and Scheepers (2000) propose that there are two factors that determine the presence of L1 strategies in the interlanguage: the proficiency of the students in their L2 and the similarity of L1 and L2. Frenk-Mestre has conducted two studies in learners of French. In her 1997 study she compares L2 learners of French with Spanish L1 and with English L1 and finds that Spanish native speakers prefer high attachment, the preferred option in French, but native speakers of English selected more low attachment, their native language preference. These groups, however, consisted of low proficiency subjects. The replication study (Frenk-Mestre, 2002) with advanced learners found that they used the attachment strategy most used in French. It seems then that the attachment preference of the L2 is acquired in the advanced phases of the learning process, but it is indeed acquired, at least for silent reading. But what happens when prosodic cues are provided? This is what this study will explore.

## 2 METHODS

To investigate the bilinguals and L2 learners attachment preferences and their sensitivity to prosodic cues, two experiments were conducted.

Stimuli consisted of ambiguous RCs. Since RC length and type of RC (De la Cruz-Pavía, 2010 for Spanish; Fernández, 2003 for English) have been shown to affect attachment preferences both were controlled for in the experiment (constant length +- 3 words and only restrictive RCs). The vocabulary used was also comprised of common words to avoid introducing an extra difficulty for the advanced learners. There was a total of 12 experimental items, 3 for each of the following conditions: (i) written ambiguous RC (default condition); (ii) written ambiguous RC with a semantic cues that would slightly favour a high attachment (semantic condition); (iii) audio ambiguous RC

with no pause (no pause condition); (iv) audio ambiguous RC with a pause between the NP1 and the NP2 (pause condition). Five training items at the beginning of each session were added, as well as distractors double the number of the experimental items, for a total of 24. Distractors always contained a complex NP but did not contain a RC. These stimuli were presented in a computer screen for the written ones, and played off the computer for the spoken ones. After being exposed to the stimulus, the subject was asked a question, which for the experimental items consisted on a question on who or what was the RC about. Our sample sentence (1) is reproduced below together with the question:

Laura visitó a la hija del sastre que vivía en París
Laura visited the daughter of the tailor that lived in Paris.
Question: *¿Quién vivía en París?*
Who used to live in Paris?

Subjects were given two options preceded by a number:

1. La hija (*the daughter*)
2. El sastre (*the tailor*)

And they had to choose one by pressing either number key in the computer. EPrime was used to register both the option and the time needed to select an option.

The experiments were applied to three different groups of subjects. The bilinguals group consisted of 21 Spanish-English bilinguals whose dominant language was Spanish and currently living in the USA with varying times of residence. The dominant language was determined by a brief interview before completing the experiment and the information collected in a sociolinguistic questionnaire administered before the experiment. The learners group consisted of 28 advanced learners of Spanish (at least year three of Spanish at university level) whose native language was English. Most of the learners had had a living abroad experience of 3 months or more and all were taking an upper division level class and majoring or minoring in Spanish. Finally, the control group of monolinguals was comprised of 18 Spanish native speakers from Spain with only basic knowledge of English who did not use this language often, except for one history teacher who used it in his class at times. This group only did the first experiment.

For the first experiment, bilinguals and L2 learners preferences in silent reading of RCs were compared between the two groups and a control group of monolinguals. Both the attachment option and the reaction time were collected. In the second experiment, subjects listened to a recording of RCs with a pause after the NP2 and without it and had to decide upon an interpretation. Only the bilinguals and the L2 learners groups participated in this experiment, due to technical restrictions while sampling the native speakers in Spain. For the monolingual results, previous studies conclusions are used for comparison. Again, attachment choice and reaction time were recorded.

The predictions for the silent reading experiment, following previous results, is that monolinguals will show a high attachment preference, although a light one, and that bilinguals and advanced learners would not have a clear preference. For the experiment with the prosodic cues, following Fodor's (2002) theory and the results in Biau and Soto-Faraco (2013) and Jun (2003), the prediction is that the pause between NPs would make all speakers prefer low attachment, regardless of their silent reading preference, while the absence of a pause will show the same preferences as the silent reading for each of the groups.

## 3 RESULTS

### 3.2 Attachment preferences results

The control group showed a slight preference for the high attachment, as expected, but this preference was statistically non significant ($\chi$=3; p-value=0.083). Table 1 shows the preferences for bilinguals and L2 learners depending on the condition, shadow boxes represent the preference for high or low attachment

**Table 1.** Relative Frequencies for Attachment Preferences by Conditions and Groups

| Attachment | Group | Default Condition | Semantic Condition | Pause Condition | No Pause Condition |
|---|---|---|---|---|---|
| **High** | Bilinguals | 33 | 36 | 35 | 38 |
| | Learners | 49 | 46 | 38 | 57 |
| **Low** | Bilinguals | 30 | 27 | 28 | 25 |
| | Learners | 35 | 38 | 46 | 27 |

As we can see in Table 1, high attachment was always preferred except by L2 learners when there was a pause. However, the chi-square test revealed that there was no statistical significance to the preference of high attachment by group. Given the difference between bilinguals and learners concerning the pause condition, I tested whether the attachment preference for the pause condition was significantly different between bilinguals and learners. No statistical significance was found between the two groups in their response preference under the pause condition despite their differences in preference ($\chi$=1.148; p-value=0.284).

