The Effects of Explicit Pronunciation Instruction in Elementary Spanish: Perception and Production of Vowels

by

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Abstract

Research in pronunciation teaching in Spanish has focused mostly on intermediate or advanced levels, with only cursory attention paid to the elementary level. This research attempts to change that. Pronunciation is obviously an important aspect of second language learning, so teaching it at the elementary level could be assumed to be beneficial. The present thesis attempted to prove that hypothesis.

Thirty students completed the steps of the study, which involved tests of perception and production of Spanish words with a focus on vowels and word stress. The results showed that the experimental group's perception improved significantly, while the control group's perception declined over time despite continuing to take Spanish classes. The experimental group's production also improved, though significance was conflictive in this study.

The results serve to amplify the research done in the area of second language pedagogy and ultimately help to determine whether pronunciation should be taught at the elementary level in Spanish.

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Table of Contents

List of Tables

Chapter 1: Review of the Literature

1.1 Introduction

Focus on pronunciation has an inconsistent history in the foreign language classroom, as shown in methodological shifts: from the Grammar-Translation Method, in which language was taught through grammar lessons and text translations from the first language (L1) to the second language (L2) and vice versa, where little to no emphasis was placed on pronunciation (Richards & Rodgers, 2001), to the Audiolingual Method, where language was taught through repetition drills, and the Silent Way, in which the teacher had a passive role and teaching was subordinate to learning, in both of which native-like pronunciation was a main goal (Richards & Rodgers, 2001). Similarly, the Direct Method, in which language was taught through complete classroom immersion, also placed emphasis on correct pronunciation by including it as a goal of the learning process (Omaggio Hadley, 2001). After several other methods were introduced and later discarded, the major shift in language teaching occurred with the introduction of Communicative Language Teaching (CLT). CLT is a widely accepted model of language teaching in the modern world, leaving almost all others obsolete in mainstream education (Richards & Rodgers, 2001).

Brandl (2008) describes Communicative Language Teaching as focused on the ultimate goal of being able to communicate in a second language. It often includes the use of tasks, which are activities with a communicative goal that encourage students to use the target language in a real-world simulation setting. Other definitions and forms of CLT implementation exist, but these are beyond the scope of this thesis.

The communicative language teaching guide, which describes goals and methods to reach them, designates comprehensible pronunciation as a goal (Richards & Rodgers, 2001). However, it does not outline any methods for teaching pronunciation, nor does it define what

comprehensible pronunciation is. This may lead to subjective interpretations of the term "comprehensible," considering second language (L2) learners may communicate with people who have knowledge of their L1, and therefore be more intuitive to their accented pronunciation; or L2 learners may speak with monolinguals with no knowledge of the learners' L1, meaning they would have a harder time understanding accented speech. It can be assumed that within CLT, pronunciation is expected to be learned inductively like grammar, through language practice and input from the instructor. In fact, Terrell's (1989) widely-cited article on Spanish pronunciation within CLT states that communicative approaches to language teaching "have not known what to do with pronunciation" (p. 197). According to Terrell, this is likely due to the belief that adults are largely unable to attain native-like pronunciation in a second language and the belief that "most features of a good pronunciation are 'acquired' (following Krashen's use of this word) and not taught (or 'learned,' using Krashen's term)" (p. 207). Krashen (1981) defines the term "acquisition," in basic terms, as a subconscious form of learning a language similar to that of children learning their first language. The term "learning" is defined as conscious effort to learn the language, which is the typical form of language learning of adult L2 learners. Stated simply, acquisition is learning through exposure, and learning is learning through explanations and rules.

Terrell's statement that pronunciation is neglected in the foreign language classroom is reflected by teaching method textbooks that summarize the main characteristics of the different methods/approaches to the teaching of foreign language. Brandl (2008), for example, in his textbook *Communicative Language Teaching in Action: Putting Principles to Work*, makes no mention of teaching pronunciation, either explicitly or implicitly. The anthology *The Art of Teaching Spanish: Second Language Acquisition from Research to Praxis* (Salaberry & Lafford,

eds., 2006) only mentions ways to give feedback through online tools and the effects of study abroad on pronunciation. However, no strategies for the teaching of pronunciation are mentioned, nor are effects of teaching pronunciation specifically. Omaggio Hadley (2001) mentions the importance of pronunciation as important aspects of the Direct Method and the Silent Way when she discusses existing methodologies, but there is again no mention of teaching pronunciation in the communicative approach, which is what her textbook promotes.

Nevertheless, some language teachers and researchers within Second Language Acquisition (SLA) claim that the communicative method can be used to teach pronunciation. Celce-Murcia (1987) discusses using communicative tasks to practice target sounds in the second language (in this case, English). However, the author does not offer any information on how the sounds are taught before students are asked to produce them. She does say that she uses the tasks successfully. It is worth mentioning that she does mention teaching pronunciation, but the activities described feature practice, not instruction in pronunciation. Terrell (1989) mentions giving explicit pronunciation instruction at various stages of development in the language classroom, though still maintaining a focus on light instruction and heavy practice. He maintains that "learners will acquire a sound system better with meaningful input than with artificial exercises designed to focus on certain sounds or on sound patterns" (208). His argument is that sound will be acquired just like grammatical features if the students receive enough exposure to target-like pronunciation.

Elliot (1993, 1995a, 1995b, 1997) tries to shift the focus to explicit pronunciation. In his 1997 study (see section 1.2.4 for a full summary of his study and findings), he reports on the results of explicit pronunciation instruction as an addition to the communicative classroom, allowing communication to be the primary focus while simultaneously adding emphasis to

proper pronunciation of the target language sounds. The present study will attempt to expand on Elliott's proposal of adding pronunciation teaching to the communicative classroom. Like the studies realized by Elliott, the language of focus was Spanish taught mostly to native speakers of English. There was originally a native speaker of Korean in the experiment, but he did not attend the final session, so all participants included in analyses were native English speakers.

As we have seen, pronunciation teaching in foreign language pedagogy has undergone many ideological shifts. Currently, although target pronunciation is a desirable goal in the acquisition of an L2, the inclusion of explicit instruction in the L2 classrooms that use CLT is a choice made by individual instructors.

The remainder of this chapter will be organized as follows: Sections 1.2.1 to 1.2.3 will discuss studies on English pronunciation teaching and its relationship to: production (1.2.1), perception (1.2.2), and both production and perception (1.2.3). Sections 1.2.4 to 1.2.8 will discuss studies in Spanish pronunciation. These are divided thusly: Sections 1.2.4 deal with explicit pronunciation instruction and its relationship to: production (1.2.4), perception (1.2.5), and both production and perception (1.2.6). Section 1.2.7 discusses studies that have examined factors besides instruction in L2 Spanish pronunciation, and section 1.2.8 presents studies in participants' perception and production of Spanish stress. Section 1.2.9 will discuss the gaps in the research. When discussing these studies, the word "instruction" will refer to pronunciation instruction in general unless stated otherwise.

The studies examined in section 1.2 will be those that are relevant to the present research; that is, those that include explicit instruction in pronunciation of the language that the participants were studying. For the purposes of the present study and following Saito (2011), explicit instruction is defined as instruction that involves detailed explanations of language

aspects. Explicit instruction may be in the form of lessons in articulation of the sounds (which may be accompanied by diagrams, though these are not a requirement for explicit instruction), corrective feedback when students pronounce sounds incorrectly, or simple modeling of sounds and student repetition until they correctly replicate the sound. In addition, pertinent studies on sound perception (usually through minimal pair discrimination) will be discussed here because of the current study's goal of studying the relationship between production and perception. Finally some of the studies reviewed will also be on mimicry or a combination of perception and production.

1.2 Previous research

Research on teaching Spanish pronunciation explicitly, that is, through instruction that focuses on phonetic form, is scarce. The majority of the pronunciation studies have focused their attention on English pronunciation teaching, within various contexts: English as a Foreign Language (classroom setting in a non-English-speaking country), English as a Second Language (classroom setting in an English-speaking country), and English as a lingua franca (classroom preparation for interaction between non-native speakers of English with different native languages). The following section will deal with present studies in the first two contexts only, as the third context is really a sub-context of the other two.

1.2.1 Research on English production

One researcher of teaching English pronunciation is Saito. He has focused his research on the effects of teaching English pronunciation to L1 Japanese speakers, conducting studies on the participants' perception and production of English, both in English as a Second Language (ESL) contexts, and in English as a Foreign Language (EFL) contexts. Saito's (2013a) study investigated the effects of form-focused instruction alone and the effects of both form-focused instruction with added explicit instruction in pronunciation. Saito defines form-focused

instruction, following Spada's (1997) definition, as "any pedagogical effort which is used to draw the learners' attention to language form either implicitly or explicitly" (Saito, p. 2). However, Saito states that this type of instruction has mostly focused on grammar, not pronunciation as in his study. Form-focused instruction is done in accordance with the three phases of interlanguage development as proposed by Lyster (2007): noticing, awareness, and practice. First, the students' attention is drawn to a new form in the L2. Next, they are encouraged to restructure their conceptions of the new form either through additional controlled practice or through explicit instruction, and finally they would (we hope) eventually use the new form in communication. In the case of pronunciation, the form in question is a sound segment instead of a grammatical item as in the examples and explanations given by Lyster. Explicit phonetic instruction, on the other hand, actually teaches them the articulatory movements needed to create the sound in question (for specific examples, see below), that is, this explicit phonetics instruction is a technical and more precise way to teach pronunciation, and form-focused instruction would depend on an individual instructor's training.

As stated before, Saito's 2013a study examines the effects of a combination of form-focused instruction and explicit phonetics instruction on Japanese speakers' production of [ɹ] given at the onset of the course; that is, the participants would be given lessons in phonetic form, and some would be taught explicitly how to articulate the sound in question. The two experimental groups were set up as follows: one group received form-focused instruction alone, i.e., exercises to allow maximum practice making the sound and distinguishing it from [l], such as debate activities with prompts containing words with the sound [ɹ], and a minimal pair distinguishing game that involved selecting a card that matched the word read by the instructor; and another group received form-focused instruction (everything mentioned) along with explicit

instruction in phonetics added to it, i.e., explanations of articulation of the sounds along with diagrams and exaggerated productions by the teacher. Both experimental groups were also given pronunciation recasts when they made mistakes in pronunciation. Finally, the control group was given meaning-focused instruction, i.e., instruction that did not focus on phonetic form at all, but rather was instruction that emphasized meaning in the classroom, though no specific examples of these lessons were given in the publication. The control group was given grammatical recasts when mistakes were made, but no pronunciation recasts. The communicative goal of all of the classes that constituted the study was the development of argumentative skills in English.

Participants' production was measured via acoustic analysis, using computer software to measure the sounds and compare them to the measurements of the target sounds as produced by native speakers. The results showed that students given explicit phonetics instruction showed substantial gains in their production of the target sound, [ɹ], especially when the word was unfamiliar to them, over those who only received form-focused instruction in addition to the communicative learning environment of the class. This study is relevant to the present one because it seems to indicate the positive effects that explicit phonetics instruction in addition to form-focused instruction may have on pronunciation.

In an earlier ESL study, Saito (2011) studied the effects of form-focused instruction (using the same definition as above) on ten L1 Japanese students living in New York. He gave individual instruction (with the exception of one pair who preferred to have their sessions together) to ten students over a course of four weeks, targeting their pronunciation of the phones /æ f v θ ð w l ɹ/. The participants completed a pre-test and post-test involving a sentence-reading task and a picture description task to collect controlled and spontaneous production data. Native English-speaking raters were used to judge students' accentedness, i.e., defined by Saito as "the

degree to which the pronunciation of an utterance sounds differ from an expected pronunciation pattern" (p. 45) and comprehensibility, i.e., "listeners' estimation of difficulty in understanding an utterance" (p. 45). According to the raters, neither group improved accentedness significantly, and some even increased. By contrast, the experimental group made substantial gains in comprehensibility in the sentence-reading test, which measured controlled speech, not spontaneous speech, while the control group did not. In the picture description task, which measured spontaneous speech, there was no significant difference overall in either group. The results of the study seem to indicate a positive effect of pronunciation instruction and participant production of target sounds in a reading task, informing the present research. A reading task was the only way to measure production from the participants in this study, as they were at a level too basic to request spontaneous speech.

1.2.2 Research on English perception

Studies on perception are also important for the current study because it focused on the participants' ability to relate rules of pronunciation to their perception of utterances in the L2.

Wang and Munro (2004) conducted a study to see whether computerized modules would help native speakers of Mandarin and Cantonese who were advanced English speakers distinguish the differences between vowel pairs based on quality, i.e., height and backness, instead of length. The following English vowel pairs were chosen because they were considered difficult for them to comprehend: /i/-/ɪ/, such as the words *beat* and *bit*; /u/-/ʊ/, such as the words *shooed* and *should*; and /ɛ/-/æ/, such as the words *set* and *sat.* Participants completed computer-delivered modules in the form of a pre-test, training, a post-test, a generalization test, which tested their ability to extend what they learned in the training modules to new stimuli, and a retention test after three months. Some of the stimuli were computer-synthesized speech tokens, and others were recorded human voices. The results showed that the software did help the

participants distinguish between the vowel pairs, as the control group, which completed the pre-test, post-test, and generalization test, did not improve significantly in their ability to distinguish between the vowels in these pairs. Furthermore, the study revealed that the experimental group participants were able to shift their focus in distinction away from length and towards quality, a weakness of ESL learners that the authors mention. They also found that the experimental group participants were able to extend their knowledge of the vowel contrasts presented to new natural stimuli. Finally, the researchers pointed out that these gains in vowel discrimination ability were retained after three months by the experimental group. Although the focus of this study was participants' sound perception, it is relevant to the current study because the current study examined participants' perception of vowels before and after experimental treatment.

1.2.3 Research on English production and perception

Another study by Saito (2013b) evaluated the effectiveness of form-focused instruction (see Saito 2013a, §1.2.1 for definition) alone (FFI only) versus form-focused instruction coupled with recasts (FFI + recasts) on L1 Japanese speakers' perception and production of [ɹ]. Explicit phonetics instruction was part of the FFI in this case, and recasts were given as single word corrections when the participants incorrectly articulated the sound. The recasts were given with a falling intonation, and time was given after the recast to repair the pronunciation. In the production test, the students read words and spontaneously described pictures using word prompts to elicit the target sounds. The speech samples were measured by human raters: linguistically naïve native English speakers (i.e., speakers with little to no contact with Japanese accents) who were asked to focus only on the [ɹ] segment, not the entire word. In the perception test, the participants were presented with a total of 70 words in minimal pairs, and had to select which of the words was the word they were hearing. The results show that with regard to perception, the form-focused instruction group performed better after treatment with regard to

words that had been seen during the class, but their performance with unfamiliar items was negligibly improved. By contrast, the group that received recasts in addition to form-focused instruction improved greatly both in familiar and unfamiliar items.

With regard to production, rating results showed that the two experimental groups (FFI + recasts and FFI-only) improved on trained and untrained items, while the control group remained relatively stable. In the spontaneous production task, both experimental groups also improved their performance of the [ɹ] in both trained and untrained words, while the control group actually declined, leaning more towards an English [l] sound. This is another example of a study that informs the present one because the results show a potential positive outcome from instruction that draws learners' attention towards linguistic forms. Although a different form of instruction, namely phonetics form instruction, was used in the current study, it might have similar positive effects.

