

The Perception of the Salvadoran [s^h] and [θ] by L2 Spanish Learners

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This paper addresses how adult learners of Spanish at a large US university perceive two common sibilants: [s^h] and [θ]. While the L2 perception of these sounds has been thoroughly investigated in many varieties of Spanish, they have yet to be studied in the Salvadoran dialect. The present investigation seeks to fill that gap, and preliminary results show that the intermediate-level learners almost always perceived the full dorso-alveolar [s] correctly, while both the aspirated [s^h] and the interdental [θ] were much harder to perceive. Likewise, when the learners were able to perceive these sounds, they consistently rated them as not /s/-like. The study's findings reflect those of the previous literature and thus explicit instruction is recommended to facilitate L2 attainment of these sounds.

Keywords: L2 phonology, perception, Salvadoran Spanish

1. Introduction

Previous studies have attended to how L2 Spanish learners perceive various target language sounds and dialects. The perception of two such sounds, the /s/ realized as the aspirated [s^h], and the interdental [θ], have been explored recently within the field of second-language phonology (Rasmussen and Zampini, 2010; Schmidt, 2009, 2010, 2011; Trimble 2011). These sounds are of interest to researchers since they do not occur in the same contexts as in English, their unfamiliarity to learners, and their implications for attaining sociolinguistic competence. Overall, these studies have concluded that while beginning learners cannot accurately perceive these sounds, perception improves with proficiency level, and both explicit instruction and exposure in a study abroad context help with this improvement. Although the [s^h] and the [θ] have been investigated from a variety of dialects where they (co-)occur, most notably Rioplatense, Caribbean, Andalusian, and Colombian Spanish, the perception of these sounds in Salvadoran Spanish has yet to be examined. Additionally, the Salvadoran case is unique in that these two sounds occur as allophones of the phoneme /s/ rather than of different phonemes. Moreover, researchers of Salvadoran Spanish have identified four distinct realizations of the /s/: the dorso-alveolar [s], the aspirated [s^h], the voiced aspirated [h̥], and the interdental [θ]. The present study addresses this dialectical gap in the research by examining the perception of the Salvadoran [s^h] and [θ] of 20 adults, native English speakers enrolled in an intermediate, post-secondary Spanish course.

2. Previous Studies

2.1 Perception & Second Language Acquisition. Phonetic perception is the “selection and integration of multiple acoustic parameters to recognize (categorize) phonetic segments as tokens of phonological categories” (Strange and Shafer, 2008, p.157). In terms of L1 perception, this ability to discriminate between sounds is present shortly after birth and continues to develop until adulthood where “native language phonetic perception is robust and automatic” (Strange and Shafer, 2008, p.157). While the process for L1 phonetic perception is relatively agreed upon within the field, L2 speech perception can be explained by a wide variety of theories (Best 1995; Flege 1995; Kuhl & Iverson 1995). For this study, the most relevant theory is Flege’s Speech Learning Model, which aims to account for “variation in the extent to which individuals learn – or fail to learn – to accurately produce and perceive phonetic segments” (Flege, 1995, p. 3). The basic principles of this model are that L2 learners can, if they have adequate feedback, accurately perceive the phonetic properties of L2 speech sounds; L2 speech learning takes time and is influenced importantly by the nature of input received; and as in L1 development, production is guided by perceptual representations stored in long-term memory (Flege, 1995, p. 92). In other words, L2 production is led by the perception and classification of new or similar L2 sounds through the L1 phonological system (Ingham, 2014, p. 50). This model is pertinent to the present study because, if accurate production of the Salvadoran [s^h] and [θ] is the ultimate goal for learners,

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then they will first need to be able to perceive these sounds correctly and accommodate them into their developing phonological system.

2.2 The L2 Perception of [s^h] and /θ/. Before reviewing the literature on the perception of these sounds, it should be noted that this section will reference studies of the phoneme /θ/ and not the Salvadoran interdental [θ] since no one has yet to examine this sound in the context of L2 perception. Studies of the /θ/ were included because of its similarity to the [θ] sound, and because the /θ/ and the [s^h] co-occur in various dialects and therefore are examined together in multiple works.