In addition, in order to see if the different prosodic cues had a global effect, I tested if the attachment preference difference was significant between pause and no pause. There was a significant difference for attachment preference between pause –low attachment preferred- and no pause –high attachment preferred ($\chi$=6.125; p-value=0.013).

Finally, a logistic regression was performed to search for significant interactions between the independent variables over the attachment preference. No interaction was found significant.

### 3.3 Reaction times results

Several relevant differences were found in the reaction times. Table 2 presents mean reaction times according to group and condition:

**Table 2.** Mean Reaction Times by Group and Condition*

| Group | Default Condition | Semantic Condition | Pause Condition | No Pause Condition |
|---|---|---|---|---|
| **Bilinguals** | 18857,22 | 22769,87 | 13371,4 | 13148,54 |
| **Learners** | 20286,571 | 20889,524 | 9759,94 | 9220,048 |

*Note*: * In milliseconds

As it can be seen, except for the default condition, learners take shorter to attach the RC. Between conditions, written conditions (silent reading) take longer than auditory conditions (listening to the sentence).

It is also relevant to see if the response given makes times longer and shorter. Table 3 and 4 show reaction times according to attachment selection and group, and condition respectively.

**Table 3.** Mean Reaction Times by Attachment Selection and Group

| Attachment | Bilinguals | Learners |
|---|---|---|
| **High** | 17776,55 | 14656,43 |
| **Low** | 16081,75 | 15536,92 |

**Table 4.** Mean Reaction Times by Attachment Selection and Condition*

| Attachment | Default Condition | Semantic Condition | Pause Condition | No Pause Condition |
|---|---|---|---|---|
| **High** | 19401,84 | 22335,18 | 12106,37 | 10555,68 |
| **Low** | 20017,32 | 20888,26 | 10519,84 | 11539,46 |

Note: * In milliseconds

Bilinguals take longer to decide on a high attachment while learners take longer in deciding on a low attachment. As for conditions, in the no pause condition low attachment (the non-favoured by the condition option) takes longer, while in the pause condition (which favours low attachment) high attachment takes longer.

A regression model was performed to search for significant effects of independent variables, their levels, and their interactions. Table 5 summarizes the results showing the model contributing variables, variables levels, and interactions and their significance levels:

**Table 5.** Regression Model Results for Reaction Time

| Variables & Interactions | t value Pr(>\|t\|) |
|---|---|
| No Pause Condition | 0.000191*** |
| Pause Condition | 0.010259* |
| Semantic Condition | 0,277102 |
| Learners Group | 0,975841 |
| Low Attachment | 0,280058 |
| No Pause: Learners | 0.003167** |
| Pause: Learners | 0.007876** |
| Semantic: Learners | 0,086646 |
| No Pause: Low Attachment | 0,726766 |
| Pause: Low Attachment | 0,448957 |
| Semantic: Low Attachment | 0,579811 |
| Learner: Low Attachment | 0.04469 |
| No Pause: Learner: Low Attachment | 0,94608 |
| Pause: Learner: Low Attachment | 0,965136 |
| Semantic: Learner: Low Attachment | 0.086646 °° |

*Note*: Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '°°' 0.1 '°' 1 Residual standard error: 0.4406 on 572 degrees of freedom Multiple R-squared: 0.3723, Adjusted R-squared: 0.3559

The most significant difference is for the no pause condition, which takes significantly shorter than the other conditions. The next most significant differences happen only in the learners group. Learners take significantly shorter to decide in an attachment than bilinguals for both the pause and the no pause conditions, that is, for the auditory stimuli that use prosodic cues. Finally, the pause condition takes significantly shorter than the other conditions but no pause, and for learners it takes shorter to decide on the attachment when the selection is low attachment.

## 4 DISCUSSION

Results reveal that there is no a particular preferred option in the silent reading experiment for any of the groups. However, prosodic cues are taken into account and a lack of pause makes speakers prefer the high attachment. The pause after the NP1 tends to encourage the low attachment, but more so in the learner group, that hence seems more sensitive to prosodic cues such as the pause. The preferences do follow Fodor's predictions, as we expected, but bilinguals do not follow the prediction in the pause condition: they still prefer a high attachment. The preferences are in consonance also with Fromont, Biau and Soto-Faraco's (2010) results.

The only significant differences between bilinguals and learners occur in their reactions times. First, in general, written conditions took longer than oral ones. Participants in the experiments did comment informally, after the experiment was completed, on how Experiment 2, with the prosodic cues, was easier. Experiment 1 felt more difficult and they comment how "in some cases" it could be both (probably the experimental conditions vs. the distractors which were not always ambiguous), while in Experiment 2 they did not feel there were two possible answers.