1.2.4 Research on Spanish production

Most of the research conducted on Spanish pronunciation teaching has been on consonantal sounds difficult for English speakers, such as the phonemes [ɾ] and [r] (Elliot 1993, 1995a, 1995b, 1997; González-Bueno 1997; Herd 2011; Kissling 2014; Reeder 1997; Waltmunson 2005; Zampini 1998), avoidance of aspiration of voiceless stops (Díaz-Campos 2004; González-Bueno 1994; Kissling 2013, 2013; Lord 2005;), and the fricative allophones of voiced stops (Díaz-Campos 2004; Elliot 1993, 1995a, 1995b, 1997; Kissling 2013, 2014; Lord 2005, 2010; Zampini 1997, 1998; *inter alia*). The general outcome of explicit pronunciation instruction tends to be a positive one: that is, subjects who are taught explicitly about these sounds tend to improve their production and perception of them.

Elliott (1993, 1995a, 1995b, 1997) has addressed the effects of explicit pronunciation instruction on Spanish L2 learners in his research. In his 1995b study, he found that a multimodal

method of explicit instruction improved the pronunciation of intermediate L2 Spanish students as judged by native Spanish speaking raters. “Multimodal method” refers to the delivery of instruction through a variety of styles. These included aural, where the instructor described the sounds; verbal, where the students described the sounds; visual, where facial diagrams were shown to the students so they could see how the sounds are made; and oral practice. The target phones of his study were [a e i o u w b β d ð g ɣ p t k ɲ ɾ r s z]. The researcher does not provide a breakdown of the impact of pronunciation instruction by allophone; rather, he reports on pronunciation performance overall. The participants’ pronunciation was evaluated by three raters on a scale of 1 to 3, where higher numbers indicated better pronunciation. The study revealed that the experimental group experienced substantial gains in their scores, while the control group actually experienced losses, though these losses were not drastic.

Another instructed pronunciation study by Elliott (1997) targeted the following phones: [a e i o u r ɾ b β d ð g ɣ p t k m (allophone of /n/) ɲ z (allophone of /s/)] in intermediate L2 Spanish students. The instruction consisted of 10 to 15 minutes per class session of presentation, description, and practice of the phones, followed by normal communicative language teaching for the remainder of the periods over half of a semester. Three judges evaluated the participants’ pronunciation, and the results showed that the group that received explicit pronunciation instruction performed better in the production test than the control group. This instruction also reduced orthographic interference in the word-reading test, such as the realization of the grapheme *v* as the sound [v]. However, the participants still had difficulty when producing language freely instead of reading words. Though he did not break down improvement in terms of statistics, he did provide ample evidence that instruction does help to improve pronunciation by helping learners achieve more target-like pronunciation. This study and the one mentioned

before it both inform the research by showing that explicitly teaching pronunciation helps learners to improve it.

Another researcher who has focused attention into the effects of Spanish pronunciation teaching is Lord. In one study (2005), she worked with students in an upper-division university phonetics class. The class was an entire semester, and the instruction type was typical of an upper-division Spanish phonetics class, including explanation of the articulations of the sounds, oral practice, and transcription practice. It also included practice with acoustic analysis. Though she does not state exactly how many times the class met, she does indicate that the treatment lasted the entire semester, with the assumption of two to three class meetings per week for a standard 3-credit upper-division course.

She reports improvement in all areas of focus: voice onset time (VOT) for voiceless stops [p t k] (though she herself says that aspiration is unlikely to cause confusion in a real-world setting); the alveolar trill [r]; diphthongs (i.e., two adjacent vowels that form a single syllable) within words, e.g. *patio* (two syllables in Spanish, three in English, i.e., [ˈpa.t̪jo] vs. [ˈpæ.ɾi.oʊ]) and between words, e.g. *tu hijo* (“your son,” pronounced as two syllables in Spanish, i.e., [ˈtwi.xo]) versus the English “too easy,” in which the vowels are in hiatus (i.e., [tu.ˈwiː.zi]); and fricative allophone [β ð ɣ] production of voiced stops [b d g]. Her study was carried out without a control group, since she was measuring the effect of instruction on the students’ production of the target phones, and thus needed only pre- and post-instruction figures for the experimental group. The results show that these students did not reach 100% accuracy in any targeted area, though they did improve by varying degrees in all areas. The speech samples were taken from the students reading a passage from a book three times throughout the course of the semester to measure improvement. This study informs the current one through results, as it seems to support

the hypothesis that explicit instruction can have beneficial effects on pronunciation, since participants improved their production of the target sounds, though they did not reach fully target-like pronunciation. This might indicate that target-like pronunciation development may happen over time, even with instructional treatment.

Zampini has also carried out studies in Spanish pronunciation. Her study in 1997 showed that students learning Spanish in second- and fourth-semester courses had difficulty producing the fricative allophones of /b d g/. They were also pronouncing the grapheme *v* as the phone [v], which does not exist in Spanish. Their production of these sounds was measured via a conversational test, in which they responded to questions asked by an interviewer; and a reading test, in which they read aloud a passage from a culture text. She concludes that the mentioned outcomes are a direct result of interference from English, since fricative allophones of these sounds are nonexistent in English, and that [ð]'s phonemic status in English presents even greater difficulties to students. These results seem to predict that in the current research, participants might apply English rules to Spanish sounds, in particular, to vowel sounds the same way they do with consonants, i.e., producing different vowel sounds in varying phonetic contexts.

González-Bueno's (1994) dissertation examined the effect of formal pronunciation instruction on all Spanish stop phones ([p t k b d g]). In addition, her study also included the fricative allophones of the voiced stops (though these were not measured). Participants included in the study were intermediate students, and the instruction was given in each class meeting over the course of a semester. The instruction was broken down by place of articulation, starting at the front and moving back, i.e., the first sounds studied were the bilabial stops [p] and [b], followed by the dental stops [t] and [d], and finally the velar stops [k] and [g]. The instruction consisted of

a theoretical introduction to stops as a type of sound, including a discussion of the contrast between English and Spanish stops. Facial diagrams were used to illustrate the articulation of the sounds in question, and spectrographic diagrams showing computerized acoustic measurements of the sounds were presented to the students to show contrasts between the languages. The instruction also included perception tasks, which required participants to discriminate between the voiced and voiceless sounds. Results showed that the voiceless stops improved with regard to reduced VOT for the experimental group, with [p] being the one with the best improvement. Again, it bears mentioning that aspiration of voiceless stops is unlikely to cause any confusion in communication when speaking with native or even linguistically naïve interlocutors. Nevertheless, this study supports the hypothesis that instruction in pronunciation, in this case consonant sounds, improves production of sounds.

1.2.5 Research in Spanish perception

A study carried out by Kilpatrick and McLain Pierce (2014) examined L2 Spanish learners' perception of diphthongs in Spanish. In the Spanish language, a diphthong is either high vowel [i] or [u], unstressed, adjacent to any other vowel, whether before or after it, and whether preceded by a consonant or not. They argue that because in Spanish diphthongs are much more common than in English, where nearly all adjacent vowels are in hiatus after consonants (e.g., the name "Fiona," which in Spanish is [ˈfjo.na] and in English is [fiːˈoʊ.nɑ]), students would perceive diphthongs as hiatuses because of their native language filter. The participants included some students in first-semester Spanish courses, though others had completed the intermediate course series. All students were enrolled in general linguistics courses.

The tests involved listening to a created nonce word and indicating the number of syllables the word had by pressing the corresponding button on a computer. In addition to the 30 tokens measured in the experiment, there were 58 distractors. The pre-test showed that their

hypothesis was correct, i.e., students perceived words with the [j] semivowel at the onset of a diphthong as a full vowel [i] (for example, the word “piano,” which in English is three syllables [pi ‘æ no], but in Spanish, two [‘pja no]). The experimental treatment consisted of a brief computer-delivered training module involving explicit instruction in syllabification. This resulted in immediate gains on the task, showing that instruction in diphthongs seems to be beneficial even for advanced learners. However, the researchers did not include a control group, a limitation of the study that they admit, as the instruction cannot be proven to be the sole factor in the change from the pre-test to the post-test. Nevertheless, this study shows that perception as well as production is influenced by a native language filter (with the effects on production being called an accent). These results are particularly relevant to the present study because they predict some of the difficulties learners may have with perception of vowels, which are the focus of the present study.

1.2.6 Research on Spanish production and perception

A handful of researchers have also addressed the effects of explicit instruction in Spanish pronunciation on both production and sound perception. In one such study, Zampini (1998) examined voiced versus voiceless bilabial stops ([p] and [b]) with regard to perception and production. Thirteen volunteers from a university Spanish phonetics course recorded themselves reading a sentence in Spanish three times throughout the semester. Each volunteer also recorded a single sample of an English sentence for comparison. The perception test involved listening to a series of computer-edited samples of the words *pada* and *bada* (which are nonsense words in English and in Spanish), identifying which consonant, [p] or [b], was being pronounced in the various versions of the words.

With regard to production, the experimental group reduced their average VOT for the voiceless stop [p] drastically and approached a VOT similar to the English [b], meaning they

improved their production of this sound. However, the participants failed to prevoice the Spanish [b], which is a feature of Spanish that the author mentions; that is, in Spanish, the vocal folds begin to vibrate *before* the release of air from the mouth. The study also addressed perception of these two sounds. The participants heard several computer-edited tokens of the nonsense words *pada* and *bada* with the VOT varied, and had to choose whether the initial sound was [p] or [b] by pressing the corresponding button. This was to determine the participants' perceptual boundaries, which are their judgments of the VOT differences between the sounds [p] and [b], or in other words, where [p] stops and [b] starts. The researcher found that the relationship between perception and production varied, i.e., participants with lower (that is, more accurate) perceptual boundaries exhibited higher VOTs in production tests. This suggests that perception and production may not always be directly related. This is important to the current study because it examined participants' perception of phonemes as well as their production of them, so the hypotheses are informed by this research. By knowing that perception and production are not necessarily related, it can be assumed that improvement can be present in one and not the other.

Kissling (2013, 2014) has addressed the relationship between pronunciation and production in Spanish as affected by explicit instruction. Kissling's 2014 study examined participants at various levels: beginner, intermediate, and advanced. Instruction was computer-delivered, not in person, so they were unable to receive feedback. The target phones were [p t k β ð ɣ ɾ r]. The explicit instruction for the experimental group consisted of vocal tract models, comparisons of the sounds to English, an explanation of the grapheme-phoneme relationship, and an identification activity in which they had to identify English and Spanish sounds in isolation. A control group completed computer modules for exposure, practice, and feedback on automated tests but without phonetics instruction. The participants were tested on production and perception

via a word-reading task and a discrimination task. In the word-reading task, the participants read 27 words aloud and recorded them. In the discrimination task, the participants heard consonants in a variety of phonetic contexts and were asked to indicate whether they heard a difference between the sounds played for them, one of which was English-accented and the other Spanish target. Their production data were analyzed through computer software and evaluated by an independent party. All of the participants, both with and without the explicit instruction, slightly improved their production of the target phones [p t k ð β ɣ ɾ r] according to the rater, who was a native Spanish speaker and phonetician, though participants from higher levels performed better than those from lower levels. The results showed that a knack for perception and discrimination of sounds was a predictor of more accurate L2 pronunciation. This study shows that perception predicts production of these phones, directly contradicting Zampini (1998), presented above, and in doing so, raises questions for the current research about the relationship between production and perception of vowel sounds, the focus of the present study.

González-Bueno and Quintana-Lara (2011) carried out a pilot study in which high school Spanish students' perception and production of [ɾ] and [r] were measured. Their study had two experimental groups, which received explicit instruction in pronunciation, and a control group, which did not. The instruction was of two types: pronunciation-processing instruction (PPI), which is essentially exposure to the given phonological form in the target language that hopefully helps to improve learning *before* production is attempted, and traditional, which consisted of the teacher saying target words and the students repeating.

The PPI group had 10 minutes per day for seven weeks of pronunciation instruction through minimal pairs presented in activities, and then the last two weeks of the experimental period were spent on production. All instruction for the PPI group was done through games, such

as *matamoscas* (“flyswatter”) for perception and Bingo or Pictionary for production. The traditional instruction group received ten minutes of instruction per day for nine weeks with no production focus, i.e., they did listen-and-repeat exercises throughout the whole period, and there was no specific block set aside for production.

After the treatment period, the participants completed the post-tests. The perception test consisted of two parts: discrimination and identification. For the discrimination test, the subjects heard a series of word pairs. The pairs were either the same word or differed only in the tap/trill, and they had to indicate whether the words in each pair were the same or different. In the identification task, 28 of the words from the list in the discrimination task were played, and the participants had to indicate which of the words was being read. For the production test, the participants had to read the tokens given to them and record themselves. The production samples were measured electronically via acoustic analysis and rated by the researchers.

The results of the study show that in the perception test, the PPI students had the greatest improvement from pre- to post-test in the identification test. However, the control group experienced the greatest gains in the discrimination test. The traditional group had higher scores on the pre-tests than the PPI group and the control group (in both discrimination and identification), but their scores declined slightly on the post-test. All of the results of the pre-test fell within a 10% range, and all of the results of the post-test fell into a 10% range. In the production test, the traditional group once again outperformed the other two groups with production of the trill, but the PPI group showed greatest improvement of tap production. However, the authors also evaluate the percentage of overcorrection, meaning the percentage of trills when the tap was the target. The traditional group and control group showed more of a tendency to overarticulate; i.e., produce a trill when a tap is the target sound. For this reason, the

authors propose that the PPI group actually had the greatest improvement overall because they produced the tap when it was supposed to be produced, and did not when this sound did not belong, even though this group did not have the highest accurate production of the trill. This study again shows that instruction in sound production can lead to improved pronunciation even if perception is not substantially affected by instruction.

1.2.7 Research on factors besides instruction

Research focus has also been directed towards factors besides explicit instruction that affect pronunciation. Reeder (1997) studied mimephonic ability, i.e., the aptitude for sound imitation, and its relationship to Spanish pronunciation accuracy on beginners as well as advanced learners. The testing procedures were different for each of the two groups because of proficiency differences. The beginning participants recorded themselves repeating real words in various languages unfamiliar to them to the best of their ability. This established their aptitude for sound repetition. They read texts and repeated Spanish tokens but did not have to produce spontaneous speech because of their level. The advanced learners repeated longer foreign unknown tokens and a series of ten monosyllabic tokens not present in English or Spanish. Their production test consisted of a written question in English, to which they responded orally in Spanish. They were expected to record an answer to the question lasting approximately one minute. The recordings of mimicry and the production tests of the beginners were rated by two graduate students in Spanish linguistics with experience in phonetic transcription. The tests were rated by first establishing standards of acceptability (which are not elaborated in the publication), and then rating each utterance as acceptable or unacceptable.

The results showed that students at both beginning levels and at advanced levels with a higher mimephonic ability generally had more accurate Spanish pronunciation according to the raters. Though this study did not include pronunciation instruction, it shows that there are

individual differences in the ability to mimic sounds in adult language learners. The present study sought to extend this principle to production, i.e., the rules were taught, and the participants were expected to make the sounds in their correct contexts. This study indicates that such an outcome is possible, given that mimicry of new sounds is possible after hearing them. It stands to reason that participants would be able to make the sounds again later without hearing them immediately before the production.

A similar study performed by Rosenman (1987) conducted a similar study on perception and oral production in Spanish. Participants in the study, first and twelfth grade students in a public school system in Muncie, Indiana, performed an auditory discrimination test and an oral mimicry test in Spanish with no previous instruction. All speakers were monolingual and had no previous knowledge of Spanish. The discrimination test asked them to determine whether two tokens were the same or different, and the auditory test asked them to repeat the tokens they heard. Production data were judged by two native Spanish speaking raters, who were instructed to judge only one phonetic segment in each word, which was indicated for them by underlining the letter corresponding to the phone, e.g. *bu<u>rr</u>o*, in which the phone to evaluate is [r]. The experiment results showed that the 12th graders discriminated and imitated the sounds better than the first graders. In discrimination, the older participants averaging 17 out of 30 on discrimination and 31 out of 40 on imitation. The younger participants averaged 13.6 on discrimination and 26.3 on imitation. No individual breakdown was given for participants, though the researcher stated that there were some high-performing first graders and low-performing 12th graders. This research seems to indicate that it is possible for individuals in their late teens to pronounce the sounds of Spanish accurately. This supports the hypothesis that target

pronunciation is possible in late adolescents, especially considering that some of the participants in the current study were approximately the same age as the 12th graders in Rosenman's study.