The first perceptual study of the [s^h] by Schmidt (2009) found that 11 adult native speakers of English with varying degrees of Spanish proficiency were able to improve their comprehension of Dominican Spanish while studying abroad in the Dominican Republic for three weeks. Their listening comprehension pre-test and post-test consisted of /s/-aspiration, intervocalic /d/ weakening, lambdacism, and /n/-velarization. At the end of the program, the participants were still able to better comprehend other dialects of Spanish more so than Dominican Spanish, but they had significantly improved their comprehension of the target dialect in just three weeks.

Rasmussen and Zampini (2010) tested the effects of instruction on the perception of Andalusian Spanish. 10 adults, intermediate learners of Spanish, participating in a six-week study abroad program in Seville, Spain, received six half-hour training sessions on four dialectal phonetic features of Andalusian Spanish: /s/-aspiration, synalepha, the interdental voiceless fricative /θ/, and the deletion of the intervocalic or word-final /d/. A control group of six similar learners did not receive this instruction. All participants listened to a recording of native Andalusian speakers and were directed to fill in missing words to test for intelligibility and to transcribe whole sentences to test for comprehensibility. While the experimental group showed greater improvement for all four phonetic features at the post-test, both groups did show improvement after the study abroad program. Regarding /s/-aspiration, the experimental group improved from 14% transcription accuracy to 41% at the post-test. In terms of the /θ/, the same group improved from 47% transcription accuracy to 57%. Overall, this study demonstrated that, while not necessary, explicit instruction does aid in increasing comprehension of these specific sounds. Additionally, seeing as no feature reached a peak accuracy of greater than 57%, these sounds seem to be of difficulty to learners who would need more time and instruction to fully attain them.

Concerning solely the perception of [s^h], George (2014) studied how adult learners of Spanish in the beginning, intermediate, and advanced courses perceive /s/-weakening. A total of 67 participants across the three courses were instructed to listen to a recording of a list of words provided by a native Venezuelan Spanish speaker. This list included some words pronounced with a full /s/ and others with a weakened /s/. In the first task, the participants discriminated which word they heard based on a series of words provided to them on an answer sheet. In the second task, the learners directly transcribed the words they heard from the recording. Her results demonstrated that, while L2 Spanish university students were significantly weaker than native speakers at perceiving /s/-weakening, this ability does vary and increases with proficiency level. She also found that students tend to perceive the weakened /s/ as deletion, and not as the /s/ being present in the word.

2.3 Salvadoran Spanish. As a whole, the Salvadoran Spanish dialect has been well-documented (Canfield, 1953, 1960; Lipski, 1985, 1988, 2000, and 2007; Maxwell, 1980; Rivas, 1978). Through these investigations, researchers have identified four distinct realizations of the /s/: the dorso-alveolar [s], the aspirated [s^h], the voiced aspirated [h̥], and the interdental [θ]. While no perception studies have analyzed the Salvadoran [θ], Iraheta (2017) performed a sociolinguistic analysis of the factors affecting the use of the [θ] in El Salvador as well as of the social meanings it possesses. Although this particular focus is not of use to the present study, the author's quantitative analysis of the distribution of the various Salvadoran /s/ sounds was instrumental in the design of this study's speech stimuli. Iraheta found that the [sh] and the [θ] are by far the most frequent /s/-realizations in Salvadoran Spanish, respectively comprising 44% and 36% of all /s/ tokens in her study. By comparison, the full [s] only appeared in 11% of the data. Regarding word position, she identified that [θ] occurs most frequently (67% of the time) in word-initial position while the [s^h] occurs most frequently (77% of the time) in syllable-final position, and therefore the present study's speech stimuli reflect this pattern.

3. Methodology

3.1 Research Question & Hypothesis. This investigation posits the following research question in this study:

RQ1: Can intermediate L2 Spanish learners accurately perceive the Salvadoran [s^h] and the [θ]?