It is also interesting to note that the no pause condition took the shortest. This is the condition that significantly favors opting for a high attachment, as if a high attachment would feel more natural.

The most puzzling result is that learners take significantly shorter than bilinguals to decide on an attachment with the oral stimuli (or that bilinguals take significantly longer than learners). Now, as we can see from the comparison of their preferences to those of bilinguals and monolinguals, learners seem to have already internalized the Spanish moderate preference for high attachment and therefore probably use already the default phrasing for Spanish in their silent reading. So why then are bilinguals slower in deciding? There are at least two possible explanations for this.

One possibility is that bilinguals take longer because they are sorting out between their two languages prosodic strategies. As we saw in the introduction, transfers do occur with longer term bilinguals or those surrounded by their non-dominant language. Also, in some cases (De la Cruz-Pavía, 2010), bilinguals have a harder time producing prosodic boundaries or they are less clear than those of monolinguals.

Another possibility is that, although all subjects were told to just try to remember the audio stimuli and not reproduce them mentally themselves, bilinguals are more able to remember the whole sentence and they still rehearsed it in their heads, which would slow them down. There is a relatively big difference in reaction times, average difference in oral stimuli being 3770 milliseconds, perhaps too big for just a delay due to sorting between prosody strategies, a more unconscious process, and as such, possibly faster than a mental rehearsal of the stimulus. The result of a (non significant) preference for high attachment in the pause condition as well in bilinguals does point in the direction of a rehearsal of the stimulus that sometimes could have lead to the use of the default phrasing that favors slightly high attachment for the case of Spanish.

It is also possible that both accounts are true, that is, that in order to sort for a language prosodic strategy, bilinguals have to rehearse the sentence in that language, particularly in a more tense situation such as an experiment, and that it is this that slows bilinguals processing.

## 5 CONCLUSIONS AND PEDAGOGICAL IMPLICATIONS

It seems that bilingualism and perhaps language contact slows down processing of ambiguities and application of prosodic disambiguation strategies. Language attrition and language transfer can happen then also at the prosodic level, showing the permeability of a language system at all levels.

Future research projects should control for age and compare with monolinguals reaction times. The bilingual group in this study was older –and ages more varied– than learner group. This could have had a slowing effect. Likewise, a comparison with monolinguals could confirm that bilinguals do have slower reaction times due to sorting between two languages and not other factors like rehearsing or age of participants. Finally, participants could be asked after the test if they rehearsed the stimuli in their heads.

We saw in the introduction how the inclusion of prosody is seeing a revival in language pedagogy. Two main reasons were pointed out: (i) the importance of prosody to be not just communicatively effective, but to achieve a better socially fit competence; and (ii) the important role that prosody played in sentence parsing. This study looks especially at the second reason, as prosody aids disambiguation in some contexts but in different ways in Spanish and English. Should we teach these different default phrasings?

Prosodic cues are used by both bilinguals and learners to process ambiguity. At the advanced stage of learning Spanish as an L2, the default phrasing for restrictive RCs seems to have been acquired already. Therefore, the place for teaching default phrasing strategies and other prosodic differences between L1 and L2 seem to be earlier stages in the learning process. These results are parallel to those of Frenk-Mestre (1997, 2002).

According to present results and Frenk-Menstre's previous results, students have acquired the L2 default phrasing without explicit instruction at the more advanced levels. In Frenk-Mestre's studies, the advanced students were even less advanced than in the present study and still had acquired the target default phrasing for French, despite having received no explicit instruction on it. In contrast, heritage bilingual speakers, although behaving like monolinguals and advanced learners regarding preferred interpretation, take longer to choose, particularly for the spoken stimuli. Although this difference does not necessarily translate into comprehension problems or an interference of English in the usual interpretation for Spanish, it does point out to a possible incipient presence of the English default phrasing in the processing. Further studies would need to be conducted, but prosody practices would be advisable, even starting in the first generation, certainly for 2nd and subsequent immigrant generations as they are more likely to request instruction in the Spanish language.

The present study illuminates a little bit more the issue of to whom and when to teach certain more subconscious prosodic phrasings. It does not propose, however, how to teach it. Its teaching is particularly difficult given the very implicit and automatic nature of the phenomenon. One possible route is to make speakers aware of the phenomenon. In advanced courses it would be possible to use graphic representations of pauses and prosodic contours, explaining the associated meaning with each type. Another possible route in lower level courses would be to practice these implicitly, possible when talking of relative clauses. Further experimental studies using both methods are needed before we can draw any conclusions on the how of teaching default phrasing. For now, we can conclude that it is best taught earlier on, or acquired naturally at more advanced stages, and that it may be beneficial to slow down language attrition at the phonological level for bilinguals very early on in their contact with another language.

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