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Instruction Type and Online Tasks in the Acquisition of L2 Phonology: Preliminary Findings

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Abstract

This study examines which type of instruction (explicit/implicit) yields target-like second language (L2) phonology. With the incorporation of speech perception exercises outside the classroom and explicit instruction in class, the production of target-like L2 phones is expected. Participants were students of 'Intermediate Spanish Conversation' at Penn State University. Tasks targeting coda [l] were completed by all subject groups. Comparative analysis of phonetic data from experimental groups receiving both explicit instruction and online perceptual input shows significant increase in target-like production of less velarized [l] in their L2 Spanish, apart from more accurate discrimination between L1 and L2 sounds.

Keywords: Linguistics, second language acquisition, phonology, instruction type, L2 phonology

Introduction

In the field of second language acquisition (SLA), the benefits of explicit and implicit instruction have been the focal points of several bodies of literature. Within the domain of L2 morphosyntax, some research has found that explicit explanation is unnecessary (Sanz & Morgan-Short, 2004; Van Patten & Oikennon, 1996; Wong & Van Patten, 2003) but other research has shown that explicit instruction may be beneficial (Schmidt, 1995). However, during the actual phonetic production of language, it is not only the ungrammaticalities of the utterances that are noticed by native speakers of the said language, but also the 'accentedness' (Magen, 1998). In fact, research in the field of speech perception indicates that listeners can detect foreign accent in their native language in segments as short as 30 ms (Flege, 1984). Studies with regard to L2 phonology have also noted a general lack of discussion of L2 sounds in the classroom (Lord, 2010; Elliot, 1995b). If foreign accent is so noticeable, why is it not discussed at earlier levels of language instruction? The current study aims to shed further light on this issue, manipulating instruction type and other variables discussed in the literature on L2 phonology. Assessments are made by acoustic data (as opposed to judgments by native speakers). This study was carried out during an undergraduate level Spanish language conversation over the course of one academic semester. With the manipulation of instruction type and other variables, such as online speech perception tasks, approximation to target forms is expected. Furthermore, the study aims to have no impact on an existing course program.

L2 Phonology and Instruction Type

Within the realm of acquisition of L2 phonology, effects of type of instruction have shown varied results (Elliot, 2003). The current study examines this issue; which type of instruction (implicit vs. explicit) is more beneficial in the acquisition of L2 phones, providing significant empirical phonetic data.

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Furthermore, if metalinguistic explanation and perceptual input can be provided online, it will be easier to address L2 sounds in the beginning levels of language learning. Any program can adopt the methods used, holding vast pedagogical implications.

A survey of recent literature specific to L2 phonology indicates that explicit instruction, along with metalinguistic explanation (i.e. theory, discussion of articulatory phonetics) aids in the target-like production of L2 sounds (Lord, 2010; De Wilde, 2009; Huthaily, 2008), as opposed to the debate in morphosyntax. This may be due to the fact that L2 phonology has a neuromuscular basis and thus is more constrained by the critical period than other language skills (Elliot, 2003; Scovel, 1988). If it is more constrained and thus more difficult to master, explicit instruction (herein EI) may not only be necessary, it may be crucial. Findings by Saito (2013) correspond with this notion, also indicating EI of L2 sounds facilitates target-like production of items in new contexts.

With respect to speech perception and speech production, several studies indicate that exposure to perceptual input alone aids in the production of (L2) speech (Botero, 2012b; Bradlow et. al., 1997; Counselman, 2010; Flege, 1995; Rvachew et. al., 2004; Wang. et. al., 2002). With these implications, if speech perception based tasks are also provided to the L2 learner online and are required for homework, this will aid to improve their L2 production skills, and there is no infringement on the set grammar-based curriculum.

