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INCORPORATING PRONUNCIATION IN THE FIRST-YEAR SPANISH CLASSROOM: AN EARLY INTERVENTION

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There is currently no consensus about the role of pronunciation instruction in beginning L2 classrooms. Trofimovich and Gatbonton (2006), and Hurtado and Estrada (2010) found that focusing on form and meaning resulted in greater improvement in the pronunciation of intermediate than beginning learners, and Hurtado and Estrada (2010), and Arteaga (2000) suggest that perceptual training could be beneficial for beginners.

This study investigates the effects of two types of instruction (Technical and Non-technical) on the perceptual abilities of beginning L2 Spanish learners. The Technical Instruction (TI) group received information on target sounds via formal phonetic explanations. The Non-technical Instruction (NI) group was aurally exposed to the target sounds and made aware of their orthographical contexts without formal phonetic explanations. Both groups completed perception activities with the target sounds. A control group of the same level received neither instruction nor perception activities. Assessments were online and consisted of a pretest, posttest and delayed posttest that measured perceptual accuracy of the target sounds.

In general, the results did not reveal a significant improvement for the groups in their perceptual development by the end of the experiment. However, there was a significant effect for instruction at the immediate posttest, in which the NI group outperformed the TI and Control groups. This effect was neutralized in the delayed posttest, which revealed no significant differences between groups. A further analysis by sound revealed gains on the vowels, voiceless stops and the grapheme 'v', which provides support for the claims of the Perceptual Assimilation Model-L2 (Best and Tyler, 2007).

As the field of second language acquisition (SLA) continues to grow and contribute important insights to the acquisition process, pedagogical approaches are being developed and modified to accommodate these findings. Researchers such as Van Patten (2004, 2007) and Swain (1995, 1998) suggest the importance of communicative and meaningful learning contexts, with Van Patten focusing on the type of input provided to learners and Swain focusing on learner output as a part of the acquisition process. Although many university-level foreign language programs acknowledge the findings of SLA and incorporate a communicative approach into their classrooms, this pedagogical method has focused more on the processing and acquisition of syntax and morphology. The aspects relating to pronunciation or the phonological system of the second language (L2) are rarely addressed in beginning-level communicative classrooms, although a certain level of accurate pronunciation is needed to achieve communicative goals. This linguistic deficit is acknowledged and discussed in several studies which attempt to examine the effectiveness of pronunciation instruction in the classroom, several of which are reviewed in the next section.

Previous empirical studies on pronunciation instruction

Various studies have incorporated phonetics instruction in L2 classrooms with positive results for both production and perception assessments, but the majority of them take place in intermediate-level (third and fourth year university level) courses. The techniques and results of several of these studies will be discussed below as well as possible modifications to make these procedures appropriate for a beginning (first year) L2 classroom.

Elliot (1997) examined the effectiveness of formal phonetic instruction for intermediate-level Spanish learners at an American university over a semester. Assessments included a pretest and posttest which included various production tasks. Participants' production was judged impressionistically by one native and two non-native speakers. Results from Elliot (1997) showed significant improvement for the experimental groups on the word reading and word and sentence repetition tasks, and improvement approached significance in the experimental participants' spontaneous speech, whereas there were no significant gains for the control group. In reference to improvement on groups of target sounds, the experimental group had significant gains on liquids and stops, and marginal gains on vowels.

Lord (2005) also used a formal Spanish phonetics course as the experimental setting. A pretest and posttest design required participants to read a paragraph from which the target forms were taken and acoustically analyzed in isolation. The treatment included instruction on technical linguistic terms, comparisons of the participants' spectrograms with those of native speakers, and oral practice. The results of the production tasks showed that L2 participants produced native-like VOTs for /p, t, k/ on the posttest (although there was not a significant gain from pre to posttest), and had significant gains from pretest to posttest on /r/, diphthongs, and the spirants [β̞, ð, ɣ].

Ausín and Sutton (2010) examined the progress of third year learners in a formal Spanish phonetics course using perception assessments. The treatment took place over a semester and used a pretest and immediate posttest design with two sections of a phonetics course. Typical class activities included explicit descriptions of target forms, transcriptions, and oral exercises. The assessment is a version of a grammaticality judgment task that was adapted to test the participants' perception based on its pronunciation, not its semantic or syntactic content. To complete the task, participants saw Spanish words on a computer screen and then heard their pronunciations twice, after which participants were asked to rate the pronunciation of the words they heard on a scale of 1 ("very bad") to 5 ("native-like"). Significant differences were found in judgments of the English-like pronunciations from pretest to posttest and for the graphemes 'z' and 'h', the spirants [β̞, ð, ɣ], word-final /l/, and the fricatives /h, v, z/.

