

# LEXICAL EFFECTS IN THE USE OF WORD-LEVEL STRESS FOR WORD RECOGNITION BY ENGLISH AND KOREAN LEARNERS OF SPANISH

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## ABSTRACT

The reliance on suprasegmental information for word recognition varies among languages: While Spanish uses only suprasegmental cues to word-level stress (e.g., *PAPA* ‘potato’ vs. *paPÁ* ‘father’), English uses both segmental and suprasegmental cues (e.g., *REcord* vs. *reCORD*), and Korean does not have lexical stress. Unclear is whether L2 learners of Spanish can make use of suprasegmental cues to recognize stress and how lexical information influences word recognition. Advanced English and Korean L2 learners of Spanish completed a cross-modal word-identification task. They heard semantically ambiguous sentences that ended with incomplete fragments, and they were asked to choose the word corresponding to the fragment heard. Results showed that all learners can make use of stress as a cue for word recognition, but Korean learners seem to be more influenced by their L1 prosodic structure. While other analyses are undergoing, L2 proficiency has shown to lead to more native-like results.

**Keywords:** Second Language Acquisition, Spanish, Suprasegmental information, Word-level stress, Word recognition.

## 1. INTRODUCTION

The reliance on suprasegmental information for recognizing words in speech varies depending on the listeners’ language background. For example, since Spanish has word-level stress and does not have vowel reduction, suprasegmental information is used to distinguish among competing lexical words, in both minimal pairs (e.g., *PAPA* ‘potato’ vs. *paPÁ* ‘father’), and temporarily overlapping pairs (e.g., *peLOta* ‘ball’ vs. *peLoTÓN* ‘platoon’) (e.g., Soto-Faraco, Sebastián-Gallés, & Cutler, 2001). Like in the case of Spanish, English has word-level stress, but it also has vowel reduction, with most minimal pairs not being segmentally ambiguous (e.g., *REcord* vs. *reCORD*) and with temporarily overlapping, segmentally similar pairs being less common (e.g., *MYStery* vs. *misTAKE*). Accordingly, while native speakers of Spanish heavily rely on suprasegmental cues for word recognition, native English listeners make limited use of these cues for recognizing English words (e.g., Cooper, Cutler, & Wales, 2002; Tremblay, 2008). Interestingly, Korean is a language without word-level stress. However, previous findings on their perception of English word-level stress indicated that Korean listeners pay more

attention to vowel reduction (not existing in Spanish) than suprasegmental cues (e.g., Lee, 2015).

The current study aims to investigate whether English and Korean listeners at advanced proficiency level in L2 Spanish would make use of stress for word recognition in Spanish, and whether they will make similar use of suprasegmental cues to stress as native Spanish listeners. Furthermore, the study also aimed to see whether the presence of stress (a ‘positive’ cue) and the absence of stress (a ‘negative’ cue) similarly constrain word recognition in all groups (Altenberg, 2005) and how the effect may be modified by lexical information (such as word frequency or word familiarity).

## 2. METHODOLOGY

### 2.1. Participants

Thirty-two ‘late’ English-speaking L2 learners of Spanish and 32 ‘late’ Korean-speaking “L2” learners of Spanish (most of which self-reported having an advanced level of proficiency in English) participated in the study. Both groups of learners had an intermediate-to-advanced proficiency in Spanish and were matched in most individual variables (such as age of acquisition or years of instructions).

Finally, 32 native Spanish speakers (bilingual in Valencian and Spanish) were included as a control group.

## 2.2. Procedure

The experiment was administered using Paradigm (Perception Research Systems, Inc., Tagliaferri, 2005). All the groups completed a cross-modal word-identification task (adapted from Cooper, Cutler, & Wales (2002); Soto-Faraco, Sebastián-Gallés, & Cutler (2001); Tremblay (2008)). Participants heard non-constraining auditory sentences that ended with two-syllable word fragments (e.g., *Elena dijo peLO...* ‘Elena said peLO...’) presented in two possible conditions. In the stressed condition, the fragments were stressed on the penultimate syllable (e.g., *peLO-*); in the unstressed condition, the fragments were unstressed (e.g., *pelo-*). Participants were asked to choose the word corresponding to the fragment on the screen (e.g., “*peLOta*” ‘ball’ vs. “*peloTÓN*” ‘squad’). All fragments belonged to words that follow regular stress patterns in Spanish and no visual information regarding the stress placement was used, other than the regular diacritics.

After the main test, participants also completed a background questionnaire, a word-familiarity test, and a proficiency test.

## 2.3. Stimuli

Twenty-four experimental stimuli were created and distributed into four lists in a counterbalanced way. All of the experimental items were trisyllabic words with ‘regular’ stress placement (Harris, 1967). Words with penultimate stress (stressed fragment) and final stress (unstressed fragments) were matched in terms of lexical frequency. An example of the two conditions can be seen in Table 1.