Given the uniqueness of these sounds in the Salvadoran context and their dissimilarity from English, it is expected that the students will be unable to perceive these sounds accurately. Instead, as the Speech Learning Model proposes, the participants may confuse the [s^h] and the [θ] with the English [h] and /θ/, both of which are not associated with /s/ in their native language. However, it is hypothesized that they will be able to perceive the [θ] better than the [s^h]. This disparity is reflected in previous research regarding learner perceptions of the [s^h] and the /θ/, which, while not a perfect comparison, may still prove to be true in the present study. Additionally, on simply a logical level, since an aspiration could be perceived as the absence of a sound, perhaps the learners will be able to better perceive the [θ] provided that in this case a clear sound is produced.

3.2 Participants. The listeners were 20 adults, native speakers of English enrolled in a second- or third-semester Spanish course at the University of Minnesota. Although the listeners came from two different levels of instruction, they were a relatively homogenous group: their average age was 19.9 years old, their average age of onset was 12.5 years old, and they had taken an average of 8.5 semesters of Spanish instruction. Additionally, exactly 50% reported visiting a Spanish-speaking country, and none of them had visited for longer than two weeks. None of the participants reported visiting El Salvador nor Central America.

3.3 Speech Stimuli. The stimuli were recorded from a 21-year-old, male, native speaker from El Salvador. The speaker had been living in the United States for 5 years and maintains the dialectical characteristics of Salvadoran Spanish. He was given phonetic instruction before the recording and, based on the impressions of the analyst, was able to adequately produce the [s], [s^h], and [θ]. To further ensure accuracy, each stimulus was checked for proper pronunciation at the time of recording. The stimuli consisted of 108 disyllabic non-words. False words were used to avoid the effect of the participants' lexical knowledge on their perception of the various /s/ sounds. 35 of the stimuli were CVC.CV words with a syllable-final *s* (*bista, lesto, pisgo*), 37 were CVC.VC and CV.CV words with a word-initial *s* (*seper, sigro, suto*), and 36 were distractor words containing no *s* (*lampo, rila, meña*). The syllable-final *s* words were produced with a full [s] and an aspirated [s^h], and the word-initial *s* words were produced with a full [s] and an interdental [θ]. Therefore, the total number of stimuli consisted of 179 words. All words conformed to the phonotactics of Spanish, and they did not contain any fricatives nor /s/-like sounds. The order of these words was randomized before the recording.

3.4 Procedure. The listeners were tested in groups in a small classroom without any apparent distractions. The stimuli were played using the classroom's audiovisual equipment, and the interviewer asked them to confirm that they could clearly and comfortably hear the words presented. Before the experiment, they were instructed to listen to each Spanish word, and evaluate whether or not the word contained an /s/. They were also instructed to evaluate to what degree the word contained an /s/, represented by a five-point scale, with 1 signifying "Not /S/-Like" and 5 signifying "Very /S/-Like". The participants were told that not every word would contain an /s/, but they were not given any phonetic instruction regarding the different realizations of /s/ being tested. Each word was repeated twice, and the participants were given five seconds between each set of words to record their evaluation. Following the experiment, the listeners were given a linguistic background questionnaire to determine their time spent abroad in a Spanish-speaking context, the amount of previous instruction, and the age at which they started learning Spanish.

3.5 Data Analysis The participants' responses were transcribed into a Microsoft Excel spreadsheet. Then, the correct identification rates and the average /s/-like rating for each allophone were calculated. A one-way ANOVA test and post hoc tests were performed to determine any significant differences between allophones for both their identification rates and their /s/-like rating.

4. Results

Table 1 details the frequencies of the number of correct identifications across all sound conditions: Regarding the control stimuli, the learners were able to very accurately (95% and higher) identify whether or not they heard an /s/ sound. In terms of the experimental stimuli, the learners performed much worse, only identifying 35.4% of the Interdental [θ] words correctly and 6.7% of the Aspirated [s^h] words correctly.