Trofimovich and Gatbonton (2006) is one of the few studies on pronunciation instruction that included a beginning level group as a comparison to an intermediate level group of L2 learners. This study tested whether repetition and Focus on Form (FonF) and Focus on Meaning (FonM) tasks with pronunciation would show an improvement in either proficiency group. For the repetition task, the response time and judgments of the participants' spoken words revealed that they processed and pronounced repeated words faster and with more accuracy, indicating sensitivity to repetition.

This experiment used a FonF and a FonM task. To bring the participants' attention to either form or meaning, they responded to a different list of words by rating from 1-10 either the "degree of pleasantness" (p. 525) or spoken clarity of the word. Participants then repeated the word. Results

showed that the FonF task did not affect the participants' sensitivity to repetition, whereas the FonM task only affected the sensitivity of the lower-proficiency learners. Trofimovich and Gatbonton concluded that the lower-proficiency participants' results on the FonM task could be due to a mismatch between what they were attending to and producing.

The above studies all suggest a positive effect for pronunciation instruction at the intermediate level, although not on all forms or tasks elicited. Trofimovich and Gatbonton (2006) also had positive results with beginning learners, as long as they were not attending to both form and meaning. However, there were limitations in these experiments: Lord (2005) and Ausín and Sutton (2010) did not include control groups; improvement was measured differently, i.e., acoustically in Lord (2005), but with judgments in Elliot (1997) and Trofimovich and Gatbonton (2006). Also, the targeted modality used to gauge improvement was production for all studies except Ausín and Sutton (2010). However, studies such as Chela-Flores (2001), and Arteaga (2000) suggest that perception should precede production activities at the beginning level, with Arteaga (2000) advocating nontechnical linguistic explanations, and Chela-Flores (2001) proposing a more embedded and meaningful context for the instruction. The current study addresses these concerns by incorporating perceptual activities in a beginning L2 classroom, while using both technical and non-technical forms of instruction to determine its effects on learners.

The following research questions motivate the present study:

1. Is pronunciation instruction beneficial for the perceptual development of beginning Spanish learners?
2. Does the type of instruction (technical or non-technical) have an effect on learners' perceptual development and accuracy in Spanish?
3. Will beginning L2 learners' perception improve more on certain sound groups than others?

METHOD

Participants

The participants in this study were students in three sections of a second-semester Spanish class at Florida State University. The language history questionnaires (Appendix A) revealed that all participants were born in the United States and native speakers of English. No participants reported being bilingual or speaking a language other than English at home. The three sections were divided by type of instruction: one section (n= 19) received technical pronunciation instruction (TI); one section (n= 17) received non-technical pronunciation instruction (NI); one section (n = 17) received no pronunciation instruction and served as a control group (C). Both instructors were graduate students studying Spanish linguistics.

Treatment

The treatment started in the experimental sections after a pretest was administered to all sections. One topic was taught each week for ten minutes over ten weeks. A full schedule of topics can be found in Appendix B.

In the TI group, the target sounds were explained in terms of their manner and place of articulation with linguistic terms that were defined in class. Animated vocal tract diagrams[1] were also used. Participants were also encouraged to think about how these sounds compared with similar English sounds, and the instructor explained common pronunciation errors made by native English speakers. In the NI group, the instructor demonstrated the target sounds orally and then exemplified these sound in the contexts of real Spanish or English words. After the explanation of the target sounds, both experimental groups completed a perception activity that included listening to recordings of discrete Spanish words and answering questions based on what they heard. Types of activities usually had six to eight questions and included *picture identification*, choosing between a target and non-target like Spanish pronunciation, or *identifying* a speaker's regional dialect. The control group received neither instruction nor perception activities. All the groups (including the control group) received input from their normal class assignments, which included activities where learners must listen to and understand audible speech in order to answer questions.

Assessment

The participants' perception was tested with three perception tests: the pretest (administered before the treatment began), the immediate posttest (one week after completing the treatment), and the delayed posttest (four weeks after the treatment). Each test contained a total of 240 items divided into two blocks. Each test lasted about 20 minutes. Of the 240 total items, 80 were fillers. During the tests, the participants saw a written Spanish word for two seconds before hearing its pronunciation. There were no repetitions. Participants were then asked the target question, "*Was this word pronounced correctly*?" or the filler question, "*Have you heard this word before*?" Participants then used a response pad to press either 'yes' or 'no', with no time limit. It is important to mention that all items used were Spanish words selected from the textbook used in the participants' class (VanPatten, Leeser, & Keating, 2011). All items used were recorded by native Spanish speakers in both a target and non-target like condition (see Appendix C for a detailed description of the non-target like items), which were counterbalanced across blocks. The native Spanish speakers included both male and female graduate students from various regional dialects in order to provide a balance of genders, dialectal features, and also to mimic the variation present in the learners' normal homework assignments[2].