Another variable addressed by researchers is the effects of instruction and study abroad on pronunciation. The following two studies on this area are included here because they measure the effectiveness of immersion either against or alongside instruction. Though they include effects of instruction, they are presented together here apart from the studies on instruction due to their emphasis on immersion in study abroad contexts.

The first study, by Díaz-Campos (2004), investigates the effects of study abroad in a target language-speaking country versus classroom learning (though the level and instructional methodology were not specified) on participants' pronunciation. The target phones analyzed were the consonants [p t k ʝ ð ɣ ɬ ɲ]. This study did not examine the commonly-studied voiced bilabial fricative [β]. The participants consisted of students taking Spanish classes at the University of Colorado and students enrolled in a ten-week study abroad program in Alicante, Spain. The test consisted of reading a text before and after the experimental period, and the evaluation procedures were not specified. The results showed that the participants who studied Spanish in an American classroom outperformed the study abroad students in all areas, though the gains, i.e., the improvement from beginning to end, were not significantly different between groups. This suggests that input alone is not enough to acquire target-like pronunciation, and that instruction may actually be better than large amounts of meaningful input or linguistic immersion with regard to pronunciation in adult learners. Still, this adds to the current study by showing that instruction can be a key factor in the acquisition of L2 pronunciation.

The second study reviewed in this section was conducted by Lord in 2010. It focuses on the effects of a combination of instruction (a phonetics class) and study abroad on the production

of Spanish voiced stops and fricatives. All of the volunteers participated in an 8-week study abroad program in Mexico. Half of them had taken a Spanish phonetics class prior to the study abroad experience, and the other half had not. The data for the experiment were collected through a pre-test and post-test, in which the participants recorded themselves reading a list of words once before the study abroad program started and again after it finished. During the program in Mexico, the participants took the same three courses, stayed with host families, and spoke only Spanish except in the architecture class in which they were enrolled. The classes they took abroad were not on grammar or pronunciation, and they reported only receiving corrective feedback when their pronunciation affected their comprehensibility. Upon completion of the post-test, the researcher used computer software to analyze the sounds and evaluate the results. The results reported that a combination of instruction and immersion greatly improved production of fricative allophones over immersion alone, though the two groups consisted of only four participants each. Neither group reached 50% accuracy in the production of fricative allophones in the experiment, though the instruction group outperformed the no-instruction group considerably in the post-test. This study contradicts Terrell's (1989) statement mentioned earlier that meaningful input is better than instruction for pronunciation accuracy. It is safe to assume that in a study abroad program, the students are exposed to large amounts of meaningful input, especially since the researcher herself describes the program as intensive. This study therefore seems to indicate that input alone is not enough to teach pronunciation, and that instruction in addition to input is greatly beneficial, supporting the hypothesis of the present research.

1.2.8 Research on Spanish stress

Other aspects of Spanish pronunciation have been examined by research. Lord (2007) discussed learner acquisition of stress patterns in Spanish. She asserts that "suprasegmental

aspects of language are neither taught nor considered in most classrooms or textbooks" (p. 1). In her study, students' understanding of Spanish stress patterns was evaluated by presenting them with sentences containing both real words and invented words. Their production of the words was then analyzed to see whether they followed the rules of stress in Spanish. She found that in the case of nonce words or words that students had never seen before, they used patterns present in words that they did know from Spanish, and in the absence of such words (which was sometimes the case with beginning learners), they resorted to similar English words. Participants in this study were from beginner (though not first semester), intermediate, and advanced levels of Spanish, as well as native speakers to serve as a baseline for comparison. Some of the participants were consciously aware of the rules of Spanish stress[1] She reaffirms that beginning students did not know these rules because stress generalizations and rules of written stress marks are omitted in beginning Spanish classrooms. One of the goals of the present study is to address the issue of whether stress patterns can be taught via explicit instruction. This question would be evaluated through participants' word stress placement in the tests. This study by Lord contributes to a hypothesis that stress patterns can be learned, as the more advanced learners were able to explain them, even though their stress accuracy was not 100%.

1.2.9 Gaps in research

The review of the literature reveals several gaps in the area of Spanish pronunciation instruction. First, many of the studies described do not discuss pronunciation instruction *per se*, but rather accent reduction. Thomson (2014) distinguishes between these terms by limiting

[1] Spanish stress rules dictate that words ending in a vowel, [n], or written *s* will receive stress on the penultimate syllable. Words ending in any other consonant sound (or a semivowel in the case of final syllables consisting of diphthongs) will receive stress on the last syllable. Any exceptions to this rule will have a written diacritic mark over the stressed vowel. Exceptions can consist of words whose stress falls outside of the last two syllables as well as words ending in vowels, [n], or [s] with final syllable stress (for example, *desván* ("attic")) and words ending in a consonant with penultimate syllable stress (for example, *lápiz* ("pencil")).

pronunciation instruction to "those features of pronunciation that actually impact intelligibility, rather than addressing every pronunciation feature that contributes to the perception of a foreign accent" (p. 164). Stated simply, pronunciation instruction is teaching phoneme articulation, while accent reduction is teaching allophone articulation[2]. Many of the reviewed studies examine features that contribute to English-accented Spanish speech production, such as avoiding aspiration of [p t k] or using the fricative allophones [β ð ɣ] of the voiced stops [b d g]. As such, these studies approach accent reduction and not actual pronunciation instruction as defined here. In other words, the studies that examine production of these allophones as well as phonemes such as the alveolar tap and trill or vowels combine pronunciation instruction and accent reduction, and studies that focus exclusively on phonemes are pronunciation instruction. This distinction will become important in the next sections.

The second gap is the lack of studies on Spanish vowel pronunciation instruction. Besides the study of the combination of pronunciation instruction with accent reduction, an examination of Spanish vowel production is nearly absent. Only a few studies focus on Spanish vowel pronunciation, and none exclusively analyze vowels as target sounds, e.g Elliott (1995a, 1995b, 1997), studies that include vowels along with other phones. The present study aims to contribute to the field of Spanish vowel pronunciation instruction by focusing only on vowels in production and perception tests.

The third research gap is student level. Previous studies done using beginning students do not focus on them exclusively; rather, they include them along with intermediate and/or advanced learners, such as Kissling (2014). This lack of research opens up a window for studies to examine what happens when elementary students are taught pronunciation from the beginning,

[2] For the purposes of this study, the term "pronunciation instruction" will include the teaching of stress patterns, as word stress is phonemic in Spanish.

as the previous studies have dealt with teaching pronunciation to students who have studied the language in university classes for at least a semester already.

1.3 Conclusion

In summary, research has shown that instruction in pronunciation is beneficial to students learning language at the intermediate and advanced levels, but no study to my knowledge has examined the effects of instruction only on elementary students[3]. Also, the studies in Spanish have not exclusively focused on participant vowel production, instead focusing on consonantal phones or vowels and consonants together.

[3] In elementary level classes, and therefore in this study, one can expect there to be true and false beginners. True beginners are students who enroll in elementary classes with no previous instruction in the language in question. False beginners are students who enroll in elementary classes but have studied the language previously. These are the terms that will be used to differentiate both types of participants hereafter.

Chapter 2: Research Questions and Hypotheses

2.1 Purpose of the study

The purpose undertaken in this study was to examine the effects of explicit pronunciation instruction at the beginning of the first semester of Spanish at the university level, in terms of whether instruction has positive effects on production and perception of vowels and word stress at this level. For this study, the term "perception" will be defined as "the ability to identify and correlate patterns of vowel pronunciation and word stress between written and spoken forms." In other words, perception is the ability to relate sounds to letters, knowing which sounds are and are not represented by the letters of Spanish, as well as the ability to identify compliance or defiance of the rules of Spanish stress. The term "production" will be defined as "the ability to apply the rules of Spanish vowel pronunciation and word stress to the participants' own speech." In other words, perception is the ability to apply the rules of Spanish pronunciation to what is heard, i.e., whether a written word is pronounced correctly in a recording, while production is the ability to apply the rules of Spanish pronunciation to what is uttered, i.e., how a written word should be pronounced. The ideal target group would have been true beginners taking elementary Spanish I as their first exposure to the language, but this was not the case. Only nine were true beginners.

Arteaga (2000) proposes a heavier focus on pronunciation in elementary Spanish. Among other things, she argues that vowels need to be taught to beginners due to high levels of contrast between English and Spanish vowel systems. She also discusses other aspects central to Spanish pronunciation, but these are beyond the scope of this thesis. Her discussion of the elements of vowel articulation includes correct articulation, shortness, avoidance of diphthongization, and avoidance of centralization (schwa).

As all vowels in Spanish are phonemes, evidenced by the minimal set *paro, pero, piro, poro, puro* (unemployment, but, I take off, pore, pure), it is important to articulate the correct vowel while speaking, as an incorrect pronunciation could result in a different word being said. For this reason, this thesis examined the effects of explicitly teaching the five Spanish vowel sounds to elementary Spanish students, along with teaching diphthongs as part of the vowel system, and word stress, which is also phonemic and has effects on vowel pronunciation in English.

2.2 Research questions and hypotheses

2.2.1 Research questions

Research questions for this study address the effects of explicit pronunciation instruction i.e., being taught how to make the sounds through methods such as mimicry and explanations of sounds and how they contrast or compare with their English counterparts, with regard to two areas of language: perception and production. Based on the gaps identified in previous research, the project undertook a study in the relationship between pronunciation instruction and vowel production and perception in beginning Spanish students. The questions were:

1. Whether teaching pronunciation rules to students explicitly at the beginning of their studies in Spanish have positive effects on perception tasks with regard to vowels and word stress.
2. Whether teaching pronunciation rules to students explicitly at the beginning of their studies in Spanish have positive effects on production tasks with regard to vowels and word stress.
3. Whether there is a relationship between perception and production of Spanish vowels and word stress.

2.2.1 Hypotheses

Previous research on the effects of explicit pronunciation instruction reviewed seems to predict for the present study to have positive results on both perception and production. Hence the hypotheses for the study are the following:

1. Students in the experimental group would improve their perception of tokens produced by other speakers, thus gaining an ability to distinguish between Spanish phones and their English counterparts.
2. Students in the experimental group would improve their production of Spanish vowels, though not to the point of being native-like in their productions.
3. Students in the experimental group would improve their perception and production of Spanish stress patterns.

According the studies reviewed, participants would be likely to be better able to differentiate the sounds heard after explicit instruction in pronunciation, but they would not be likely to reach native-like pronunciation after only one lesson. This conclusion was reached by examining the studies by Elliott (1995a, 1995b, 1997) and Lord (2005), in which 100% accuracy in production was not reached even after a semester, and Kilpatrick and McLain Pierce (2014), in which perception was dramatically increased after instruction.

In terms of production, participants would likely to be closer to native-like, meaning that their vowels would more accurately represent correct articulation. This is supported by the previous studies reviewed, in which students who received explicit instruction in pronunciation performed better than they did before the instruction and better than students in control groups, even in study abroad contexts. The studies show that this is the case in both English and Spanish (Diaz-Campos 20014; Elliott 1995a, 1995b, 1997; Kissling 2014; Lord 2005, 2007, 2010; Saito 2011, 2013a, 2013b, *inter alia*).

With regard to stress, the same conclusion is drawn based on previous data. Stress is simply another aspect of pronunciation, so explicit instruction of the rules of Spanish stress can be expected to have positive results in the same way that teaching articulation of sounds has positive results.

These aspects are important to pronunciation in Spanish because all vowel sounds are phonemes in Spanish, and there are only five vowel sounds, which contrasts with the English 15,

including schwars (stressed ɝ, as in “early” and unstressed ɚ, as in “mother”). Also, in English, unstressed vowels are often reduced to the allophone schwa [ə] (Small 2012), whereas in Spanish, all vowel sounds are fully articulated in all contexts regardless of syllable stress. In addition, word stress is phonemic, as there are minimal pairs in which word stress is the only difference, such as in the minimal pair *sabana* (savannah) and *sábana* (bed sheet), and many vowel pairs that distinguish between tenses. For these reasons, these aspects were included in the evaluations.

2.3 Conclusion

This research attempted to fill two of the gaps in the existing research, contributing to the field of pronunciation in foreign language teaching, as well as pronunciation within the communicative approach. Based on previous research, their production and perception can be predicted to improve, though not reaching native-like levels.

Chapter 3: Methodology

3.1 Introduction

The focus of the current research project was to explore whether explicit pronunciation instruction of vocalic phonemes and stress patterns of Spanish have a positive effect on pronunciation and perception.

To answer this question, an experimental design was chosen. The experiment was composed of three sessions, and participants were divided evenly into two groups: experimental and control. The first session included an Orientation and a pre-test. In the first session, student volunteers decided whether or not they were interested in participating in the study. Those who were interested completed a questionnaire and a pre-test to gauge participants' knowledge of Spanish as well as for purposes of assignment to the experimental or control group. In the second session, which included experimental group participants only, a lesson was presented detailing the pronunciation of the vocalic phones of Spanish. The lesson was followed by an immediate post-test. The third session involved only the delayed post-test, and it included the participants in the control group again.

3.2 Participants

To recruit participants, the researcher visited Spanish 1010 classes at Auburn University. During the third week of classes, the orientation session (see section 3.3) was conducted, and a total of 33 students (9 male, 24 female; age 18-44, average 20.76) came to the orientation session. All but one were native speakers of English, and the remaining participant was a native speaker of Korean[4]. Of these 33 original participants, three did not attend one or both of the subsequent sessions, and were therefore eliminated from the results. Nine were true beginners, though of these nine, only one had never studied any foreign language previously. The remaining

[4] This participant was eliminated because he did not attend the third session.

participants had either studied Spanish before, had studied another language before, or in some cases, both. Table 3.1 contains the details of the participants who attended all required sessions. It does not include the data for participants who did not complete the study. Note that “number” refers to the alphabetical order of their code word (see section 3.2.1 below) that was given to them in the orientation session. All participants who completed the required steps of the study were awarded 20 bonus points for their Spanish 1010 grade.

Table 3.1

Number	Group assignment	Gender	Age	L2 (not Spanish) experience	Previous Spanish Experience
1	Experimental	F	44	n/a	2 years hs
2	Control	M	22	Mandarin, 3 months	2 years hs
3	Control	M	21	n/a	2 years hs
4	Experimental	F	19	French, 11 years; Latin, 2 years	0
5	Experimental	M	19	Latin, 4 years	0
6	Control	f	20	n/a	2 years hs
7	Experimental	F	21	n/a	2 years hs
8	Experimental	F	19	Latin, 3 years	0
9	Experimental	F	19	Latin, 4 years; Italian, 3 months	0
10	Control	F	19	n/a	2 years hs
11	Control	M	20	n/a	1 year hs
12	Control	f	20	n/a	2 years hs
13	Experimental	F	19	Latin, 3 years	0
14	Control	m	22	Latin, 6 years	2 years hs
15	Experimental	F	19	n/a	2 years hs
16	Experimental	F	19	Latin, 2 years	0
17	Experimental	F	39	n/a	0
18	Experimental	F	19	n/a	3+ years hs
19	Experimental	F	19	Latin, 2 years	0
20	Experimental	F	19	n/a	2 years hs
21	Control	F	18	n/a	2 years hs
22	Control	M	21	Hebrew, level 1	2 years hs
23	Control	M	19	n/a	2 years hs
24	Control	F	19	n/a	2 years hs
25	Control	f	19	n/a	2 years hs
26	Control	f	19	n/a	1 year hs
27	Control	M	18	n/a	2 years hs
28	Experimental	F	19	n/a	1 year hs
29	Experimental	F	18	Latin, 2 years	0
30	Experimental	F	20	French, 1 year	2 years hs

Two of the participants came from the researcher's class. Both were true beginners. Two one-way ANOVAs revealed no significant difference between these two participants and the other true beginners and the experimental group as a whole.