**Table 1:** Example of an experimental trial in the two stress conditions (underlined is the correct response).

AUDIO	WORD CHOICE	
<b>Stressed Fragment</b>		
🔊 peLO-	<u>pelota</u>	pelotón
<b>Unstressed Fragment</b>		
🔊 pelo-	pelota	<u>pelotón</u>

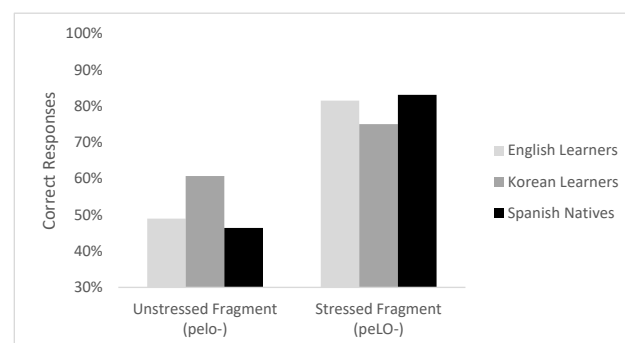
The experimental task also included 36 filler items, in which the difference between the two potential target words was segmental rather than suprasegmental (e.g., *balido* ‘bleat’ vs. *batido* ‘shake’).

## 2.4. Data Analysis

Participants’ accuracy was analyzed with logit mixed-effects models (cf. Baayen, 2008). A first model on participants’ results included the following fixed variables: group (Spanish vs. English L2 Learners vs. Korean L2 learners; baseline=Spanish), type of fragment (stressed vs. unstressed; baseline=stressed), and the interaction between the two variables. Subjects and trial were used as a random effect. As a post-hoc analyses, three additional models on the learner group’s accuracy results were conducted. In these analyses, either the proficiency scores, the log-transformed frequency of the competitor word, or the log-transformed word familiarity ratings of the L2 learners were entered as independent variables. Both models included participant and test item as crossed random variables.

## 2.5. Results

Figure 1 presents the percentage of correct responses of the three groups in each of the two fragment type conditions (unstressed and stressed).

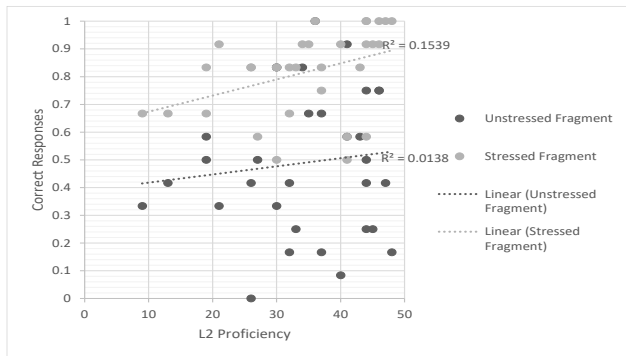


**Figure 1:** Accuracy results of the cross-modal word-identification task.

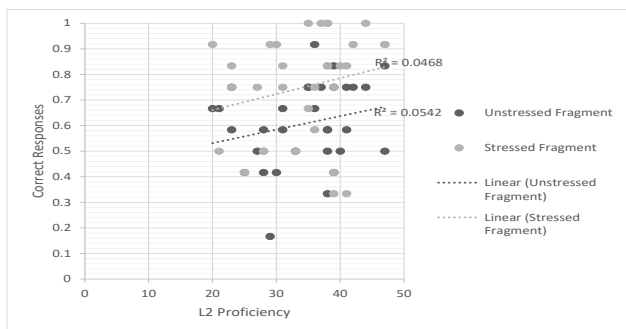
A first logit mixed-effects model revealed a main effect of fragment type, showing that the stressed fragment received, overall, more accurate responses; a main effect of group, indicating that the Korean learners patterned differently with respect to the other two groups (native speakers and English learners); and a stress by group interaction, showing that the group effect varied depending on the stress fragment type. While Korean learners were more accurate in the unstressed fragment condition, as compared with the other two groups, they showed the reverse pattern (being less accurate) in the stressed fragment condition.

A second logit mixed-effects model, on only the L2 learners’ data and including proficiency, revealed a main effect of fragment type and proficiency and a significant interaction between fragment type and group, as well as between fragment type and

proficiency. As can be seen in Figures 2 and 3, these results indicate that, while learners were better at using word-level stress for word recognition with increasing proficiency in Spanish, this effect was in general stronger for the Korean learners (similar effect for both fragments types) and, among the English learners, it influenced more positively the stressed fragment than the unstressed fragment.