Data Analysis

Participants' accuracy means were analyzed with a 3 x 3 ANOVA with Group (TI, C, NI) as a between subjects variable, and Test (pretest, posttest 1, posttest 2) as the within subjects variable. Three participants who demonstrated performance at random in the tests (scores lower than 55%) were excluded from the analysis, as well as two participants who were not present for all assessments. There were 48 participants in total. (Note: Five participants in the TI group did not complete the posttests and are excluded from the analysis.)

[1](http://www.uiowa.edu/~acadtech/phonetics/spanish/frameset.html)

[2] All sections of this course had an on-line homework component, which included listening activities that were recorded by male and female speakers of various dialects.

RESULTS

Table 1 presents the descriptive statistics for each group and test. The ANOVA revealed no significant effect for group, $p = .259$. There was a significant main effect for test, F (2, 90) = 65.3, $p < .001$, with the highest perception accuracy percentage in the immediate posttest. There was also a test × group interaction that approached significance, F (4, 90) = 2.4, $p = .054$.

Table 1
Descriptive Statistics for Pretest and Posttests by Group

		Pretest		Posttest 1		Posttest 2	
Group	***N***	*M*	*SD*	*M*	*SD*	*M*	*SD*
1 (TI)	14	63.3	8.9	69.3	5.9	64.2	6.2
2 (C)	17	62.4	4.4	68.8	4.4	63.9	4.8
3 (NI)	17	64.1	4.6	75.1	5.7	64.3	6.1

The test × group interaction was analyzed using a test of simple main effects with Bonferroni adjustment for multiple comparisons. Pairwise comparisons for the interaction revealed that, on the immediate posttest, the non-technical group (NI) significantly outperformed the control (C), $p = .020$, and the technical groups (TI), $p = .050$. No significant differences were found between the groups in either the pretest or the delayed posttest. The ANOVA also revealed that all three groups made significant gains from pretest to immediate posttest, $p < .001$; however, the gains were not sustained in either group by the time the delayed posttest was administered, $p < .001$ (see Figure 1).

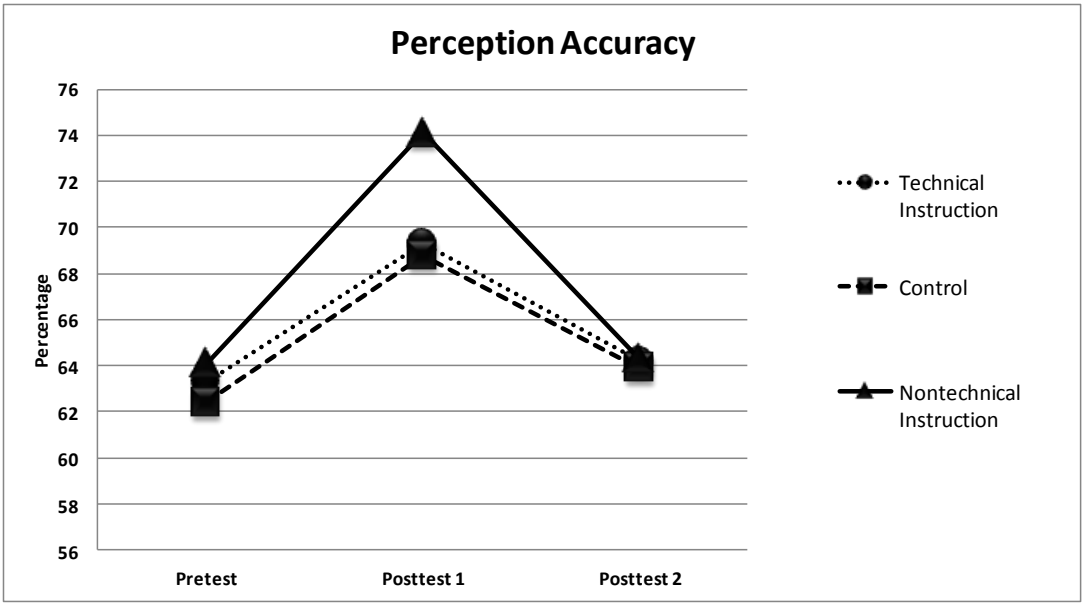

Figure 1. Accuracy in perception test by group.