3.2.1 Experimental and control groups

Once the orientation session was conducted, students who decided to participate in the study completed a preliminary questionnaire, drew a word out of a box to code their tests and protect their identities, and then completed the production and perception pre-tests. To divide the participants between experimental and control groups, the following steps were taken: first, all true beginners of Spanish (as attested in the questionnaire) were assigned to the experimental group in order to see the effects explicit instruction has at the beginning stages of L2 learning. Then, participants were assigned to the control group based on their scores on the perception test, higher scores being assigned to this group, until the number reached 16, or half of the participant pool. The control group's perception test score range was 54.2% to 79.3%. The remaining participants were placed in the experimental group. The experimental group's perception test score range was 40.7% to 69.5%. A one-way ANOVA revealed no significant difference in the scores of perception on the pre-test between the true and false beginners in the experimental group, showing that the group was comprised of equal performers in perception. The reason the perception test was used was because scoring all results of the production test in the time available was not feasible. After these criteria were followed, the experimental group had 17 participants and the control group had 16 participants. All participants were notified via e-mail of their group assignment and the next meeting session they would have to attend.

At the second session, the experimental treatment session, one person did not attend, reducing the experimental group to 16. All of the remaining experimental group participants attended one of the treatment sessions held the week after the orientation.

Five weeks later, the third session took place and the post-test was administered. Two participants did not attend, and therefore were eliminated from the study. Both were from the

control group, leaving a total participant pool of 30: 16 in the experimental group and 14 in the control group, all of whom spoke English as their native language.

3.3 Experimental sessions

The experiment was composed of three separate sessions for the experimental group and two for the control group. In the first session, there was an orientation during which potential participants were explained the expectations of the project in detail, filled out the preliminary questionnaire form, signed the consent form, and completed the production and perception pre-tests (see section 3.4).

The second session was only for the experimental group, as it included the experimental treatment, that is, the explicit pronunciation instruction was given (see section 3.6). This was followed by the immediate post-tests of perception and production.

The third and final session consisted only of the administration of the delayed post-test, after which the participants were sent a debriefing form via e-mail to inform them of what was not included in the original information and let them see the evaluation rubric.

All of the experimental sessions had three meeting times to choose from, and the participants were required to attend one of the meetings. This was to ensure the least amount of conflict with work, class, labs, or other obligations that may have prevented or hindered participation. The first two sessions started in a classroom and then moved to a computer lab for testing (see section 3.4). The final session consisted only of the delayed post-test, so it took place only in the computer lab.

3.4 Tests

Testing design for this study addressed two areas: Perception of vocalic sounds and stress patterns in Spanish and production of vocalic sounds and stress in Spanish, as previous studies

with similar focus have done (Elliott 1995a, 1995b, 1997; Saito 2011, 2013a, 2013b; Lord(2005, 2007, 2010; Kissling 2014, among others).

3.4.1 Perception test

The perception test was administered through a Qualtrics survey in which participants were shown a word displayed on the computer screen and listened to a word through headphones and were asked to indicate via a yes/no response whether the word they heard matched the word written on the screen, following a similar design used by González-Bueno and Quintana-Lara (2011), though it is slightly modified. The goal of this test is to test whether explicit pronunciation instruction had any effects on participants' ability to distinguish between Spanish vowel sounds and their English counterparts, one of the goals of the study.

The perception word list contained 60 words, measuring ten phonological contrasts (see Appendix C), one of which was word stress. The remaining nine were phonological and orthographical contrasts between English and Spanish. Each contrast had six words that served to measure it. This was done to ensure equal distribution among contrasts.

The voice in the recordings was that of the researcher, a native English speaker with advanced proficiency in Spanish. It was determined that this was the best option, as the errors in mispronunciations that needed to be produced would have been difficult for native Spanish speakers to make in their own language, such as the combination [kju] in an unstressed syllable (see Appendix C) . Nonetheless, all recordings were approved before use by the thesis director, a native Spanish speaker with a Ph.D. in Spanish linguistics. The recordings were made via Audacity and uploaded to the Qualtrics survey to be embedded in each question. Half of the recorded words matched the words on the screen, and half did not; that is, 30 out of 60 were "yes" answers. This was done to ensure an even distribution of "yes" and "no" answers. In addition, three of each of the six words measuring each phonetic contrast were "yes," and three

were “no.” This ensured that each contrast tested had exactly the same number of affirmative and negative answers, which served to guarantee equal coverage of all phenomena.

The evaluation of the perception test was automatic; that is, the correct answers were programmed into the Qualtrics survey beforehand to facilitate scoring.

All tokens in the perception test were phonetically possible in Spanish; that is, no word contained a segment not found in Spanish, such as a schwa or a lax vowel such as [ɛ]. This was done because the perception test was to gauge participants’ ability to match Spanish sounds to their written representations, so using any sound outside of the Spanish phonetic inventory would not have been appropriate. Nevertheless, the contrasts tested were based on English and Spanish orthographic contrasts (see Appendix C for a list of contrasts and word list with transcriptions).

3.4.2 Production test

The production test focused on participant production of vowels, as one of the goals of the present research was to address whether explicit pronunciation instruction on vocalic sounds and stress patterns of Spanish has any effects on participants’ pronunciation. A reading task design consisting of discrete words was chosen for the production test because of the limited exposure to Spanish participants had at the moment of the experiment. This design also guaranteed that the vowel sounds would be evenly distributed and predictable for evaluation. The task consisted of participants recording themselves while pronouncing a list of words containing each of the five Spanish vowels in tonic and atonic positions, five times each, for a total of fifty tokens. All of the words were exactly three syllables with varying levels of stress to allow for the stressed vowel to be in different positions. No word contained a diphthong, and only two contained consonant clusters (see Appendix D for the complete list). The reading task for production was also administered through Qualtrics, and the recordings were made via Audacity.

3.5 Data processing and analysis

All tests were administered on campus in a computer lab equipped with headphones and microphones. The audio recordings were taken from the computers and put on the researcher's encrypted jump drive and backed up on a computer in his office. Once the tests were complete, the researcher, a Master's level student in Spanish with phonetics training in Spanish, English, and French, evaluated the pronunciations of the students following a written rubric. Another rater was recruited to rate the samples from the pre-test and the immediate post-test as well to give an additional score for each participant. At the end of the rating process, a random sampling of 12 tests showed only 57% agreement in individual scores of vowel accuracy. Stress placement correlation was 81%, but the low agreement in accuracy coupled with the large range of score differences in both areas justified the use of the evaluations from both raters. The rater was a native Spanish speaker from Spain with a Master of Arts in Spanish. She was trained before evaluating the production tracks. The evaluation rubric included word stress and articulatory accuracy (See Appendix D). As mentioned before, these aspects are important to pronunciation in Spanish because all vowel sounds are phonemes in Spanish, and there are only five vowel sounds, which contrasts with the English fifteen.

Each word had only one target vowel to be scored. The vowel was underlined on the rubric for the researcher and evaluator. Comments could be given on any aspect of pronunciation, but only the underlined vowel was assigned a score on the provided scale of 0 to 2, and all words were given a "yes" or "no" evaluation with regard to word stress.

With regard to word stress, a "yes" response was to be given only if the correct syllable was stressed, and no other syllable was also stressed. A "no" response was given if the incorrect syllable was stressed, if more than one syllable was stressed, or if no syllable was stressed. With regard to articulatory accuracy, a score of 2 meant that the vowel was articulated correctly and

non-accented. A score of 1 could have meant several things: accurate but accented, diphthongized in the case of [e] and [o], a palatal glide in the case of [u], or within a range of acceptability for the vowel, such as pronouncing the grapheme *e* as [ɛ] or *i* as [ɪ]. A score of 0 meant that the vowel was completely English, falling outside of the range of acceptability for the vowel. A 0 was also given in the event that the vowel was pronounced in a way that was completely incorrect, such as pronouncing the grapheme *e* as [ɑ]. Since vowels in Spanish are not centralized, a 0 was also given when a schwa was produced. Furthermore, a 0 was assigned in the event that the vowel was rhotacized, since the sound [ɹ] does not exist in Spanish, but it affects preceding vowels in a way that is specific to English[5] (Small, 2012).

3.5.1 Data analysis

Once all scores were obtained, the researcher ran Repeated Measures Analyses of Variance (repeated measures ANOVAs) on the data for the groups. One was done on the experimental group's perception pre-test and immediate post-test, then another with the same two and adding the delayed post-test. One was run on the control group's two perception tests. One repeated measures ANOVA was run for each of the following areas: stress accuracy from pre- to post-test according to the researcher, articulatory accuracy from pre- to post-test according to the researcher, stress accuracy from pre- to post-test according to the second rater, and articulatory accuracy from pre- to post-test according to the second rater. The data of the true beginners were isolated, and repeated measures ANOVAs were run in the same areas as above. A one-way Analysis of Variance (ANOVA) was also run on perception test scores in experimental versus control group, and also on the true beginners versus false beginners in the experimental group. Finally, one more one-way ANOVA was run on the pre-test data in order to

[5] The sound may exist in other languages, but the current study only compares English and Spanish sounds.

see if the higher perception scores of the participants assigned to the control group were reflected in their production scores.

All statistical analyses were run using IBM SPSS version 23.

3.6 Experimental treatment

The instructional treatment had to be given outside of class time. For this reason, it consisted of only one session, following Kilpatrick and McLain Pierce (2014). The instruction lasted approximately half an hour, with slight variations of no more than five minutes between the different meeting times.

The instruction was composed of modeling and repetition of the vocalic sounds in isolation, comparisons with English corresponding sounds, and word repetition drills, reflecting the multimodal methodology to cater to different learning styles, as suggested by Elliott (1995b).[6]

During the treatment session, the participants were presented with the basic rules of Spanish vowel pronunciation and word stress. First, the simple vowels were presented, explained, and modeled. The vowels were modeled in the video by the researcher as well as through a Spanish phonetics module available from the University of Iowa (see Appendix D for a screenshot of the module). Then, the diphthongs were presented, explained, and modeled. Finally, the three rules of word stress were presented and modeled, followed by practice, as seen in Appendix D. The instruction was video recorded to ensure that all sessions received the same instruction, though the video was paused periodically to allow questions, and the word stress

[6] Though Elliott included vocal tract diagrams in his semester-long studies, this study did not, as the information presented needed to be as salient and digestible as possible. For this reason, the diagrams were left out in favor of simpler explanations. This is because the instruction took place in one lesson outside of class time. In other words, had it been a longitudinal study over several weeks, facial diagrams and animations would have been used as part of instruction. As it was, they were left out in order to reduce the information input and keep the information simple and clear.

practice section was done live due to issues with video recording of a PowerPoint presentation. Also, during the stress practice section, the participants were asked to explain why the stressed syllable was what it was, in order to have more practice with the rules. See table 3.2 for a summary of the rules.

Table 3.2[7]

Rule 1:	If the word ends in a vowel, [n], or written *s*	Second-to last syllable stress, e.g. “pulpo” [ˈpul.po] (octopus), “revelan” [re.ˈβe.lan] (they reveal), and “gambas” [ˈgam.bas] (shrimp)
Rule 2:	If the word ends in any other consonant	Final syllable stress, e.g. “universal” [u.ni.βeɾ.ˈsal] (universal), “juzgar” [xusˈɣaɾ] (to judge), etc.
Rule 3:	If the word has a written accent mark	The syllable with the accent mark is stressed, e.g. “pálido” [ˈpa.li.ðo] (pale), etc.

The researcher was willing to answer questions about any aspect of Spanish pronunciation, though none was asked outside of what was taught during the session. Participants were allowed to take notes, though only a few of them took advantage of this option. No notes were allowed during the assessments.

[7] Exceptions to these rules exist in the form of loan words, many of which are from English, e.g. “ketchup” [ˈke.ʧup], “donut” [ˈdo.nut].

3.7 Conclusion

The present study sought to investigate whether teaching pronunciation explicitly at the beginning of instruction in Spanish has benefits in vowel production, as well as perception of utterances by others. Therefore, the participants completed a test in which they were asked to judge the difference or sameness between a spoken and written token, then one in which they were asked to read words and record them via Audacity. Both tests were administered through Qualtrics.

The experimental treatment information was presented in a multi-method approach similar to that of Elliott (1995b), and the format of measurement was pre-test, post-test, delayed post-test. The control group will take the pre-test and delayed post-test to verify whether the instruction in pronunciation is a factor in the pronunciation of participants. The participants were recruited from Elementary Spanish I classes at Auburn University, and were rewarded with extra credit.

The production data were evaluated by the researcher and another rater, then analyzed with paired samples t-tests, repeated measures ANOVAs and one-way ANOVAs. The perception data were evaluated automatically, and the scores were analyzed with paired samples t-tests, repeated measures ANOVAs and one-way ANOVAs for different comparisons.

Chapter 4: Results

4.1 Introduction

The focus of the present study is the effects of explicit pronunciation instruction on production and perception of Spanish vowels and stress. Data were collected through perception and production pre-tests, immediate post-tests and delayed post-tests. In order to measure the results, three types of data analyses were carried out: repeated measures ANOVAs were run to determine the effects of instruction (or the lack thereof) within the groups, paired samples t-tests were run when there were only two test times (e.g. control group perception, all production, and comparisons of the experimental group's perception pre-test and immediate post-test only), and one-way ANOVAs were run to compare the results of two different groups (e.g., control versus experimental or true versus false beginners). The presentation of the results will be structured as follows: first, the individual participants' scores, followed by the mean scores for each group, (i.e., control versus experimental) will be presented for the categories of pre-test, immediate post-test, and delayed post-test. The test types will be perception, accuracy of stress placement in production according to the researcher, articulatory accuracy in production according to the researcher, accuracy of stress placement in production according to the second rater, and articulatory accuracy in production according to the second rater. The production results will only include the experimental group, as data for the delayed post-test was not analyzed due to time constraints, and therefore there is no source of comparison for the control group, for which only the production pre-test was evaluated at the time of the publication. After presenting the raw individual and mean scores for each group, the results of the statistical analyses will be presented.

All numbers are percentages and have been rounded to one decimal point. It is important to note that three participants' production results were eliminated from the results, one from the

control group, and the other two from the experimental group. This was deemed necessary because the production of these three participants differed from the target words in such a degree that inclusion of their results in the data would have skewed the results. Specifically, their non targetlike production consistently involved adding sound segments whose corresponding graphemes were not in the target words, deletion or addition of entire syllables, metathesis of consonants, and omission of segments, both consonants and vowels.

Because the study sought to determine benefits both in perception of vowels and perception of word stress, additional separate tests were run for each category in perception, i.e., stress rule adherence and vowel rule adherence. This was to be able to show the effects of instruction in each measured area individually.

After the scores are presented, the results of the statistical analyses will be shown. The discussions of the results will be presented in the following chapter. All statistical analyses assumed $p \leq .05$.

4.2 Results

4.2.1 Perception test scores for the experimental group

Before discussing perception test scores, it needs to be mentioned that there was a slight difference between the perception pre-test and both post-tests. When making the Qualtrics survey, the researcher failed to activate a feature that would prevent participants from skipping questions. For this reason, some of the participants' scores are out of a different total from the rest. This issue was fixed in the immediate and delayed post-test. To account for the difference, all scores were calculated as a percentage of accuracy, with the number correct out of the number answered used as the official score.

