CAN ADVANCED LEARNERS OF SPANISH ACHIEVE NATIVE-LIKE PRONUNCIATION? A RE-EXAMINATION OF THE CRITICAL PERIOD FOR ACCENT[1]

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Introduction

What is the foundation for the Critical Period Hypothesis?[2] For the last thirty years, researchers have pondered whether learners of a second language can achieve native-like pronunciation. The first attempt at addressing the issue occurred in the early 1960's. To account for the difficulty that some children had in acquiring a first or second language, the Critical Period Hypothesis was proposed (Penfield and Roberts, 1959; Lenneberg, 1967). It was postulated that there is a neurological based critical period, which ends at the onset of puberty. But after the critical period, mastery of a first or second language is no longer possible (Lenneberg, 1967). The cause for the lack of language attainment is attributed to a loss of neural plasticity. As the brain ages, it loses its "plasticity", and thus, its ability to learn languages. It was suggested that language learners who started to acquire a second language before the close of the critical period could achieve native-like levels, but those who began to learn languages after the end of the critical period would not.

Since the Critical Period Hypothesis was proposed, different variations have emerged (Seliger, 1978; Walsh and Diller, 1981; Scovel, 1969, 1988). It has been implied that not one single critical period affects all aspects of a language at the same time. Accent, for instance, is believed to be the first to be lost right after the onset of puberty. (Scovel, 1988). Other researchers have argued that one of the causes for foreign accents is the tendency of L2 learners to establish phonetic categories for their L1 and then perceive L2 sounds in terms of those categories (Flege, 1987, 1992a, 1992b, 1995). If the sounds between the L1 and the L2 are similar, the learner will not notice the subtle differences that exist between the two sounds. In short, relying on phonetic categories that have already been established impedes the establishment of new phonetic categories for the L2.

In spite of the weight given to the critical period for accent, room has been allowed for the possibility that some learners can in fact achieve native-like levels. Scovel (1988) agrees that there may be "superexceptional" learners, perhaps 1 in 1,000 who are not restrained by a critical period. It has also been suggested that if learners receive sufficient exposure to the L2 and the motivation exists to sound like native speakers, it is possible that they will attain native-like levels, in spite of a late start (Klein, 1995).

Is there any empirical evidence to suggest the existence of a critical period for accent? Studies that support a critical period for accent have concluded that those who begin a second language at an early age are capable of achieving native-like pronunciation, but adult starters are seldom capable of native-like attainment (Asher and García, 1969; Seliger, Krashen & Ladefoged, 1975; Oyama, 1976; Payne, 1980; Scovel, 1981). The work by Oyama (1976) has been considered one of the most carefully conducted studies to have examined the critical period for accent. The purpose was to assess whether native-like command of a second language phonology could be acquired regardless of the age at which language learning began. The study looked at 60 Italian-born

male immigrants from the New York metro area who learned English as a second language upon arrival in the United States.

Correlations were calculated and significant associations between the demographic variables and accent scores were produced. With regard to the results, Oyama stated:

> It appears, then that accent is rather resistant to the effects of factors other than age at the beginning of the language, and the apparent influence of such factors is an artifact of their relationship with age at learning (p. 271).

In other words, age at arrival was a strong predictor of degree of accent, while length of stay had little effect. For the most part, child arrivals performed at the level of native speakers, those older than 12 at the time of arrival did not perform at the native level, and some who arrived before age 12 demonstrated a non-native accent. Therefore, it was concluded that a sensitive period exists for the acquisition of pronunciation.

Although the critical period for accent remains to be demonstrated beyond any measure of doubt, its supporters believe that the mass of evidence is consistent with the hypothesis. Overall, the supporters of the critical period suggest that a native-like accent is probable if exposure occurs quite early, probably around the age of 6 for most individuals. Those who start late can attain high levels of native-like accent but not native-like standards (Long, 1990, 1993; Patkowski, 1994).