A repeated-measures ANOVA with Sound (see Table 2 for the sound list), Condition (target or non-target like), and Test (pretest, posttest 1, posttest 2) was also performed to explore whether specific groups of sounds improved with the treatment. The analysis revealed a significant main effect for test, F (2, 90) = 76.49, p < .001, sound, F (11, 484) = 75.58, p < .001, and condition, F (1, 45) = 689.75, p < .001. There was no significant effect for group, p = .367. There were several significant interactions between sound, condition, test, and group, which are summarized in Appendix D. Relevant to this paper is the test × sound interaction, F (22, 968) = 16.29, p < .001, which was analyzed further with an analysis of simple main effects (Bonferroni adjustment).

Pairwise comparisons for the test and sound interaction showed significant improvements from pretest to immediate posttest for eight of the twelve sound groups tested. A summary is displayed in Table 2.

Table 2
Pairwise Comparisons from Pretest to Posttest by Sound

Sounds	**Pretest** ***M***	**Posttest 1** ***M***	**Mean Difference**	***SE***	***P***
Vowels	67.8	58.1	-9.7	1.6	< .001
Diphthong/Hiatus	59.8	67.4	7.7	2.1	= .002
/p, t, k/	52.4	65.2	12.7	1.4	< .001
Vibrants[3]	59.1	59.6	0.6	1.4	= 1.000
Laterals	69.1	88.8	19.8	2.5	< .001
Nasals	72.3	78.1	5.7	1.9	= .016
'h', /h/	76.2	80.5	4.3	2.0	= .121
'z', /s, θ/	71.3	77.4	6.1	1.9	= .007
'v'	54.5	51.2	-3.3	2.5	= .059
[g, tʃ]	63.6	80.1	16.5	2.6	< .001
[β̞,ð,ɣ]	49.7	66.7	17.1	1.8	< .001
'y', 'll'	54.7	72.5	17.8	2.4	< .001

Pairwise comparison between immediate and delayed posttests revealed a different pattern. From immediate to delayed posttest, the groups showed significant gains on only two of the twelve sound groups tested: vowels and 'v'. There were significant losses on eight sound groups (see Table 3).

[3] The term *vibrants* refers to rhotics that are either realized as *taps* [ɾ] (simple vibrant) or *trills* [r] (multiple vibrant).

Table 3
Pairwise Comparisons from Immediate to Delayed Posttest by Sound

Sounds	**Posttest 1** ***M***	**Posttest 2** ***M***	**Mean Difference**	***SE***	***P***
Vowels	58.1	68.2	8.2	1.8	< .001
Diphthong/Hiatus	67.4	32.9	-5.6	2.0	= .025
/p, t, k/	65.2	58.6	-9.5	1.2	< .001
Vibrants	59.6	57.9	-1.8	1.6	= .834
Laterals	88.8	71.5	-17.3	2.4	< .001
Nasals	78.1	77.2	-0.8	1.7	= 1.000
‘h’, /h/	80.5	79.7	-1.4	2.2	= 1.000
‘z’, /s, θ/	77.4	71.8	-5.6	1.8	= .009
‘v’	51.2	58.3	7.1	2.3	= .012
[g, tʃ]	80.1	62.8	-19.3	2.6	< .001
[β̞,ð̞,ɣ̞]	66.7	46.7	-20.1	1.7	< .001
‘y’, ‘ll’	72.5	54.2	-18.3	2.3	< .001

The analysis of learners’ accuracy in perception also revealed significant gains from pretest to delayed posttest for /p, t, k/, $p = .027$, and a marginal effect was found for nasals, $p = .058$. All other sound groups showed no significant difference in accuracy between pretest and delayed posttest.

The two sound conditions within each of the tests were analyzed as well, and these results are shown in Table 4.

Table 4
Accuracy of Target and Non-target like Conditions by Tests

	Conditions			
	Target-like		**Non-target like**	
Test	*M*	*SD*	*M*	*SD*
Pretest	89.2	7.0	35.9	2.0
Immediate posttest	90.4	5.0	50.5	1.6
Delayed posttest	89.7	5.0	37.2	1.8

The results revealed that participants had significantly higher accuracy when identifying target-like conditions than non-target like conditions, $p < .001$, in all tests. Also, they demonstrated a significant improvement in identifying non-target like conditions from pretest to immediate posttest, $p < .001$. However, from immediate to delayed posttest, accuracy of non-target like conditions declined significantly, $p < .001$. This is displayed in Figure 2.