The perception test individual scores are illustrated in Table 4.1 below:

Table 4.1[8]

Participant[9]	Perception pre-test score	Perception immediate post-test score	Perception delayed post-test score
1	53.6	53.3	55
2*	62.7	60	58.3
3*	66.1	68.3	63.3
4	50.8	60	56.7
5*	49.2	65	50
6*	69.5	73.3	76.7
7*	50.8	65	55
8	49.2	60	58.3
9*	59.3	68.3	65
10*	50	53.3	50
11	55.4	68.3	65
12*	50	70	71.7
13	52.5	50	50
14	50.8	50	50
15*	40.7	70	58.3
16	50	56.7	65

As the table shows, the general trend in participants was that the immediate post-test resulted in improvement from the pre-test, but these gains were not fully retained in the delayed post-test. The average scores illustrated in the table below indicate the same outcome.

Table 4.2

Pre-test: 53.8	**Immediate post-test: 62.0**	**Delayed post-test: 59.3**

According to raw scores in Table 4.2, there was improvement in perception overall after treatment, though it declined in the delayed post-test. Nonetheless, the delayed post-test showed higher scores than the pre-test, indicating that there was some retention over time.

[8] All participant numbers correspond to the alphabetical order of the code words given during orientation, e.g. "aware," "plant," "train," etc.

[9] On all score tables for the experimental group, an asterisk will denote a true beginner.

Furthermore, the results of the perception tests were broken down according to perception of stress rule adherence (i.e., whether the word was correctly stressed according to its spelling) and perception of vowel sound accuracy. For the sake of simplicity, only the mean scores will be presented in Table 4.3 below.

Table 4.3

Perception pre-test stress perception mean score: 54.2	**Perception immediate post-test stress perception mean score: 62.9**	**Perception delayed post-test stress perception mean score: 57.3**
Perception pre-test vowel perception mean score: 54	**Perception immediate post-test vowel perception mean score: 61.8**	**Perception delayed post-test vowel perception mean score: 59.5**

This table indicates similar scores between perception of stress and perception of vowel accuracy, showing that improvement was not substantially different in the two areas.

4.2.1.1 Analyses of perception test scores for the experimental group

First, a paired samples t-test was run testing only the difference from the pre-test to the immediate post-test. The independent variable was "Instruction" and the dependent variable was the score. The statistics revealed that there was a significant effect for instruction, $t(15)=-3.695$, $p=.002$. This indicates that the improvement in scores for the experimental group was statistically significant immediately following instruction.

A repeated measures ANOVA was run to include the delayed post-test. Again, a significant main effect was found for instruction, $F(2, 30)=9.79$, $p=.001$. This shows that the participants retained what they had learned in the instructional session over five weeks' time. A

pairwise comparison revealed significance between the pre-test and both post-tests, but not between the post-tests. In other words, the decline from the immediate post-test to the delayed post-test was not significant. This reveals that the instruction yielded significant improvement even after five weeks had passed between instruction and the delayed post-test.

After the breakdown of the two areas of perception, additional tests were run. It revealed that there was no statistical significance of instruction in stress perception improvement from the pre-test to either post-test, but there was significance of instruction in vowel perception improvement due to instruction, $t(15)=-2.409$, $p=.029$ from pre-test to immediate post-test. When the delayed post-test was added, the instruction still had significance, $F(2, 30)=4.053$, $p=.02$. These analyses reveal that the instruction improved the participants' perception of vowel sounds better than their perception of word stress patterns. It bears mentioning that vowel stress adherence was measured only by six tokens, whereas all other aspects of vowel perception were measured by a total of 54 tokens (6 for each contrast x 9 contrasts = 54)

4.2.2 Perception test scores for the control group

The perception test individual scores for the control group are given in Table 4.4 below:

Table 4.4

Participant	Perception Pre-test score	Perception Delayed Post-test score
1	71.2	73.3
2	71.2	66.7
3	59.3	53.3
4	59.3	65
5	55.9	55
6	55.9	58.3
7	66.1	51.7
8	65.5	63.3
9	79.3	80
10	67.8	70
11	72.9	73.3
12	59.3	63.3
13	54.2	51.7
14	66.1	68.3

The table shows that the individual participants in the control group underwent little change from the pre-test to the post-test, with the exception of number 7, whose score declined by almost fifteen points. As Table 4.5 shows below, the control group's overall perception average declined from the pre-test to the post-test despite the fact that they were taking Spanish classes during the six weeks that elapsed between the tests.

Table 4.5

Pre-test: 64.6	**Delayed post-test: 63.8**

Furthermore, as above, the ability to perceive adherence to stress rules and vowel pronunciation rules were also analyzed individually. Table 4.6 shows the mean scores in these areas.

Table 4.6

Perception Pre-test stress perception: 64.3	**Perception Delayed Post-test stress perception: 53.6**
Perception Pre-test vowel perception: 64.2	**Perception Delayed Post-test vowel perception: 65.0**

Here, perception of stress declined drastically, with perception of vowel pronunciation increasing just slightly. The following section presents the statistical analyses of these data.

4.2.2.1 Analyses of perception test scores for the control group

Another paired samples t-test was run with the same parameters as the first, except that the immediate post-test was replaced by the delayed post-test. In this test, no significant effect was found, $t(13)=.568$, $p=.58$. This indicates that the control group's change in overall perception was not statistically significant.

When the data for perception were broken down between stress and vowel quality, there was significance in the stress decline, $t(13)=2.223$, $p=.045$. However, since the group is the control group in this case, the significance of the decline can be attributed to the lack of instruction in the rules of Spanish pronunciation and word stress. With regard to the perception of vowels, no significant difference was present.

4.2.2.2 Analyses of perception test scores for both groups

As stated, the groups were created by placing higher-scoring participants in the control group. This meant that the groups were different at the beginning of the experiment, which is why the tests mentioned examined each group individually, not as a comparison. In order to see how the groups compared on the perception pre-test, an additional one-way ANOVA was run to

test the significance of the difference between the groups' scores on the pre-test and delayed post-test, with the results showing $F(868.322, 54.544)=15.92$, $p<.0005$ for the pre-test and $F(153.307, 70.908)=2.162$, $p=.153$ for the post-test. In other words, there was a significant difference in their scores for the pre-test, and there was not a significant difference in their scores for the post-test. This shows that after experimental treatment, the group with lower scores in perception was able to reach a score closer to the group that had higher scores from the start, effectively bridging the gap between the participants who were more advanced and those who were at a lower level from the beginning of the research.

4.2.3 Production test scores for the experimental group

As mentioned in Chapter 3, production tests were evaluated by two raters: the researcher and a second rater to ensure rater reliability. However, interrater reliability was not established due to the low correlations between the two raters' individual scores. For this reason, both raters evaluated all production tests, and the results of both were statistically analyzed and presented below. For the sake of clarity, the individual scores on the production tests for the experimental group participants are presented in two sets of tables. The first four tables (C-F) shows the scores over time (from the pre-test to the immediate post-test) from each of the raters separately, and the next four (G-J) show a comparison between the two raters' scores on each of the tests separately. As stated previously, two participants' results were omitted from the statistical analyses due to productions that were deemed too far from the target to be included. The numbers of these participants on the tables are 1 and 15. They were left in the individual score charts for comparison purposes between the two raters. The omission of their results does not apply to the perception tests.

Table 4.7 illustrates the scores on stress placement from the pre-test to the immediate post-test, while and Table 4.8 shows the scores of articulatory accuracy from the pre-test to the immediate post-test, both as scored by the researcher.

Table 4.7

Participant	Stress Placement score: Production Pre-test	Stress Placement score: Production Immediate Post-test
1	62	56
2*	66	56
3*	54	50
4	62	68
5*	54	62
6*	60	66
7*	76	92
8	54	60
9*	64	62
10*	76	64
11	68	68
12*	74	72
13	34	50
14	68	80
15*	38	34
16	62	50

Table 4.8

Participant	Articulatory Accuracy Score: Production Pre-test	Articulatory Accuracy Score: Production Immediate Post-test
1	39	51
2*	37	48
3*	50	63
4	44	51
5*	49	43
6*	66	72
7*	51	57
8	49	51
9*	57	63
10*	59	65
11	55	51
12*	72	72
13	46	50
14	62	67
15*	38	40
16	42	47

Table 4.9 illustrates the scores on stress placement from the pre-test to the immediate post-test, while Table 4.10 shows the scores of articulatory accuracy from the pre-test to the immediate post-test, both as scored by the second rater.

Table 4.9

Participant	Stress Placement Score: Production Pre-test	Stress Placement Score: Production Immediate Post-test
1	42	58
2*	50	74
3*	52	66
4	54	66
5*	52	74
6*	66	70
7*	74	96
8	56	64
9*	64	70
10*	56	58
11	60	68
12*	68	74
13	58	64
14	82	78
15*	42	40
16	76	60

Table 4.10

Participant	Articulatory Accuracy Score: Production Pre-test	Articulatory Accuracy Score: Production Immediate Post-test
1	57	53
2*	43	52
3*	53	62
4	45	59
5*	53	46
6*	82	79
7*	56	67
8	52	55
9*	65	63
10*	64	63
11	56	47
12*	67	57
13	40	45
14	65	60
15*	31	36
16	58	53

Tables 4.11 and 4.12 present a comparison between the scoring of the two raters in the two areas of the Production Pre-test.

Table 4.11

Participant	Stress placement score: Researcher	Stress placement score: Second Rater
1	62	42
2*	66	50
3*	54	52
4	62	54
5*	54	52
6*	60	66
7*	76	74
8	54	56
9*	64	64
10*	76	56
11	68	60
12*	74	68
13	34	58
14	68	82
15*	38	42
16	62	76

Table 4.12

Participant	Articulatory Accuracy score: Researcher	Articulatory Accuracy score: Second Rater
1	39	57
2*	37	43
3*	50	53
4	44	45
5*	49	53
6*	66	82
7*	51	56
8	49	52
9*	57	65
10*	59	64
11	55	56
12*	72	67
13	46	40
14	62	65
15*	38	31
16	42	58

These two tables show that there was a range of agreement between the two raters, from equal ratings on participants' production to a difference of over twenty points. These discrepancies will be discussed in sections 5.3 and 5.4.4.

The following two tables, 4.13 and 4.14, serve to show a comparison of the two rater's scores in the two areas evaluated in the Production Immediate Post-test.

Table 4.13

Participant	Production Immediate Post-test Stress Placement score: Researcher	Production Immediate Post-test Stress Placement score: Second Rater
1	56	58
2*	56	74
3*	50	66
4	68	66
5*	62	74
6*	66	70
7*	92	96
8	60	64
9*	62	70
10*	64	58
11	68	68
12*	72	74
13	50	64
14	80	78
15*	34	40
16	50	60

Table 4.14

Participant	Production Immediate Post-test Articulatory Accuracy score: Researcher	Production Immediate Post-test Articulatory Accuracy score: Second Rater
1	51	53
2*	48	52
3*	63	62
4	51	59
5*	43	46
6*	72	79
7*	57	67
8	51	55
9*	63	63
10*	65	63
11	51	47
12*	72	57
13	50	45
14	67	60
15*	40	36
16	47	53

These two tables show that the raters' scores differed to a lesser extent than in the pre-test. Also, all four tables that compare the scores of the raters show that there were occasions when the researcher gave a higher score than the second rater, and vice versa. Possible explanations for this will be given in section 5.3.

Now that all individual scores have been given along with a comparison of the two raters' scores, the mean scores in production will be presented, followed by the statistical analyses.

Table 4.15 shows the mean scores of production in the experimental group.

Table 4.15

Pre-test stress according to researcher: 62.3	**Immediate post-test stress according to researcher: 64.3**
Pre-test accuracy according to researcher: 52.8	**Immediate post-test accuracy according to researcher: 56**
Pre-test stress according to second rater: 58.8	**Immediate post-test stress according to second rater: 68.1**
Pre-test accuracy according to second rater: 55.1	**Immediate post-test accuracy according to second rater: 56.1**

Here, an interesting phenomenon happened. One rater noted improvement in accuracy but negligible improvement in stress, and the other noted improvement in stress but negligible improvement in accuracy. These differences and their implications will be explored in the discussions section of the next chapter.

4.2.3.1 Analyses of production tests scores

For the production tests, four paired samples t-tests were run: one measuring stress correctness before and after instruction according to the researcher, one measuring accuracy before and after instruction according to the researcher, one measuring stress correctness before and after instruction according to the second rater, and one measuring accuracy before and after instruction according to the second rater. This section will detail the tests in the order in which they are mentioned above. Note again that participants 1 and 15 from the above tables were eliminated from the statistical analyses due to their extreme non-targetlike productions.

The first test measured stress correctness according to the researcher. It revealed no significant effect for instruction, with $t(13)=-.784$, $p=.447$. This shows that the researcher's evaluations did not show substantial improvement in the participants' ability to accurately stress Spanish words.

The second test measured articulatory accuracy over time according to the researcher. It did reveal a significant effect of instruction, with $t(13)=-3.192$, $p=.007$. This shows that according to the researcher, the participants' ability to correctly pronounce Spanish vowels was improved by the training session.

The third test measured the correctness of word stress according to the second rater. It revealed a significant effect for instruction, with $t(13)=-2.852$, $p=.014$. This reveals that according to the second rater, the training did improve the participants' ability to accurately stress Spanish words.

The fourth and final paired samples t-test measured the pronunciation accuracy according to the second rater. It did not show a significant effect for instruction, with $t(13)=-.306$, $p=.764$. This shows that the second rater did not note substantial difference between the participants' pronunciation accuracy from the pre-test to the post-test.

Because the group division was made by placing participants with higher perception scores in the experimental group, there was a significant difference in their perception test scores. In order to see if this was also the case in the production pre-test, a one-way ANOVA was run to compare the significance between groups. This ANOVA revealed that the two groups' scores in all four areas of production on the pre-test were statistically insignificant, meaning that all participants were at the same level in production at the beginning of the study.

4.2.3.2 Analyses of perception and production scores

In order to test for correlations between perception and production, a Chi-Square test was performed because the data were not monotonic; that is, the relationship was not direct between the two variables. The variables were the perception scores of vowel perception and the two scores of articulatory accuracy on the production pre-test and immediate post-test. Only these two tests were used because the results of the delayed post-test had not been evaluated at the time of analysis due to time constraints. The relationship of stress accuracy perception to stress accuracy production was not tested because there were six tokens that measured perception of stress, and all fifty tokens on the production test measured it, so the data for this were not comparable.

The Chi-Square tests showed that according to the researcher, there was no relationship between perception and production on either the pre-test or immediate post-test. However, according to the second rater, there was a significant relationship between perception and production of vowels on the pre-test, with $\chi(306)=351.3$, $p=.038$. This shows that the second rater noted more accurate production of vowels in the pre-test in the participants who had higher scores on the perception test. She did not have access to the scores on the perception tests, so this phenomenon is not attributable to her knowing whose scores were higher in advance.

4.2.4 Scores of true beginners

All true beginners were assigned to the experimental group, as the purpose of the research was to determine the effect of explicit pronunciation instruction at the beginning stages of learning Spanish as a Second Language (L2). Only nine of the participants were truly at the beginning states of learning Spanish; the rest were false beginners. For this reason, the data for the true beginners were isolated in order to better understand these effects on beginning learners. This section details their individual scores as well as their mean scores for each category. One of

the omitted participants from the production test was a true beginner, so there will be nine scores for perception, but only eight for production. The participant's scores will be included in the tables for comparison purposes, but omitted from the statistical analyses as above. The number of the participant on these tables is nine.

Table 4.16 details the true beginners' scores in the perception tests.