Experimental Design & Methods

This study took place during the spring 2008 academic semester at Pennsylvania State University. Two sections of an intermediate-level Spanish conversation course were divided into three experimental participant groups (n=40). For an eight-week period, Group A received 15 minutes of EI of Spanish phonetics and phonology in class per week accompanied with perception based tasks and metalinguistic explanation online. Tasks focused on the non-velarized coda [l] of L2 Spanish. The second group (Group B) received only EI in class with additional metalinguistic explanation online, and the third (Group C) served as the control. The following table summarizes the participant groups.

Table 1: Summary of Participant Groups

Group	**Method of Instruction**
A (n=13)	EI, online tasks (perception, metalinguistic explanation)
B (n=12)	EI (metalinguistic explanation, online)
C (n=15)	Control

With respect to phonology, the English and Spanish sound systems have some differences that are often difficult for the L2 speaker (of either language) to master. The one under focus in this study is the velarization of the syllable-final [l], rendering the 'darkened' sound [ɫ] (Ladefoged & Maddieson, 1996). English and Spanish differ with respect to the distribution of this velarized allophone. As noted, it is observed in the coda position of the syllable in various contemporary varieties of English (Giegerich, 1992). In the majority of dialects of Spanish this sound is generally not a part of the allophonic inventory (Harris, 1969; Lipski, 1994; Núñez Cedeño & Morales-Front, 1999).

The degree of velarization is easily measured by spectral analysis in the frequency of the F2 formant. Generally, the 'lighter' non velarized phone will have an F2 of approximately 1200 Hz, while the 'darker' velarized variant tends to have a lower F2 of approximately 800 Hz (Ladefoged, 2003; Martínez-Dauden & Llisterri, 1991). Since the degree of velarization is easily measureable and different between English and Spanish, it is the acoustic property under discussion.

At the beginning of the semester, all participants came to the phonetics lab in Moore building to complete necessary paperwork (IRB consent), after they completed the Boston naming task (Kaplan et. al., 1983), language history questionnaire (Marian et. al., 2007), and the PAI (Elliot, 1995a). They then completed a pretest consisting of three (3) blocks of tasks in Spanish. The first block was a warm-up (recorded but not analyzed) word-naming task using E-Prime® software. The second block was identical to the first; a word naming task containing 110 items with [l] in the coda position. The third block was identical to the first two, but it was carried out while completing a simultaneous arithmetic task (not under discussion in this article).

These blocks were recorded and digitally analyzed using Praat (Boersma & Weenink, 2013) software. This assessed their Spanish pronunciation and served as the baseline against which the effect of the training exercises was measured. This session is herein known as the pretest. For an eight-week period, Groups A and B received fifteen minutes of EI of Spanish phonetics during class. EI consisted of pronunciation drills, articulatory description, and elementary phonological theory. There was no sacrifice to the already established curriculum of the conservation course. Group A was also provided with additional audio clips (via the online course management system ANGEL of Penn State) of the distinctive sounds between English and Spanish. The audio files were approximately 250 ms in duration. Along with the audio files, the students were provided with an additional document giving additional information (metalinguistic explanation, explicit articulatory explanation) on the difference in velarization of [l] in English and Spanish. Group B was provided with only additional metalinguistic explanation online.

Results

For the said eight-week period, all participants completed weekly sets of speech perception exercises. Each task consisted of twenty questions in which the participant had to decide if the sounds (given in corresponding .wav files) were English or Spanish. At the end of the eight-week period, all participants returned to the phonetics laboratory to complete the posttest, which consisted of the identical word-naming task of the pretest. Recordings from the pretest and posttest were compared to assess improvement (or lack thereof) in the production of the target Spanish sounds. The speech perception results of Group A are noted below in Figure 1.