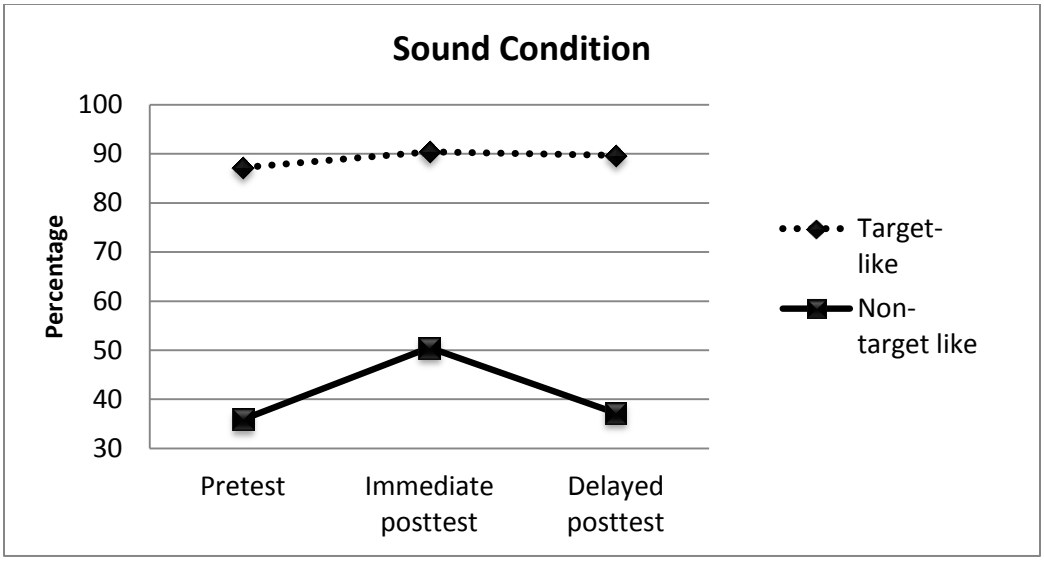

*Figure 2.*Accuracy in perception test by sound condition.

To summarize, the results suggest that all three groups improved from pretest to immediate posttest on their perception of non-target like sounds. On the immediate posttest, the NI group outperformed the TI and the Control groups. The Sound analysis revealed that there was significant improvement in the participants' perception of eight of the twelve target sounds examined from pretest to posttest (diphthong/hiatus, laterals, /p t k/, nasals, [ɡ ʧ], [β̞ ð ɣ], 'z'/s θ/, and 'y''ll'). From pretest to delayed posttest, only two sound groups showed improvement (vowels, 'v'). The analysis also revealed that the improvement in perception was mainly in the identification of non-target like sounds compared to target-like sounds. The improvement in perception ability was not sustained by any of the groups by the time of the delayed posttest was administered.

DISCUSSION

In this study, the groups showed significant improvement on the perception task from pretest to immediate posttest, regardless of instruction. This seems to suggest that the type of input provided to the three groups during the language class was sufficient to draw the learners' attention to different types of sounds. It is possible that the input, along with these types of aural and meaning-based activities, helped the groups improve their perceptual abilities. However, the groups also showed significant losses from delayed to immediate post-tests, suggesting an effect for time for all three groups or a more universal U-shaped learning trend, in which the delayed post-test represents the valley of the skill in question.

An interesting finding is that the TI group performed just like the control group, and the NI group outperformed these two groups. These results suggests that non-technical instruction may be more beneficial in helping beginning learners improve their perception skills than technical

instruction. These results are consistent with the results in Trofimovich and Gatbonton (2006), who found that pronunciation activities that focused on *form* as well as in meaning were less successful for beginners than for higher proficiency learners. The combination of explicit phonetic forms as well as the normal meaning-based audio activities used in the TI group could have been cognitively more demanding for beginning learners who may still be in a 'meaning before non-meaning' stage of acquisition (Van Patten, 2007). On the other hand, reinforcing the normal meaning-based audio activities with more input (i.e. the contextual, non-technical examples) in the NI group could have strengthened the learners' perceptual skills by bringing their attention to the target sounds and helping them "notice" them, a construct which Schmidt's (1990) Noticing Hypothesis argues is necessary for acquisition. When the type of input was no longer available to the NI group, the improvement differential did not persist.