Table 4.16

Participant	Perception Pre-test score	Perception Immediate Post-test score	Perception Delayed Post-test score
1	62.7	60	58.3
2	66.1	68.3	63.3
3	49.2	65	50
4	69.5	73.3	76.7
5	50.8	65	55
6	59.3	68.3	65
7	50	53.3	50
8	50	70	71.7
9	40.7	70	58.3

Tables 4.17 and 4.18 illustrate the true beginners' scores on the Production Pre-test and Immediate Post-test, both as scored by the researcher.

Table 4.17

Participant	Stress Placement score: Production Pre-test	Stress Placement score: Immediate Post-test
1	66	56
2	54	50
3	54	62
4	60	66
5	76	92
6	64	62
7	76	64
8	74	72
9	38	34

Table 4.18

Participant	Articulatory Accuracy score: Production Pre-test	Articulatory Accuracy score: Production Immediate Post-test
1	37	48
2	50	63
3	49	43
4	66	72
5	51	57
6	57	63
7	59	65
8	72	72
9	38	40

The next two tables, 4.19 and 4.20, will show the individual scores of the true beginners in stress placement and accuracy of vowel production on the production tests according to the second rater.

Table 4.19

Participant	Stress Placement score: Production Pre-test	Stress Placement Score: Production Immediate Post-test
1	50	74
2	52	66
3	52	74
4	66	70
5	74	96
6	64	70
7	56	58
8	68	74
9	42	40

Table 4.20

Participant	Articulatory Accuracy score: Production Pre-test	Articulatory Accuracy score: Production Immediate Post-test
1	43	52
2	53	62
3	53	46
4	82	79
5	56	67
6	65	63
7	64	63
8	67	57
9	31	36

One of the most striking aspects of the tables above is that the person with the greatest gains in perception is the one whose production results were left out due to substantial errors in pronunciation that hindered evaluation. This is obvious evidence that gains in perception may not necessarily mirror or predict gains in production. More discussion on the subject will follow in later sections.

Now that the individual scores have been given for the true beginners, the means will be presented, followed by the statistical analyses.

The mean scores in perception for the true beginners are shown in Table 21.

Table 4.21

Perception pre-test mean score: 55.4	Perception immediate post-test score: 65.9	Perception delayed post-test score: 60.9

This table shows that the trend among the true beginners was the same as the trend in the experimental group as a whole; that is, the immediate post-test showed substantial gains from the pre-test, and the delayed post-test score was between the first two, indicating a loss of some of

the information. Nonetheless, the scores do show improvement due to instruction. Statistical analyses will explain these results.

For the true beginners, the perception test results were also broken down into the categories of stress and vowel perception. The means are given in the table below.

Table 4.22

Perception pre-test stress score: 55.6	**Perception immediate post-test stress score: 63.7**	**Perception delayed post-test stress score: 59.3**
Perception pre-test vowel score: 54.8	**Perception immediate post-test vowel score: 61.1**	**Perception delayed post-test vowel score: 61.1**

This table shows that the differences between the two areas of perception were not substantially different. Again, however, word stress was measured only by six tokens in the perception test, whereas vowel contrasts as a whole were measured by 54.

Table 4.23 contains the average scores for each area of the production tests.

Table 4.23

Pre-test stress according to researcher: 65.5	**Immediate post-test stress according to researcher: 65.5**
Pre-test accuracy according to researcher: 55.1	**Immediate post-test accuracy according to researcher: 60.4**
Pre-test stress according to second rater: 59.0	**Immediate post-test stress according to second rater: 72.8**
Pre-test accuracy according to second rater: 60.4	**Immediate post-test accuracy according to second rater: 61.1**

Interestingly, what this table shows is that the true beginners' averages were higher than those of the false beginners in all areas on both tests (see Table 4.15). The statistical analyses discussed below will reveal whether these differences are significant.

4.2.4.1 Analyses of scores for true beginners

Separate tests were run for all of the above categories; that is, perception, stress placement in production according to the researcher, articulatory accuracy in production according to the researcher, stress placement in production according to the second rater, and articulatory accuracy in production according to the second rater; isolating the data from those of the true beginners. Though the numbers were different, there was significance in the same areas as above, indicating that the significance of the scores of the true beginners was not significantly different from that of their false beginner counterparts. In other words, there was significance in perception, researcher's evaluations of accuracy, and second rater's evaluations of stress placement, but not the researcher's evaluations of stress placement or the second rater's evaluations of articulatory accuracy. However, when perception was broken down into stress and vowel accuracy, no significance was found in either area on its own.

After the repeated measures ANOVAs and paired samples t-tests, two one-way ANOVAs were run: one on perception in true versus false beginners, and one in each production area in true versus false beginners. The only area with statistical significance was the Perception Immediate Post-test, with $F(319.725, 39.463)=8.102$, $p=.013$. In this case, the true beginners had a statistically significantly better score overall on the perception test than the false beginners, though this was not the case on the following test five weeks later. In all areas of production, there was no statistical significance, meaning that true beginners and false beginners performed relatively equally in production.

4.3 Conclusion

This chapter has reported the results of all tests for individual participants, as well as the mean scores for groups and statistical analyses of significance. Overall, there was statistical significance in perception for the experimental group, as well as improvement in production vowel accuracy as measured by the researcher and production stress accuracy as measured by the second rater. The next chapter will present discussions, limitations and other factors, conclusions, and proposals for future research.

Chapter 5: Discussions, Conclusions, Limitations and Other Factors, and Proposals for Future Research

5.1 Introduction

The fifth and final chapter of this thesis will be structured thusly: First, discussions of the statistical analyses presented in the previous chapter will be given. Then, the other factors and limitations of the study will be presented and discussed. Following this, there will be conclusions and discussions of possibilities for future research. Finally, there will be a section to conclude the thesis.

Before discussing the findings, the research questions and hypothesis will be given once more.

5.1.1 Research Questions

4. Whether teaching pronunciation rules to students explicitly at the beginning of their studies in Spanish have positive effects on perception tasks with regard to vowels and word stress.
5. Whether teaching pronunciation rules to students explicitly at the beginning of their studies in Spanish have positive effects on production tasks with regard to vowels and word stress.
6. Whether there is a relationship between perception and production of Spanish vowels and word stress.

5.1.2 Hypotheses

4. Students in the experimental group would improve their perception of tokens produced by other speakers, thus gaining an ability to distinguish between Spanish phones and their English counterparts.
5. Students in the experimental group would improve their production of Spanish vowels, though not to the point of being native-like in their productions.
6. Students in the experimental group would improve their perception and production of Spanish stress patterns.

5.2 Discussion of findings in perception test scores

The significance of difference in the experimental group coupled with the lack of significance of difference in the control group shows that the pronunciation instruction had a

positive effect on the participants' perception of Spanish vowel sounds. However, perception of word stress rule adherence was not significantly improved. This suggests either that having only six tokens measuring word stress was insufficient to measure benefits in this area, or that stress rules are not as easily taught as vowel pronunciation rules. Again, the instruction took place only in one session, so it is possible that stress was not learned as well as vowel quality.

The hypothesis regarding perception was that the experimental group participants would improve their perception of Spanish vowel sounds. This hypothesis was upheld. However, the third hypothesis was not upheld. Analyses revealed that vowel perception was significantly improved, while perception of stress was not. This shows either that stress is not as easily taught as vowel quality, or that six tokens do not provide enough data to make a conclusion. More research is needed to determine which of these possibilities is true.

With regard to the drop in perception scores from immediate post-test to delayed post-test as well as the drop in the control group's scores, it is possible that they began to hypercorrect once they had more awareness of Spanish, effectively overcompensating for what they originally did not know.

5.3 Discussion of findings in production test scores

The outcome of these tests is remarkable. Each rater noted improvement in one area and no significant improvement in the other. One possible explanation of this phenomenon is the L1 perceptual filter proven to exist by Kilpatrick and McLain Pierce (2014). Spanish words have only one stressed syllable, and the rest are equally unstressed. English has secondary stress in some words (e.g. "calibrate" [ˈkæ.lə.ˌbɹeɪt]). This difference may account for some differences in stress evaluation between the two raters, due to the fact that a native English speaker's ear is more likely to pick up two stressed syllables than a native Spanish speaker's. In other words, to a

Spanish speaker, the correct syllable stressed is all that matters, whether or not another one is as well.

Another possible explanation of the differences is vowel ranges. English has 15 vowel sounds, whereas Spanish has five. This means that what in English is a separate phoneme, in Spanish may be perceived as simply accented, such as a schwa or lax vowels. Simões (1996) states that vowels in Spanish have a range of dispersion, and sometimes they even overlap with one another. This aspect of Spanish, which is not present in English, is a possible explanation of the disparity between raters. It is important to mention that the second rater was trained on these aspects, but again, the vowel range explains why some sounds may have been considered accurate and others not.

Research has shown that these discrepancies are possible. Swan (2002) discusses a study in which Greek teachers of English (non-native English speakers) and British non-teachers (native English speakers) evaluated the severity of grammatical mistakes made by Greek students learning English. What the Greek teachers scored as most severe, the British viewed as the least severe, and vice versa. Extending the findings to pronunciation, a parallel outcome could be predicted. More research is needed to investigate this question further.

When the evaluations were completed by both raters, the researcher looked at some of the evaluation forms in order to find sources of difference between scoring. Some of the differences included:

1. High vowels. The second rater tended to rate these vowels more harshly than the researcher.

2. The low vowel: The second rater rated [ɑ] and [æ] more generously than the researcher in general, possibly due to the vowel range and the fact that [a] is the only low vowel in Spanish, while [a], [æ], and [ɑ] all exist in English.
3. Lax vowels: The second rater sometimes rated these as a two instead of a one, possibly due to the vowel range mentioned above.
4. Rhotacized vowels: The second rater sometimes rated these as ones instead of zeros, possibly because rhotacization does not happen in Spanish due to the absence of the [ɹ] sound, and therefore the difference between a rhotacized and non-rhotacized vowel is not as obvious to the Spanish speaker.
5. Diphthongized mid vowels: The second rater sometimes rated them as twos instead of ones, possibly due to the fact that Spanish rising diphthongs involve lowered vowels as opposed to English (University of Iowa Spanish Department; Small 2012).
6. Centralized vowels: The second rater sometimes rated these as ones or even twos, again possibly due to the vowel ranges mentioned above.

These differences between raters serve as a very rich source of future research proposals, which will be discussed in section 5.4.

The results of the production test serve to support the hypothesis that there is improvement after treatment, though further research is needed to determine the exact benefits, as this study's results were conflictive. However, examining some of the production results individually, it can be stated that some participants did benefit from the instruction. For example, one of the participants started with 76% stress correctness according to the researcher and 74% according to the second rater, then reached a score of 92% and 96% respectively in the post-test.

This shows obvious substantial improvement in this area. However, these gains were not universal.

The results of the production analyses still show a positive effect of instruction. Improvement in both areas was noted, meaning that the benefits were different according to the language perspective of the rater. This upholds the hypothesis that stress and accuracy improve with instruction, though which area improves is dependent upon the perception of the listener. With more research in the area of listener perception, a more definite conclusion could be drawn.

With regard to the relationship between perception and production mentioned in Research Question #3, the relationship is not definite. A series of Chi-square tests revealed only one area of significant correlation, which was the score on the Perception Pre-test and the production accuracy of vowels according to the second rater, with $\chi(306)=351.3$, $p=.038$. The remaining areas of production did not correlate with perception, indicating that a correlation is not present at least after only one treatment session.

5.4 Other factors

5.4.1 Factors in participants

This study had a few uncontrollable factors. One such factor was the participants' motivation. Of the 30 participants who completed the study, only six indicated that they were taking Spanish 1010 for interest or a similar reason (such as pursuing a minor in Spanish, which implies interest in the language). When asked why they agreed to participate in the study, only seven of the 30 participants did not mention the bonus points. However, some participants mentioned bonus points alongside other reasons, such as extra practice, interest in skill development, or to help with the research. Knowing that they were going to be awarded with bonus points regardless of performance, there is a possibility that their effort was minimal. It is impossible to know for certain just how much some of them tried, though if the scores are used

to estimate this figure, it is obvious that at least some of them were genuinely putting forth an effort.

An additional factor that is somewhat related to the above one is the participants' level of in-class participation. As previously stated, all participants were recruited from Spanish 1010 classes, which were continuously meeting over the course of the study. The participants in the experimental group had opportunities to practice what they had been taught in the experimental session in class through participation in activities, but whether or not they took advantage of the opportunities is impossible to determine without breaching FERPA regulations. In addition, the participants were from different classes and different instructors, meaning that pronunciation feedback during class meetings may have varied from nothing to constant. Furthermore, whether they continuously reviewed and studied the pronunciation rules is also indeterminable, though if scores on the delayed post-test of perception are used to estimate, it is obvious that at least some did not.

A third factor is the participants' level of Spanish and/or other languages. As stated in Chapter 2, only one of the 30 participants had never studied any foreign language previously, Spanish or otherwise. The rest had studied Spanish to some extent, another language, or in some cases both. They were not asked to gauge the level of pronunciation instruction or quality of instruction overall they had received in previous Spanish classes, as they may have been linguistically naïve and not known how to judge these aspects objectively. Therefore, it is possible that they had received some previous instruction in Spanish pronunciation, though obviously not enough to achieve perfect perception of Spanish vowels, as no participant reached 100% accuracy in any area measured.

Another factor in the study was the participants' instructors for Spanish 1010. Each participant in the study was enrolled in Spanish 1010, and five instructors had students in the study including the researcher. As mentioned previously, there is no set guideline for pronunciation in class, so it is the instructors' choice to deal with pronunciation however they deem it appropriate. In order to determine how pronunciation was treated in their classes, the researcher sent the remaining four instructors a brief survey to gauge the treatment of pronunciation in classes other than his own. Only two of them responded. One, reported teaching some of the dialectal contrasts to facilitate the students' comprehension of her speech as well as teaching sounds such as [x], [r], and [k] with the grapheme "qu." She reported that word stress errors were uncommon, but when they happened, she did not typically correct them. She did report correcting errors in pronunciation with regard to sounds, though which sounds she corrected were not specified. The other instructor who responded to the survey reported teaching the rules of word stress and when it makes a difference, as well as modeling words for the students or intentionally mispronouncing them to emphasize certain sound contrasts. With regard to correcting sound production, she reported correcting when the mistake was common for the student in question or the class as whole. She also reported not correcting every mistake in pronunciation. There were two other instructors of Spanish 1010 at the time, and they did not respond to the survey.

The final participant factor is talent. Some people have a natural ability and affinity for languages, while other people struggle more with them (Cook 144). Language aptitude was not measured in this study, as it was beyond the scope. Nonetheless, it is a factor that may have affected scores.

These five participant factors were present in the study and uncontrollable by the researcher. The next factors were introduced into the study through various avenues.

5.4.2 Factors in instructional treatment

The instructional treatment was administered via video recording to ensure that all participants received the same explanations. However, the video was paused at certain times to allow for questions. Some of the sessions had questions asked, thus reinforcing certain points from the presentation that were not reinforced during other sessions. However, as the researcher promised the participants that questions could be asked, this factor was uncontrollable.

5.4.3 Factors in tests

Two factors were inadvertently introduced in the perception pre-test. The first was that the score was out of 59 instead of 60. This happened because one of the words had to be changed at a late stage, and the change was not approved by the university's IRB in time to administer the pre-test. In order to take this into account the researcher had to see whether the participants answered correctly or not, as it would determine whether to deduct a point from the participants' scores. The word was "cura," and it was included on all subsequent tests. The second factor was due to an error on the part of the researcher. When building the survey through Qualtrics, the researcher failed to activate a feature that would prevent participants from skipping questions. This allowed some of the participants' results to be out of a different total score from the rest. Both of these issues were resolved by the time the post-tests were administered. In order to alleviate the problem, all perception test scores were calculated as percentages, measured as the number correct out of the total number answered.