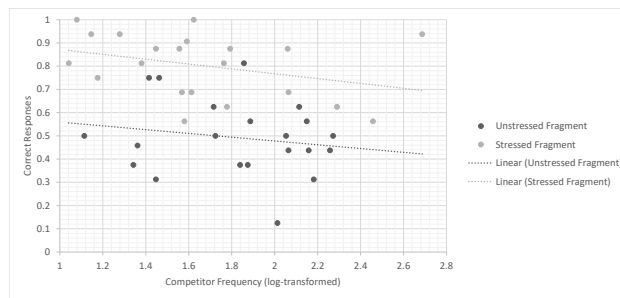


**Figure 2:** Correlation between accuracy results of English learners and L2 proficiency.

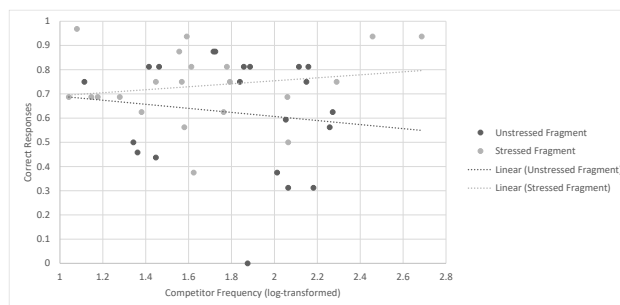


**Figure 3:** Correlation between accuracy results of Korean learners and L2 proficiency.

A third logit mixed-effects model, on only the L2 learners' data and including the log-transformed frequency of the competitor word, revealed a main effect of fragment type, a main effect of frequency and an interaction between fragment type and group. As can be seen in Figures 4 and 5, these results indicate that, the more frequent the competitor word is, the less accurate participants are (there is a tendency for them to choose the competitor word over the target word). However, this effect reverses in the stressed fragment condition (Korean learners), where the frequency of the competitor word increases the likelihood of selecting the correct target response. However, there is not an interaction with frequency. That is, the fragment type differs between the two groups, but this effect is not influenced by the frequency of the competitor word.



**Figure 4:** Correlation between accuracy results of English learners and competitor frequency (log-transformed).



**Figure 5:** Correlation between accuracy results of Korean learners and competitor frequency (log-transformed).

### 3. GENERAL DISCUSSION AND CONCLUSION

The current study aimed to explore whether English and Korean listeners at an advanced proficiency level in L2 Spanish could make use of suprasegmental cues to stress for word recognition in Spanish and how lexical information (such as competitor frequency or word familiarity) may modify this effect. The results of this study indicate that the three groups showed a similar pattern in the word-identification task: The overall accuracy is overall higher in the stressed fragment condition than unstressed condition. That is, stressed fragments similarly constrain lexical access, while unstressed fragments showed a smaller effect for all three groups. Thus, these L2 learners appear to rely on similar mechanisms as native speakers for recognizing Spanish words.

These results are in line with previous findings showing that L2 learners can show sensitivity to stress cues for word recognition (for studies on English learners of Spanish, see: Martínez-García, Van Anne, Brown, R., & Tremblay, n.d.; for studies on Korean learners of English, see: Kwon, 2016; Lee, 2015). Moreover, the evidence for L2 learning is further reinforced by the proficiency effects reported in the study. Learners show increased sensitivity to stress as their proficiency in L2 Spanish increases. This suggests that English- and Korean-speaking L2

learners of Spanish can use Spanish stress when recognizing Spanish words. Thus, these L2 learners appear to learn to use suprasegmental cues for word recognition, at least as measured by the word identification task.

However, it is important to keep in mind that other possible interpretations of the results may exist. For example, while it is possible that learners show sensitivity to the greater acoustic saliency of the stressed fragments (that is, that learners have learned to use suprasegmental cues to stress for word recognition in a similar way as native speakers of Spanish), it is also possible that the results obtained are identifying learners' sensitivity to other types of information (or a combination of factors). As preliminary explored in the current study (considering that the word familiarity results have not yet been analyzed), learners seem to also be sensitive to lexical information (their pattern of results interacted with the frequency of the competitor word). Thus, further studies should explore how the frequency of the words and/or of that specific stress pattern or even other variables (such as the amount of lexical competition generated) explain the way in which learners use suprasegmental cues to word recognition in L2 Spanish.

Interestingly, while the three groups showed a similar pattern of results, the absence of stress cues (the unstressed fragment) affected the 3 groups differently, such that the Korean learners were more accurate in the unstressed condition than any of the other two groups, and that the proficiency effect was smaller for the English learners than Korean learners in this specific condition. One of the possible interpretations of this different pattern is related to the Korean prosodic structure (Kwon, 2016; Shin & Speer, 2012). Korean learners have a preference towards unstressed fragments, because they match the preferred High-Low (HL = trochaic) pitch pattern in Korean. Since Korean learners' L1 only allows for trisyllabic words to have HL or Low-Low (LL) pitch pattern, they seem to be transferring this preference towards the stress fragment that follows a similar structure.

While future studies still need to explore variables such as how lexical knowledge (e.g., word familiarity) influences online word recognition or how the specific properties of the L1 affect the use of suprasegmental cues, this is one of the first studies to investigate and compare how two groups of learners of Spanish (English-speaking and Korean-speaking learners) make use of suprasegmental cues to stress during word recognition in an almost native-like manner and how this effect seems to be partially modulated by lexical information.

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