Another interesting finding was that although the groups showed significant gains on eight out of twelve target sounds from pretest to immediate posttest, their accuracy declined significantly from immediate to delayed posttest, resulting in sustained significant gains only for /p, t, k/, and a marginal effect for nasals, and significant immediate to delayed posttest gains for vowels and 'v'. Best and Tyler's (2007) Perceptual Assimilation Model for L2 learners (PAM-L2) posits that various factors affect the likelihood of a sound or sound group being acquired, such as L1-L2 distribution of the sound(s), frequency, or perceptual sensitivity. Several of these factors may have played a role for the overall improvement of the four sound groups that improved at the delayed post-tests. To explain, the nasal consonants /m/ and /n/, vowels, and (unaspirated) /p, t, k/ have similar distributions in both Spanish and English, making this a 'single-category' transfer process, which the PAM-L2 model considers the most optimal transfer situation. The majority of the sounds that improved at the delayed post-test are also frequent sounds in Spanish. As documented by Guirao and Jurado (1990), vowels (except /i/) and /n/ were amongst the 67.5% of all sounds measured, followed by the group that contained /m/, /i/, and the voiceless stops /p, t, k/. Perceptual sensitivity was also a factor for nasals, which an additional reaction times analysis revealed to be the fastest sound group perceived by participants in both conditions, and /p, t, k/, which was perceived faster in its target-like condition. As predicted by the PAM-L2 model, a combination of these factors seems to provide the most optimal environment for perceptual acquisition and transfer.

The accuracy of the target and non-target like conditions, as well as their reaction times on the tests, revealed that sounds in the target-like condition showed a ceiling effect (with an accuracy of approximately 90%) and were perceived significantly faster than sounds in the non-target like conditions. Each word in the non-target like condition consisted of L1 and L2 sounds; therefore, a possible explanation for these results is that the non-target condition was cognitively more costly to process because it activated the participants' L1 and L2. More research is needed in order to understand how processing load affects perception.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

There are several limitations within this study. One is the grouping of target sounds; in cases such as the vibrants (taps and trills), where different perceptual processes may be taking place with simple and multiple vibrants, it might be more appropriate to separate sounds like the simple (tap) and multiple (trill) vibrants into different sound groups for analysis. The relatively small number of participants due to class attrition and outliers is also an issue; the availability of more participants could contribute to more robust, reliable findings.

Future studies could examine how perception or pronunciation instruction could relate to the phonological development of several levels of L2 learners and include delayed assessments. Due to the difficulty involved in incorporating a phonetics component into an established curriculum, perhaps a smaller group of sounds (those which showed the most improvement) could be considered for implementation. Learners in study abroad or naturalistic contexts could also be investigated, in which proficiency level will need to be determined by means other than course title. Studies that include both production and perception measures could attempt to explain the link and suggested gap that exists between perception and production, and inform pedagogical approaches about learner development and appropriate interventions.

CONCLUSION

The results from a pretest and two posttests measuring L2 perception of target and non-target like pronunciations of Spanish words suggest that explicit pronunciation instruction may not be beneficial for the perceptual development of second-semester learners. All groups involved in the study improved significantly from pretest to immediate posttest, suggesting the importance of meaningful input in the perceptual development of L2 learners, and there were no statistical difference between the scores of the control and explicit information group on the pretest or delayed posttest. However, the nontechnical instruction group did significantly outperform the control group and the technical on the immediate posttest, which suggests that non-technical linguistic descriptions and meaning-based forms of input may be more beneficial for beginning learners, although this effect was lost with time. Beginning L2 systems may not be ready to process the demands of tasks that focus both on meaning and explicit phonetic forms, but incorporating a less formal approach in these beginning courses may aid in learners' perceptual development.

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Anel Brandl teaches in the Department of Modern Languages and Linguistics at Florida State University. She specializes in second language acquisition and Spanish phonology, and she regularly teaches undergraduate and graduate courses in these areas. Her current research examines the processing strategies utilized by beginning second language learners of English and Spanish. She is also exploring the processing of inflectional morphology in beginning second language learners.

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REFERENCES

Arteaga, D. L. (2000). Articulatory phonetics in the first-year Spanish classroom. *The Modern Language Journal*, *84*, 339-54.

Ausín, A., & Sutton, M. (2010). *An L2 pronunciation judgment task*. Paper presented at Selected Proceedings of the 12th Hispanic Linguistics Symposium, Somerville, MA: Cascadilla Proceedings Project.

Best, C. T., & Tyler, M. D. (2007). Nonnative and second-language speech perception: Commonalities and complementarities. In M. J. Munro & O. S. Bohn (Eds.), *Second language speech learning: The role of language experience in speech perception and production* (pp. 13-34). Amsterdam: John Benjamins.