There were also two factors in the production tests. First, one of the words was "ilegal." When completing the production tests, some of the participants misread the word in Qualtrics, as it was written with an uppercase "I" at the beginning, and many participants read the

combination as “ll,” which is Spanish is realized as a palatal glide [j] or a similar variant. These productions were given a score of zero due to vowel omission, and on the post-test, the word was entered into the Qualtrics survey with a lowercase “i” to contrast the two letters more. However, there was no way to remedy the error in the pre-test or post-test.

The second factor was that two of the words contained consonant clusters: “ordenar” and “libreta” (the vowels to be evaluated are underlined). However, the presence of these consonant clusters did not appear to have effects on pronunciation. The overall scores on these words were not different from scores on the same vowels in words without consonant clusters. In the case of “ordenar,” many participants produced an r-colored vowel, but this is something they did in several words in which the evaluated vowel was followed by an “r,” so this is attributable to the final letter and not the consonant cluster. In “libreta,” the participants made the same mistakes (e.g. vowel lowering, diphthongization, vowel raising, etc.) that they made in other cases where a stressed “e” was evaluated, so the errors are not attributable to the presence of a consonant cluster.

These four factors were introduced into the tests by the researcher through oversights in design. There is one other factor that was not tested: participant familiarity with the words on both tests. Some of the words were basic, such as “para” (for, perception test), or “basura” (garbage, production test). Other words were less likely to be familiar to elementary Spanish students, such as “hígado” (liver, production test) or “berenjena” (eggplant, perception test). Since the participants came from different backgrounds of previous Spanish or other foreign language study, some words may have been familiar to some of the participants.

The next section will deal with the factors between the two raters of the production tests.

5.4.4 Factors in evaluators

As discussed previously, the two raters had very different outcomes in the production test evaluations. Even though the second rater was explained the criteria, the results were drastically different. Some possible explanations are offered in Chapter 3, but more research is needed into the area of perception of accuracy in order to explain these discrepancies. The researcher attempted to explain some of the phenomena, but was unable to explain reasons for everything, which reveals a direction for future research (see below).

5.3 Limitations

This study did have several limitations. In this section, they will be categorized and discussed as above.

5.5.1 Limitations of time

As a master's thesis, this study was undertaken in a relatively short amount of time. As a result of the time limit, the results of the production post-test were not included, and therefore the production results of the control group were not analyzed. However, they still may be used in a future publication.

Another effect of the time limitation was the single instructional session and short time elapsed between the instruction and the delayed post-test. With an entire semester, the study could have included continuous instruction and a more longitudinal design. However, an entire semester was not available to the researcher, as the university only allows two years for master's level studies.

These are the two effects of the time limit for the thesis. The next section will deal with limitations in instruction.

5.5.2 Limitations in instruction

The instruction only included the Spanish vowel system and word stress. Though the original plan was to teach all phonemes of Spanish, this was deemed impossible to do in one session, so only vowels, diphthongs, and word stress were included. As a result, many errors in pronunciation were noted, such as the pronunciation of the graphemes “que” and “qui” as [kwe] and [kwi] or the grapheme “j” as [ʤ] or [ʒ]. This caused some of the words to be incorrectly pronounced despite correct realization of the vowel in question. An ideal study would include instruction in all areas of pronunciation regardless of target phones to maximize pronunciation accuracy.

Another instructional limit was the inability to use a single intact class. The use of an intact class was not possible for this study, thus causing the instruction to only consist of one session. With an entire class and the use of class time, the instruction could have been done over time as described above. This would also eliminate the variable of instructor differences in teaching.

These limitations in the instructional treatment were substantial, but unavoidable in the scope of the study. The following section deals with the limitations in testing procedures.

5.5.3 Limitations of tests

The limitation of the production test is that it did not measure participants’ pronunciation in spontaneous speech. Though spontaneous speech is what is produced when an individual is speaking with other speakers of the language in real-world settings, and thus the ideal measurement of improvement in pronunciation, students at the level used in the research did not have the ability to produce such utterances, so using this type of speech samples would not have been possible.

5.5.4 Limitations of evaluation

The perception test was automatically scored through Qualtrics with correct answers set up beforehand. The production test, however, was scored quite subjectively. An obvious way to avoid such subjectivity would be to use spectrographic analysis to score the pronunciation of the sounds. However, in line with the limitation of time, this was impossible. The raters were very different in their scoring of the production, and as mentioned above, more research is needed to determine the root cause of the discrepancies.

Another limitation was the small scale of evaluation. The original design had more than one criterion of evaluation, allowing for the separate categorization of diphthongized mid vowels and the presence of gliding in the case of [u]. These scales were eliminated when the evaluation scheme was changed to include these aspects as part of accuracy. Though a larger scale would have been ideal in the face of such a change, time did not permit the modification, so the small scale of zero to two was kept, and the remaining criteria were eliminated.

These were the two limitations in the evaluation procedures. The next section will detail opportunities for future research, and the following one will conclude the thesis.

5.6 Possibilities for future research

Over the course of this study, many avenues were opened for future research. The goal of this study was to determine the effects and benefits of explicitly teaching pronunciation at the elementary level in Spanish. The results show that there is a potential for benefit in the area of perception. There are also benefits in production, though what these benefits are remains to be seen, as each rater noted improvement in a different evaluated area. Using the results of this study, there are several possibilities for research in the future.

One such possibility is a study over an entire semester of first-semester Spanish. The students would receive explicit pronunciation instruction over the course of a semester like the

studies of Elliott (1993, 1995a, 1995b, 1997), with intermediate students. Their pronunciation would be measured at the beginning and end of the semester against that of students in a control group who did not receive such explicit instruction. This study could then be continued into a longitudinal study that kept track of participants' pronunciation over the course of the second semester of elementary Spanish, then into intermediate, and possibly advanced. Besides the obvious benefits of the longitudinal aspect, it would allow for sentence reading and spontaneous speech samples instead of strictly word-reading tasks, which was what the present research had to use due to participant level. This study would help determine the long-term effects of elementary level pronunciation instruction versus short-term effects, as this study measured.

This study used words in the production test that were exactly three syllables long, had varying word stress, and no diphthongs. Only two of the words had consonant clusters. Research could be done into the effects of word length, presence of diphthongs, and presence of consonant clusters in pronunciation difficulty or accuracy of any sounds in the words along with correct placement of word stress.

Another possibility of future research stems from the evaluators' ratings of pronunciation. Perception of accuracy of different speakers could be measured by having different speaker types (e.g. native/non-native, linguist/non-linguist, teacher/non-teacher, etc.) evaluate the same pronunciation, which would also be measured via acoustic analysis for certainty, and measuring how they evaluated different sounds as accurate, inaccurate, or in-between. This study would help to explain why the raters' judgments of improvement were so different in the two evaluated areas, and also to determine what the important aspects of pronunciation in Spanish are as judged by different speakers and speaker types.

One other avenue of research would be to examine teaching pronunciation in a language that uses the Latin alphabet versus teaching pronunciation in a language that uses a different alphabet, such as Russian. Such a study could serve to examine whether new sounds for familiar letters are more easily learned, or if new sounds along with new orthographic representations of them are more easily learned.

These are four possible studies that could be conducted based on the results of this research. The following section will bring the thesis to a close.

5.7 Thesis conclusion

In Chapter 1, it was shown that explicit pronunciation instruction tends to have beneficial effects in foreign language teaching in multiple languages. The gap was revealed that most of the research has involved intermediate or advanced speakers, and not beginning learners.

Chapter 2 discussed the purpose of the study, which was to determine the benefits of teaching Spanish vowel pronunciation and word stress rules to students at the beginning stages of Spanish L2 learning. It also discussed the research questions that would be addressed, which were whether teaching these aspects of pronunciation would benefit the participants' perception and production of Spanish vowels, and also whether or not there was a relationship between perception and production. Finally, the hypothesis were given, which were formed based on future research and stated that perception and production would be improved through instruction, though not reaching native-like levels.

Chapter 3 dealt with participant recruitment through class visits to the Spanish 1010 classes at Auburn University, who the participants were as far as gender, age, and foreign language experience. It also discussed the production and perception tests and how they were made, administered, and evaluated. It detailed how the data were analyzed through statistical

analyses, and how the experimental treatment was given via different instructional methods to accommodate many different learning styles.

Chapter 4 presented the results of the tests and the statistical analyses, which showed that there was improvement from the pre-test to the post-tests in perception, though the delayed post-test experienced a drop. The results also showed that the two raters evaluated very differently, but each one noted improvement in either stress or vowel accuracy. It also showed that the true beginners performed better than false beginners on the Perception immediate post-test, but not elsewhere.

Finally, Chapter 5 discussed the results of the research, proving that the hypotheses were correct. It detailed the variables and limitations of the study, and proposed future research directions for Spanish pronunciation teaching.

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Appendix A: Recruitment and orientation materials

Recruitment presentation for class visits

Orientation presentation

Appendix B: Preliminary Questionnaire

Please answer all questions truthfully to the best of your ability and knowledge.

Information provided will be used only for the purposes of the study. Your answers will not affect the evaluation of your performance or your candidacy for bonus points.

Personal information

Name_____ Date _____

Code word_____

Gender M F Prefer not to answer

Age_____ Spanish 1010 Instructor _____

Auburn University e-mail address for any notifications _____

Language information

Is English your native language? Yes No

If no, what is your native language? _____

If yes, please list any other languages you speak with native proficiency _____

_____

Have you ever studied a foreign language (not Spanish)? Yes No

If yes, which one(s) and for how long? _____

_____

Please indicate your amount of previous Spanish experience in the table below:

None	1 year of high school or 1 semester of college	2 years of high school or 1 year of college	3+ years of high school, 3+ semesters of college

Academic information

What is your academic level and year (freshman, sophomore, first year graduate student, non-degree seeking, etc.)? _____

What is your major at Auburn University? _____

Why are you enrolled in Spanish 1010 this semester? _____

_____

Why have you agreed to participate in this research? _____

_____

Appendix C: Perception test materials

Perception test words with answer and transcriptions of true pronunciation and token (in the cases of "no" answers). Transcriptions follow standard Latin American Spanish pronunciation. Numbers 12, 14, 27, and 51 are not real words in the written forms, but the recorded tokens are real words. In all of the remaining cases, the written word was real.

1. Carne (n), true pronunciation [ˈkaɾ.ne], token [ˈkaɾ.nei̯]
2. Para (y), [ˈpa.ɾa]
3. Casco (n), true pronunciation [ˈkas.ko], token [ˈkas.kou̯]
4. Crema (n), true pronunciation [ˈkɾe.ma], token [ˈkɾi.ma]
5. Generoso (y), [xe.ne.ˈɾo.so]
6. Cura[10] (n), true pronunciation [ˈku.ɾa], token [ˈkju.ɾa]
7. Vaso (n), true pronunciation [ˈba.so] token [ˈba.sou̯]
8. Bolígrafo (y), [bo.ˈli.ɣɾa.fo]
9. Marido (y), [ma.ˈɾi.ðo]
10. Seco (y), [ˈse.ko]
11. Cara (n), true pronunciation [ˈka.ɾa], token [ˈke.ɾa]
12. Murcielago (n) [muɾ.ˈsje.la.ɣo], token matched true pronunciation, but word was written without accent mark.
13. Diente (y), [ˈdjeɲ.te]
14. Rena (n), true pronunciation [ˈre.na], token [ˈrei̯.na]
15. Chaine (n), true pronunciation [ˈʧai̯.ne], token [ˈʧei̯.ne]
16. Calado (y), [ka.ˈla.ðo]
17. Paulatino (n), true pronunciation [pau̯.la.ˈti.no], token [pa.la.ˈti.no]
18. Jaime (n), true pronunciation [ˈxai̯.me], token [ˈxei̯.me]
19. Flota (n), true pronunciation [ˈflo.ta], token [ˈflou̯.ta]
20. Trauma (n), true pronunciation [ˈtɾau̯.ma], token [ˈtɾa.ma]
21. Olvida (n), true pronunciation [olˈβi.ða], token [olˈβai̯.ða]
22. Pela (y), [ˈpe.la]
23. Clima (n), true pronunciation [ˈkli.ma], token [ˈklai̯.ma]
24. Raigo (y), [ˈrai̯.ɣo]
25. Esfera (y), [es.ˈfe.ɾa]
26. Mentirosa (y), [meɲ.ti.ˈɾo.sa]
27. Tepo (n), true pronunciation [ˈte.po], token [ˈti.po]
28. Película (n), true pronunciation [pe.ˈli.ku.la], token [pe.ˈli.kju.la]
29. Cordón (y), [koɾ.ˈðon]
30. Problema (n), true pronunciation [pɾo.ˈβle.ma], token [pɾa.ˈβle.ma]

[10] Omitted from pre-test

31. Londres (y), [ˈlo̪n̪.dɾes]
32. Ópera (y), [ˈo.pe.ɾa]
33. Célula (y), [ˈse.lu.la]
34. Fleto (y), [ˈfle.to]
35. Pino (y), [ˈpi.no]
36. Balón (n), true pronunciation [baˈlon], token [baˈlan]
37. Currículum (n), true pronunciation [ku.ˈri.ku.lum], token [ku.ˈri.kju.lum]
38. Fauna (y), [ˈfau̯.na]
39. Caray (y), [ka.ˈɾai̯]
40. Flauta (y), [ˈflau̯.ta]
41. Liga (y), [ˈli.ɣa]
42. Flaco (y), [ˈfla.ko]
43. Naipe (n), true pronunciation [ˈnai̯.pe], token [ˈnei̯.pe]
44. Zapato (n), true pronunciation [sa.ˈpa.to], token [ˈsa.pa.to]
45. Cable (n), true pronunciation [ˈka.βle], token [ˈka.βlei̯]
46. Loncha (y), [ˈloɳ.ʧa]
47. Poncho (n), true pronunciation [ˈpoɳ.ʧo], token [ˈpaɳ.ʧo]
48. Cautela (n), true pronunciation [kau̯.ˈte.la], token [ka.ˈte.la]
49. Paula (y), [ˈpau̯.la]
50. Unicornio (y), [u.ni.ˈkoɾ.ɲo]
51. Reto (n), true pronunciation [ˈre.to], token [ˈri.to]
52. Grapa (n), true pronunciation [ˈgɾa.pa], token [ˈgɾei̯.pa]
53. Espada (n), true pronunciation [es.ˈpa.ða], token [es.ˈpei̯.ða]
54. Aire (y), [ˈai̯.ɾe]
55. Cebo (y), [ˈse.βo]
56. Berenjena (n), true pronunciation [be.ɾeŋ.ˈxe.na], token [be.ˈɾeŋ.xe.na]
57. Loro (y), [ˈlo.ɾo]
58. Comunicar (y), [ko.mu.ni.ˈkaɾ]
59. Afila (n), true pronunciation [a.ˈfi.la], token [a.ˈfai̯.la]
60. Mamífero (y), [ma.ˈmi.fe.ɾo]

Perception test contrasts

Palatal glide initial /u/: Cura (n); Película (n); Célula (y); Currículum (n); Unicornio (y); Comunicar (y)

Diphthongization of /e/: Carney (n); Diente (y); Rena (n); Cable (n); Fleto (y); Cebo (y)

/o/ vs. /a/ with grapheme “o”: Cordón (y); Problema (n); Londres (y); Balón (n); Loncha (y); Poncho (n);

/e/ vs. /i/ with grapheme “e”: Crema (n); Seco (y); Pela (y); Esfera (y); Tepo (n); Reto (n);

/i/ vs. /a$\underset{\sim}{\text{i}}$/ with grapheme “i”: Olvida (n); Clima (n); Pino (y); Liga (y); Afila (n); Marido (y)

Diphthongization of /o/: Generoso (y); Vaso (n); Flota (n); Loro (y); Casco (n); Mentirosa (y)

/a/ vs. /e/ or /e$\underset{\sim}{\text{i}}$/ with grapheme “a”: Para (y); Cara (n): Calado (y); Flaco (y); Grapa (n); Espada (n);

/a$\underset{\sim}{\text{u}}$/ vs. /a/ with grapheme “au”: Paulatino (n); Trauma (n); Fauna (y); Flauta (y); Cautela (n); Paula (y);

/a$\underset{\sim}{\text{i}}$/ vs. /e$\underset{\sim}{\text{i}}$/ with graphemes “ai” and “ay”: Chaine (n); Jaime (n); Raigo (y); Caray (y); Naipe (n); Aire (y);

Word stress rules: Bolígrafo (y); Murcielago (n); Ópera (y); Zapato (n); Berenjena (n); Mamífero (y)

Appendix D: Production test materials

The following is the rubric used to evaluate pronunciation. The order of the words changed between tests, but the words themselves and the evaluation criteria remained the same. This example is the pre-test evaluation form. The underlined vowel in each word is the one scored. Any element of pronunciation could be a source of comments, but these did not affect the scores.