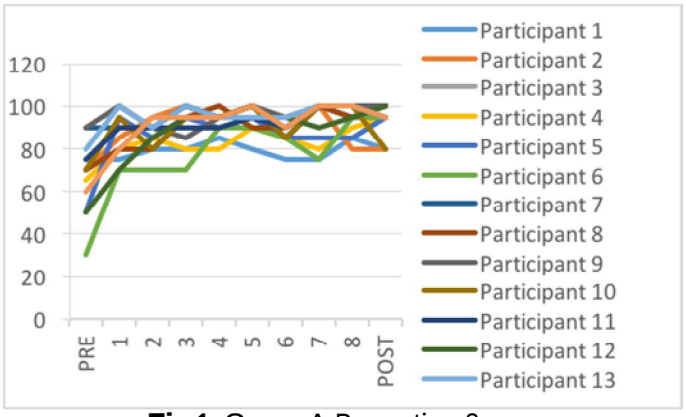

Fig.1. Group A Perception Scores

It is noted that in Group A, scores range between 30 and 90 percent correct speech discrimination abilities before completing the first weekly online tasks. After the being provided with EI, audio (perceptual) examples online, as well as metalinguistic explanation, scores in the first week rise dramatically from 70 to 100 percent. The perceptual abilities of Group B are seen below in Figure 2.

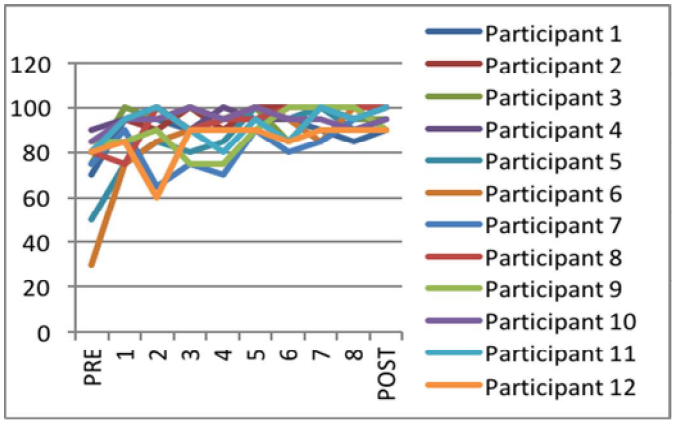

Fig.2. Group B Perception Scores

Above we note that there is significant improvement, but not like the pattern observed in Group A. Scores again range from 30 to 90 during the pretest, but after week two scores still range from 60 to 100. Not until week 5 do we see all scores ranging from 90 to 100. The perceptual abilities of both Groups A and B did improve drastically when compared to the control group seen in Figure 3.

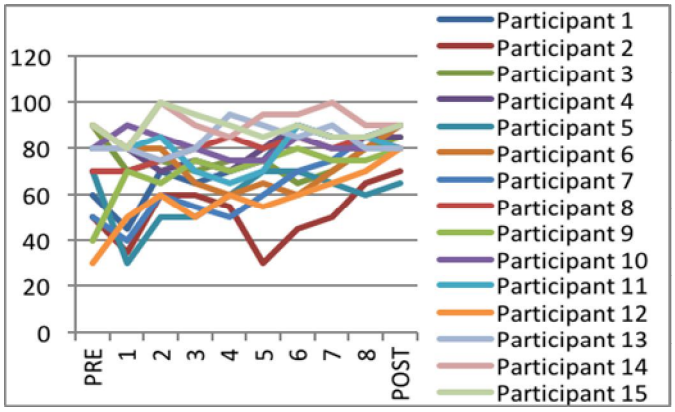

Fig.3. Group C Perception Scores

With regard to L2 speech production during the word naming tasks of the pretests and posttests, Group A's abilities do improve after the eight-week period, seen below in Figure 4. It is noted that the mean F2 frequency of coda positioned [l] is 849.7 before being exposed to EI, perceptual input and metalinguistic explanation, which corresponds to a more velarized phone. During the posttest production of the L2 phones improves to 1004.4, corresponding with a lighter, non-velarized allophone.