Chela-Flores, B. (2001). Pronunciation and language learning: An integrative approach. *IRAL*, *39*, 85-101.

Elliott, A. R. (1997). On the teaching and acquisition of pronunciation within a communicative approach. *Hispania, 80*, 95-108.

Guirao, M., & Jurado, M.A. (1990). Frequency of occurrence of phonemes in American Spanish, *Revue Quebecoise de Linguistique, 19*(2), 135-150.

Hurtado, L. M., & Estrada, C. (2010). Factors influencing the second language acquisition of Spanish vibrants. *Modern Language Journal, 94*, 74-86.

Lord, G. (2005). (How) can we teach foreign language pronunciation? On the effects of a Spanish phonetics course. *Hispania, 88*, 557-567.

Schmidt, R. W. (1990). The role of consciousness in second language learning. *Applied Linguistics, 11*, 129-158.

Swain, M. (1995). Three functions of output in second language learning. *Principle and practice in applied linguistics: Studies in honour of HG Widdowson*, (pp. 125-144). Cambridge: Cambridge University Press.

Swain, M. (1998). Focus on form through conscious reflection. In C. Doughty & J. Williams, (Eds). *Focus on form in classroom second language acquisition* (pp. 64-82). NY; Cambridge University Press.

Trofimovich, P., & Gatbonton, E. (2006). Repetition and focus on form in processing L2 Spanish words: Implications for pronunciation instruction. *The Modern Language Journal, 90*, 519-35.

VanPatten, B., & Williams J. (Eds.). (2007). *Theories in second language acquisition: An introduction*. Mahwah, NJ: Erlbaum.

VanPatten, B. (Ed). (2004). *Processing instruction. Theory, research and commentary*. Mahwah, NJ: Erlbaum.

VanPatten, B., Leeser, M., & G. Keating. (2011). *Sol y viento: Beginning Spanish* (3rd ed.). New York, NY: McGraw Hill.

Appendix A
Language History Questionnaire

Subject # _____
Date _____

This questionnaire is designed to give us a better understanding of your experience with other languages. We ask that you be as accurate and thorough as possible when answering the following questions.

General Background Questions

1. Gender
□ Female
□ Male

2. Age: _____ years

3. Do you have any known visual or hearing problems (corrected or uncorrected)?
□ No
□ Yes [Please explain] _____

4. Native Country
□ United States
□ Other _____
If other, at what age did you come to the US? _____

Home Language:
5. What is your native language?
□ English
□ Other: _____

6. Language spoken at home:
□ English
□ Spanish
□ Other _____

Education:
7. Please indicate where you have studied Spanish.
Please check all that apply and indicate length of study.

High School
□ 1 year
□ 2 years
□ 3 years
□ 4 years

College
□ Less than a one semester
□ 1-2 semesters
□ 3-4 semesters
□ 5-6 semesters
□ 7-8+ semesters

Rate your Spanish Skills:
8. Please rate your Spanish reading proficiency. (1=not literate and 10 = very literate)

1 2 3 4 5 6 7 8 9 10

9. Please rate your Spanish writing proficiency. (1=not literate and 10=very literate)

1 2 3 4 5 6 7 8 9 10

10. Please rate your Spanish speaking ability. (1=not fluent and 10=very fluent)

1 2 3 4 5 6 7 8 9 10

11. Please rate your Spanish speech comprehension ability. (1= unable to understand conversation and 10=perfectly able to understand)

1 2 3 4 5 6 7 8 9 10

12. Rate how comfortable you feel expressing yourself in Spanish:

1 2 3 4 5 6 7 8 9 10

13. Have you had any musical training (this includes informal experiences with singing and musical instruments)?

NO_____
YES How long? _____
What kind of instrument or ensemble? _____

14. Is there anything else that we should know about your language abilities? Other languages you may speak, etc. Please explain:

_____

_____

_____

_____

_____

Appendix B
Schedule of Treatment

Practice #	Week	Date	Topic
1	2	1/11	Pretest
2	3	1/18	Simple and Multiple Vibrants
3	4	1/25	The letter ‘h’: Orthography vs. pronunciation
4	4	1/27	/p, t, k/: Orthography and Non-Aspiration
5	5	2/1	Spanish nasals
6	6	2/8	The letters ‘s, z, c’: Dialectal variations
7	7	2/13	The letters ‘g, j, ch’
8	7	2/15	Approximants and the letter ‘v’
9	9	2/27	Laterals and the letter ‘y’: dialectal variations
10	9	2/29	Spanish vowels
11	11	3/14	Diphthongs vs. hiatus
12	12	3/21	Posttest
13	16	4/20	Delayed Posttest