Type of Sound	N		Accuracy
	Correct	Incorrect	
Distractor	692	28	96.1%
[S]-Initial	740	0	100%
[S]-Syllable Final	698	2	99.7%
Aspirated [s ^h]	47	653	6.7%
Interdental [θ]	248	452	35.4%

Table 1: Frequency of correct identifications across sounds

Table 2 shows the mean /s/-like ratings for each sound condition with 1 signifying “Not /S/-Like” and 5 signifying “Very /S/-Like”:

Type of Sound	Average /S/-Likeness Rating
Distractor	.03
[S]-Initial	4.72
[S]-Syllable Final	4.03
Aspirated [s ^h]	.08
Interdental [θ]	.81

Table 2: Mean /s/-like ratings for each sound

The mean /s/-like ratings reflect the results from the previous table. The learners rated the [S]-Initial and [S]-Syllable Final control stimuli as being more /s/-like, while they considered the Distractor, Aspirated [s^h], and Interdental [θ] stimuli to be much less /s/-like. Of the experimental stimuli, the learners rated the Aspirated [s^h] words as less /s/-like than the Interdental [θ] words, coinciding with their inability to accurately identify the Aspirated [s^h] words in the previous task.

In addition to these figures, two one-way ANOVA tests were performed, one for each task, to determine the statistical significance of these results. The first one-way between-subjects ANOVA was conducted to compare the effect of different /s/ sounds on correct identifications in Distractor, [S]-Initial, [S]-Syllable Final, Aspirated [s^h], and Interdental [θ] conditions. There was a significant difference between the conditions at the $p < .05$ level for the five conditions [$F(4, 174) = 402.17, p = 0$]. Post hoc comparisons using the Tukey HSD test indicated that the mean scores for the control conditions (Distractor; $M = 19.22, SD = 2.76$), [S]-Initial; $M = 20, SD = 0$), [S]-Syllable Final; $M = 19.94, SD = 0.24$) were significantly different than the experimental conditions (Aspirated [s^h]; $M = 1.31, SD = 2.98$), (Interdental [θ]; $M = 7.09, SD = 4.23$). There were no significant differences between control conditions, but there was an additional significant difference between the two experimental conditions. The second one-way between-subjects ANOVA was conducted to compare the effect of different /s/ sounds on subjective /s/-like ratings in the same five conditions examined above. There was a significant difference between the conditions at the $p < .05$ level for the five conditions [$F(4, 172) = 2037.99, p = 0$]. Post hoc comparisons using the Tukey HSD test indicated that the mean scores for two of the control conditions ([S]-Initial; $M = 4.72, SD = 0.19$), [S]-Syllable Final; $M = 4.03, SD = 0.25$) were significantly different than the Distractor condition (Distractor; $M = 0.03, SD = 0.08$) and the experimental conditions (Aspirated [s^h]; $M = 0.08, SD = 0.07$), (Interdental [θ]; $M = 0.81, SD = 0.58$). As with the first Tukey, there was also a significant difference between the two experimental conditions. Taken together, these results

suggest that the learners were significantly worse at perceiving the experimental stimuli and rated the experimental and Distractor stimuli as significantly less /s/-like.

5. Discussion

Returning to this study's research question, "*Can intermediate L2 Spanish learners accurately perceive the Salvadoran [s^h] and the [θ]?*", the results of the two tasks indicate that the learners were unable to accurately perceive these sounds and that they did not consider these sounds to represent an /s/. The data also appear to support the hypothesis that the learners would perceive the [θ] better than the [s^h]. Not only were they able to correctly identify the [θ] sound 35.4% of the time (compared to 6.7% for the [s^h]), they also rated it as significantly more /s/-like (.81 versus .08 out of 5). The second figure is especially important regarding the instructional implications for this study because it shows that it may be significantly easier for learners to assimilate the [θ] sound into their conceptualizations of the /s/.

In terms of those instructional implications, the results of the present study preliminarily support the findings of similar previous studies in that these sounds are inaccessible without prior instruction. However, as proposed by the Speech Learning Model, learners can develop the ability to perceive and produce any L2 sound given adequate and sufficient input, and previous studies (Rasmussen and Zampini 2010) have shown that learners can make significant perceptual improvements of similar sounds in a relatively short amount of time. If the ultimate goal is the attainment of these sounds, explicit instruction appears to be necessary. Although the Salvadoran [θ] could be viewed as a niche sound with little value to the average Spanish learner, the instruction of this feature to students who are studying abroad in El Salvador or who are participating in service-learning projects with Salvadoran immigrant communities could be advantageous. Given the considerable population of Salvadoran immigrants in the United States, interacting with these communities is probable, and knowing these sounds could help to facilitate communication. However, instructors may have to be careful in how they teach the [θ], making sure to distinguish between this sound and the /θ/, especially for students who are already familiar with this phoneme. Additionally, regarding the [s^h], /s/-weakening is a widespread dialectal feature and knowledge of this sound will aid students who will almost certainly come into contact with a speaker who exhibits /s/-weakening.