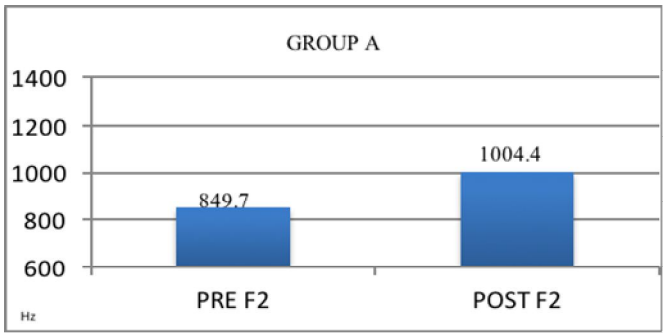

Fig.4. Group A Mean Production Scores

Perhaps surprisingly, we note that the production abilities of Group B are very similar to those of Group A. Referring to Table 1, we note that the only difference between these two groups is the exposure to perceptual input. However, Groups A and B both make significant L2 production improvements when compared to the control group, seen in Figures 5 and 6.

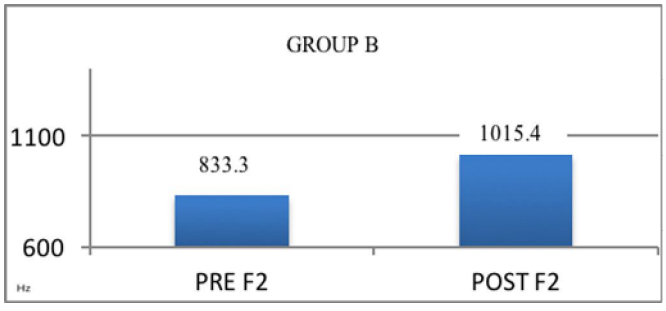

Fig.5. Group B Mean Production Scores

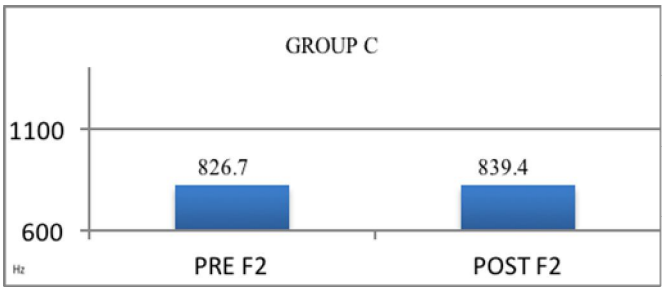

Fig.6. Group C Mean Production Scores

Of course as with many areas of research, several questions were raised upon the completion of this study, and there are also several areas in which the methodology can be improved. Perhaps one of the most noticeable shortcomings is the distribution of the variables among the participant groups. Referring again to Table 1, we note that 'instruction type', 'perceptual input', and 'metalinguistic explanation' were not directly compared. That is, there was no group that received only explicit instruction, there was no group that received only perceptual input, and there was no group that received only metalinguistic explanation. If said variables were isolated among separate participant groups, the study should yield more conclusive results.

Discussion

The study will also benefit from further statistical analyses, as well as more accurate measurements of the degree of velarization. Other studies examining the degree of [l] velarization also measure the F1 frequency as well as the difference between F1 and F2 (Davis, 2013; Recasens et. al., 1995). Further improvements can also be made by increasing the number of participants, the token list, and by also focusing on other sounds that differ between English and Spanish (such as differences in VOT of voiceless plosives, vowel quality, etc. These sounds were included in the weekly EI but that data is not included in the present study).

One of the more significant findings of this study is the similarity of both perception and production abilities between Groups A and B. Again we recall that the only differing variable between the groups was exposure to additional perceptual input online. This contradicts the various findings that speech perception alone aids the production of L2 sounds (Botero, 2012a; Bradlow et. al., 1997; Counselman, 2010; Rvachew et. al., 2004; Wang. et. al., 2002). However, the methodologies between this and said studies are quite different and thus the studies cannot be compared directly. Finally, we are able to conclude that EI and the incorporation of tasks online (perceptual input, metalinguistic explanation) do aid in the production of L2 speech sounds, without infringement upon an already set course curriculum. The methodology can be adopted by any course that aims to improve the production of L2 speech.

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