Production test evaluation rubric Stress _____/50 AA_____/100

1. Medida
    a. Was this word correctly stressed? _____Yes _____No
    b. Articulatory accuracy: 0 1 2
    c. Comments:

2. Colina
    a. Was this word correctly stressed? _____Yes _____No
    b. Articulatory accuracy: 0 1 2
    c. Comments:

3. Cálido
    a. Was this word correctly stressed? _____Yes _____No
    b. Articulatory accuracy: 0 1 2
    c. Comments:

4. Alabó

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

5. Pabellón

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

6. Jaqueca

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

7. Solapa

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

8. Hígado

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

9. P<u>u</u>reza

    a. Was this word correctly stressed? _____Yes _____No

    b. Articulatory accuracy: 0 1 2

    c. Comments:

10. Canes<u>ú</u>

    a. Was this word correctly stressed? _____Yes _____No

    b. Articulatory accuracy: 0 1 2

    c. Comments:

11. Ocurr<u>í</u>

    a. Was this word correctly stressed? _____Yes _____No

    b. Articulatory accuracy: 0 1 2

    c. Comments:

12. As<u>u</u>mir

    a. Was this word correctly stressed? _____Yes _____No

    b. Articulatory accuracy: 0 1 2

    c. Comments:

13. <u>I</u>legal

    a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

14. Quejica

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

15. Húmedo

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

16. Susurrar

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

17. Ordenar

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

18. Amado

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

19. Chaleco

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

20. Elegir

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

21. Sureño

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

22. Terraza

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

23. Baraja

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

24. Quimera

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

25. Olivar

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

26. Peluche

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

27. Arete

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

28. R<u>o</u>mero

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

29. Bes<u>o</u>te

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

30. Mej<u>i</u>llón

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

31. <u>Ó</u>rale

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

32. Hoguera

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

33. Basura

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

34. Dígame

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

35. Figura

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

36. Lavaron

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

37. Maruja

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

38. Malavé

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

39. Ganador

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

40. Oreja

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

41. Ataque

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

42. Pacheco

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

43. Tónica

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

44. Paloma

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

45. Alemán

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

46. Libreta

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

47. Vocales

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

48. Acecho

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

49. Óvulo

a. Was this word correctly stressed? _____Yes _____No

b. Articulatory accuracy: 0 1 2

c. Comments:

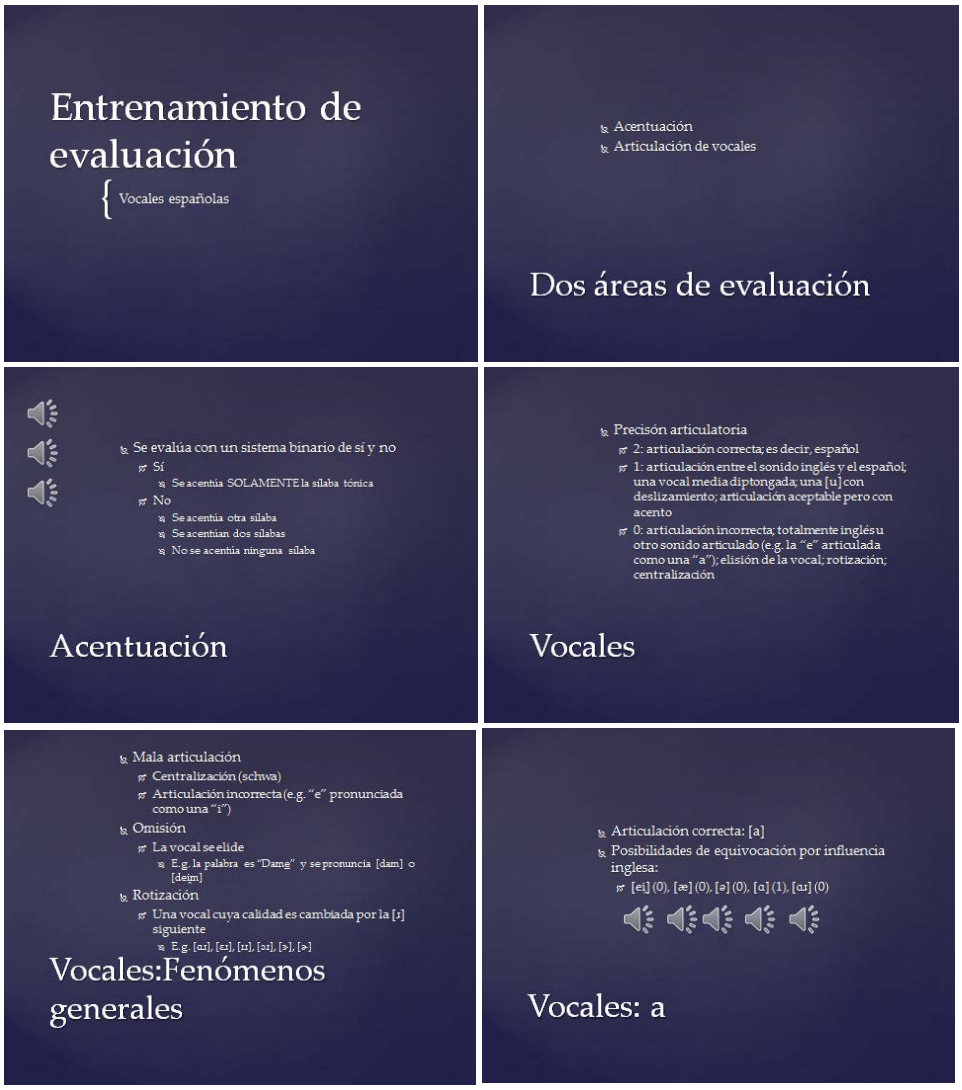
50. Enano

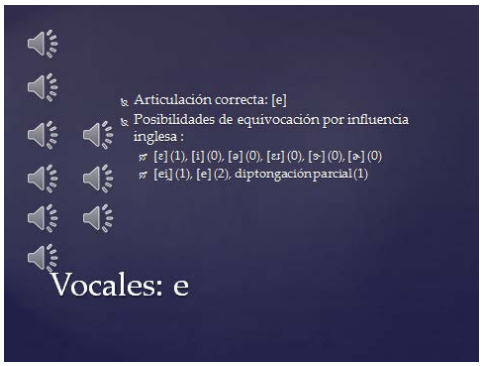
a. Was this word correctly stressed? _____Yes _____No

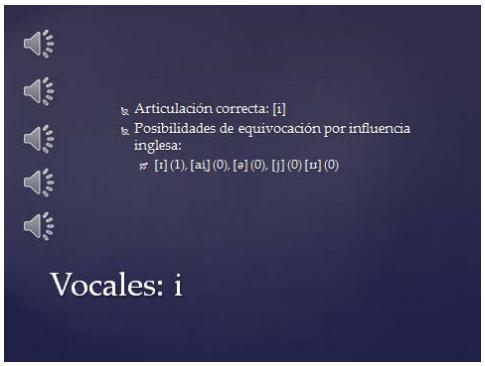
b. Articulatory accuracy: 0 1 2

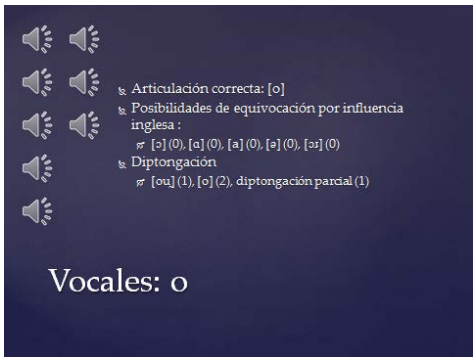
c. Comments:

Production evaluation training presentation for second rater




Articulación correcta: [e]
Posibilidades de equivocación por influencia inglesa :
[ɛ] (1), [ɪ] (0), [ə] (0), [ɛɪ] (0), [ɔ] (0), [ɚ] (0)
[eɪ] (1), [e] (2), diptongación parcial (1)
Vocales: e

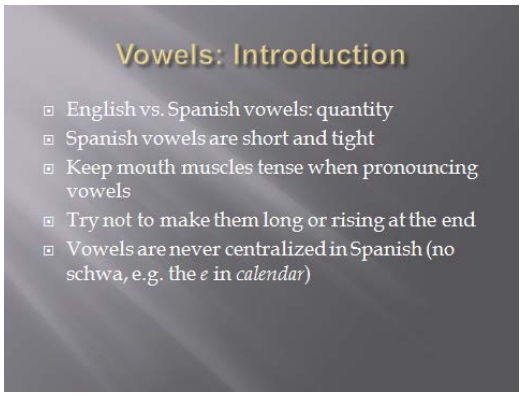

Articulación correcta: [i]
Posibilidades de equivocación por influencia inglesa:
[ɪ] (1), [aɪ] (0), [ə] (0), [j] (0) [ɪɪ] (0)
Vocales: i

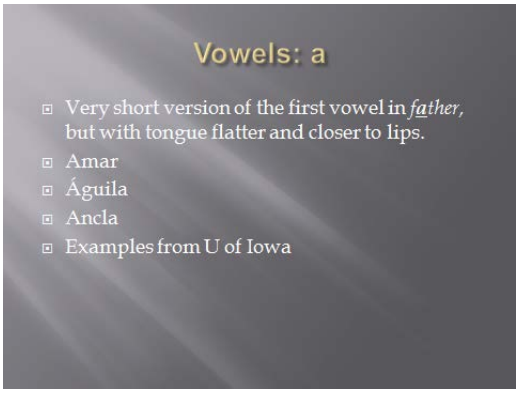

Articulación correcta: [o]
Posibilidades de equivocación por influencia inglesa :
[ɔ] (0), [ɑ] (0), [a] (0), [ə] (0), [ɔɪ] (0)
Diptongación
[oʊ] (1), [o] (2), diptongación parcial (1)
Vocales: o

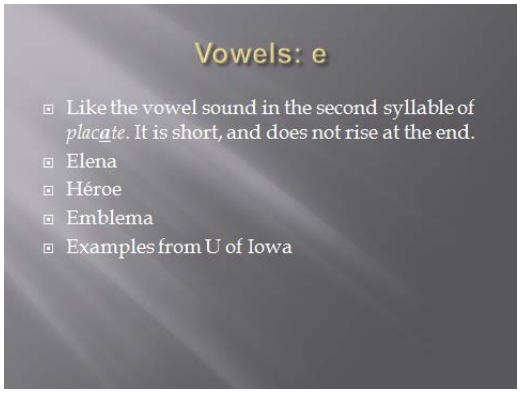

Articulación correcta: [u]
Posibilidades de equivocación por influencia inglesa:
[ʌ] (0), [ʊ] (1), [ə] (0)
Deslizo palatal:
[ju] (1), [u] (2), [jə] (0), [ə] (0), [jɚ] (0), [ɚ] (0), [jəɪ] (0), [əɪ] (0), [jɚ] (0), [ɚ] (0), [jʌɪ] (0), [ʌɪ] (0)
También palatalización de la consonante anterior
Vocales: u

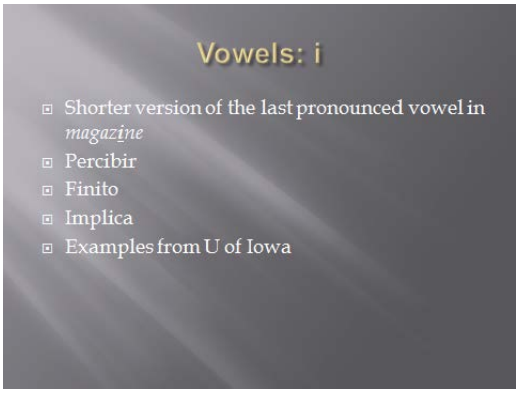
Appendix E: Pronunciation teaching materials

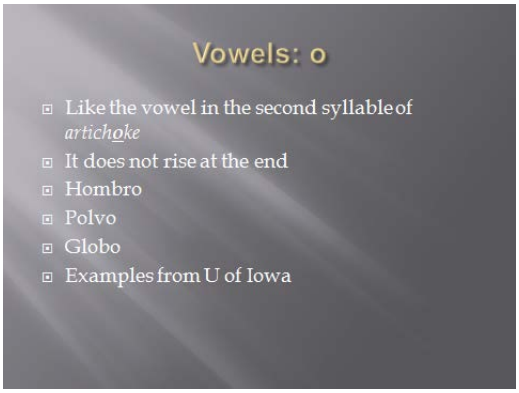
Pronunciation PowerPoint presentation. For the sake of space, the slides allowing questions at the time were cut out. These were present after each vowel slide, the two slides on diphthongs, and after the last slide of word stress practice.











Vowels: u

- Always pronounced without preceding *y* sound unless an *i* or *y* is present
- Shorter version of the vowel in *bloom*
- Arúgula
- Úvula
- Púrpuro
- Examples from U of Iowa

Vowels: diphthongs

- Two vowels side by side: one must be unstressed *i* or *u*
- These form one syllable. The weak vowel (*i* or *u*) becomes a semi-vowel, which is like an English *y* or *w*, respectively
- Keep in mind that two vowels side by side that don't include one of these form separate syllables, e.g. *toalla*. The same is true if the *i* or *u* is stressed, e.g. *tranvía*, *graduás*, etc.

Vowels: diphthongs cont'd

- With *u*: cuando, puede, Luisa, cuota, aula, deuda, viudo, lo usó
- With *i*: piano, tienes, Fiona, ciudad, bailar, veinte, asteroide, cuidado

Word stress

- Spanish has three rules of word stress
  - If it ends in a vowel, *n*, or *s*, the word will receive stress on the second to last syllable
    - E.g., Corona, necesitan, animales
  - If it ends in any other consonant, the word will receive stress on the final syllable
    - E.g., Animal, avestruz, mamut
  - If it is an exception to either of these rules, it will have a written accent mark over the stressed syllable
    - Desván, compás, brújula, lápiz, sofá

Word stress, cont'd

- Practice: identify the stressed syllables of the following words:
  - Columna
  - Pinar
  - Enchufe
  - Bastón
  - Rima
  - Móvil
  - Inicial
  - Policía
  - Tambor

Word stress, cont'd

- Practice: identify the stressed syllables of the following words:
  - Candela
  - Colibrí
  - Amante
  - Cantarán
  - Servilleta
  - Céntrico
  - Atún
  - Cambur
  - Linterna

This is a screenshot of the phonetics module from the University of Iowa. Only the word list was used for the presentation. The vocal tract animation was omitted.