6. Conclusion

The intermediate L2 learners of Spanish in this study were significantly worse at perceiving the Salvadoran [s^h] and [θ] than the full dorso-alveolar [s] and rated these two sounds as being significantly less /s/-like, providing support to the previous research which claimed that learners are unable to perceive similar sounds and that they do not perceive these sounds as being a true /s/. Therefore, when relevant for students, explicit instruction of and exposure to these two sounds could be useful as a means to increase their comprehension and their abilities to interact meaningfully in the target language. Seeing as this preliminary study was rather limited in scope, future studies should modify the methodology to include various learner groups to test learner perceptions across proficiency levels. Furthermore, a study that tested the effects of explicit phonetic instruction on the perception of these sounds would be useful, especially in terms of the Salvadoran [θ] which has not been subject to this kind of study. Overall, the present study offers results that support the findings of previous studies as well as supplement the absence of SLA studies concerning Salvadoran Spanish.

References

- Best, C. T. (1995). Chapter 6 A Direct Realist View of Cross-Language Speech Perception. *Speech perception and linguistic experience: Issues in cross-language research*, 171-204.
- Canfield, D. L. (1953). Andalucismos en la pronunciación salvadoreña. *Hispania*, 32-33.
- Canfield, D. L. (1960). Observaciones sobre el español salvadoreño. Universidad de Buenos Aires, Facultad de Filosofía y Letras, Instituto de Filología Hispánica Dr. Amado Alonso.
- Flege, J. E. (1995). Second language speech learning: Theory, findings, and problems. *Speech perception and linguistic experience: Issues in cross-language research*, 92, 233-277.
- Flege, J. E. (2005). Origins and development of the Speech Learning Model. Retrieved December, 13, 2005.
- George, A. (2014). Perception of a Regional Spanish Sound: The Case of /s/-Weakening. *Dimension*, 97, 110.
- Ingham, J. (2014). Perception, production and perceptual learning in the second language: A study of perceptual learning by L1 Bengali speakers of L2 English. In *The 9th Lancaster University postgraduate conference in linguistics and language teaching*. Lancaster: Lancaster University (pp. 49-69).
- Iraheta, A. (2017). Interdental/s/in Salvadoran Spanish: Finding Linguistic Patterns and Social Meaning.
- Kuhl, P. K., & Iverson, P. (1995). Linguistic experience and the "Perceptual Magnet Effect," in W. Strange ed., *Speech Perception and Linguistic Experience: Issues in Cross-language Research*, 121-154.
- Lipski, J. M. (1985). /s/ in Central American Spanish. *Hispania*, 68(1), 143-149.
- Lipski, J. M. (2000). El español que se habla en El Salvador y su importancia para la dialectología hispanoamericana. *Revista Científica*, 2, 65-89.
- Maxwell, J. (1980). El español en El Salvador. *Estudios Centro Americanos (ECA)*, 386, 1152-1166.
- Rasmussen, J., & Zampini, M. (2010). The effects of phonetics training on the intelligibility and comprehensibility of native Spanish speech by second language learners. In *Proceedings of the 1st pronunciation in second language learning and teaching conference* (pp. 38-52). Ames, IA: Iowa State University.
- Rivas, P. G. (1987). *La lengua salvadoreña*. Ministerio de Cultura y Comunicaciones, Viceministerio de Comunicaciones, Dirección de Publicaciones e Impresos.
- Schmidt, L. (2009). The effect of dialect familiarity via a study abroad experience on L2 comprehension of Spanish. In *Selected proceedings of the 11th Hispanic linguistics symposium* (pp. 143-154).
- Schmidt, L. B. (2011). *Acquisition of dialectal variation in a second language: L2 perception of aspiration of Spanish/s* (Doctoral dissertation, Indiana University).
- Strange, W., & Shafer, V. L. (2008). Speech perception in second language learners: The re-education of selective perception. *Phonology and second language acquisition*, 36, 153-192.