Appendix C
Definitions of Non-targetlike Conditions

Sounds	Types of errors used and examples
Vibrants	The target vibrant was replaced by its counterpart (i.e. a multiple vibrant was replaced by a simple vibrant and the simple vibrant was replaced by a multiple vibrant). o Example: *barra* (‘bar’) [ˈba.ra] pronounced as *[ˈba.ɾa]
Vowels	Vowels were replaced with an English-like vowel or diphthong o Examples: *café* (‘coffee’) [ka.ˈfe] as *[kæ.ˈfe]; *lejos* (‘far’) [ˈle.xos] as *[ˈle.xo^{w}s]
Diphthong/Hiatus	Tokens with diphthong or hiatus were replaced with their counterpart, i.e. two vowels in hiatus were pronounced as a diphthong and a diphthong was pronounced as two vowels in hiatus. o Examples: *edificio* (‘building’) [e.ði.ˈfi.sjo] pronounced as * [e.ði.fi.ˈsi.o]; *filosofía* (‘philosophy’) [fi.lo.so.ˈfi.a] as *[fi.lo.ˈso.fja]
Laterals	Word final /l/ was velarized and pronounced as [ɬ]. o Example: *fiel* (‘faithful’) [fjel] was pronounced as *[fjeɬ]
Voiceless occlusives	/p, t, k/ were pronounced with aspiration in non-target conditions. o Example: *pantalones* (‘pants’) [pan̪.ta.ˈlo.nes] was pronounced as*[p^{h}an̪.ta.ˈlo.nes]
Voiced occlusives	Intervocalic /b, d, g / were not spirantized or were de-voiced in non-target conditions. o Examples: *lado* (‘side’) [ˈla.ðo] pronounced as *[ˈla.do]; *conseguir* (‘to get’) [kon.se.ˈɣiɾ] as *[kon.se.ˈkiɾ]
Nasals	The nasal consonants /n, m,ɲ/ were interchanged in the non-target conditions. o Examples: *mañana* (‘morning’,‘tomorrow’) [ma.ˈɲa.na] pronounced as: *[ma.ˈna.na]; *medias* (‘socks’, ‘tights’) [ˈme.ðjas] as *[ˈne.ðjas]
Affricate	/tʃ/ was pronounced as [ʃ] in non-target conditions. o Example: *salchicha* (‘hot dog’) [sal.ˈtʃi.tʃa] pronounced as *[sal.ˈʃi.ʃa]
‘z’	Orthographic ‘z’ was pronounced as [z] in non-target conditions o Example: *zanahoria* (‘carrot’) [sa.na.ˈo.ɾja] pronounced as *[za.na.ˈo.ɾja]

'v'	Orthographic /v/ was pronounced as [v] in non-target conditions. o Example: *viernes* ('Friday') [ˈbjeɾ.nes] pronounced as *[ˈvjeɾ.nes]
'gui'	The orthography 'gui' was pronounced as [gwi] in non-target conditions. o Example: *guitarra*('guitar') [gi.ˈta.ra] pronounced as *[gwi.ˈta.ra]
'h'	Tokens with the orthographic letter 'h' were pronounced as /h/ in the non-target conditions; tokens with a phonetic /h/ represented by an orthographic 'j' or 'g' were pronounced as [dʒ]. o Examples: *hora* ('hour') [ˈo.ɾa] pronounced as *[ˈho.ɾa]; *gemelos*('twins') [xe.ˈme.los] pronounced as *[dʒe.ˈme.los]
'll'	Tokens with orthographic 'll' were pronounced as /l/. o Example: *mantequilla* ('butter') [maɲ̟.te.ˈki.ʝa] pronounced as *[maɲ̟.te.ˈki.la]
'y'	Orthographic 'y' was pronounced as the glide [j] in non-target conditions.

Appendix D
ANOVA TABLE

Source	*df*	*MS*	*F*	*p*	η^2_p
Test × Group	4	.08	3.03	= .022	.12
Sound × Group	22	.07	2.36	= .001	.10
Test × Sound	22	.30	16.29	< .001	.27
Test × Condition	2	1.60	34.89	< .001	.44
Sound × Condition	11	2.63	81.85	< .001	.65
Sound × Condition × Group	22	.56	1.75	= .019	.07
Test × Sound × Condition	22	.11	6.50	< .001	.13
Error	968	.02			