It cannot be ignored, however, that there is opposing evidence for the critical period for accents. Neufeld (1977, 1978, 1979) demonstrated that high levels of pronunciation can be achieved by foreign and second language learners. Twenty-five English speaking students from the University of Ottawa participated in the 1978 study. The researchers videotaped one 18 hour program for individualized instruction for Chinese, Japanese and Eskimo. Learners were trained to produce

sounds of these languages with short phrases. The learners, however, did not understand the meaning of those sounds.

Three judges for each language listened to the recorded speech samples of the subjects. In the end, subjects' performance in Eskimo was not analyzed because two of the judges were frequently too far apart in their observations. With regard to the other languages, nine of the subjects were rated by three native speakers of Japanese as unmistakable native, and six others were rated as near-native. Eight out of twenty were rated as native speakers of Chinese. The results suggested that adults seem to be able to produce native or near native sound patterns in new languages. Therefore, Neufeld concluded that adult language learners can acquire native-like proficiency "in the sound patterns of another language in an artificial learning situation" (p. 173).

Despite its contribution, Neufeld's study has been criticized. For instance, the speech samples in the study were very limited, as they recorded rehearsed imitations of short isolated phrases. These rehearsed imitations, which were produced under monitored conditions, do not necessarily indicate that the subjects possessed phonological competence. Hence, the study does not invalidate the critical period for accent. Neufeld's study did suggest that a number of adults can be trained to imitate or mimic phrases from a foreign language, and that "perceptual and motoric abilities that permit children to acquire the speech sounds of their L1 are still available and can be accessed by adult L2 learners" (Bongaerts, 1997, p. 450). That is, Neufeld's study did show that foreign accent cannot be due to missing motor or perceptual skills of adults.

As Neufeld did not obtain enough evidence to reject the critical period for accent, he conducted another study. The new study (1979) was different in that it did not involve learners repeating language sounds. The subjects for the new study were proficient second language learners. Neufeld (1979) believed that to renounce the CP he needed to find subjects who had acquired their second language as adults and could pass as native speakers of that language. Seven NNSs of French

and three NSs participated in the study. Eighty-five French-Canadians participated as judges. In all, 5 anglophones who learned French as adults were identified as native speakers of French. Once again, Neufeld concluded that it is possible for adult learners to achieve a native-like pronunciation.

Despite Neufeld's efforts to deny the CP for accent, once again his work was subject to criticism. It has been argued that it is limited with regard to the speech samples. As the 1978 study, the 1979 study required the subjects to produce rehearsed material under monitored conditions. Rehearsed passages and phrases do not demonstrate that the subjects possessed phonological competence. To refute the critical period for accent, studies would have to be replicated focusing on very advanced learners producing natural speech. With regard to the critical period for accent Long (1990) states:

> The easiest way to falsify such claims would be to produce learners who have demonstrably attained native-like proficiency despite having begun exposure well after the closure of the hypothesized sensitive period (p. 274).

In fact, there is evidence that exceptional learners exist and that they have achieved native-like pronunciation (Schneiderman et al., 1988; Novoa et al., 1988; Ioup et al., 1994; Bongaerts et al., 1995, 1997).

Ioup, Boustagui, Tigi and Moselle (1988), for instance, studied the ability of successful adult learners to attain native-like competence in a second language either in a naturalistic or instructional environment. The two subjects were Julie, who acquired Egyptian Arabic in an untutored setting, and Laura, whose first exposure to Arabic was in a classroom. To assess the subjects' level of native-like competence, the researchers employed a speech production task, a grammatical judgment task, an anaphoric interpretation task and an accent recognition task. Only the results with regard to the subjects' pronunciation will be discussed, as they are relevant to the present

study. The first measure in Ioup et al.'s (1988) study evaluated the subjects' spoken language to determine if they would be considered native speakers by Egyptian judges. The subjects' spontaneous speech was elicited and taped. They were asked to detail their favorite recipe. Five other female speakers were also chosen to perform the task. Three of the females were educated native speakers of Arabic and the other two were non-native speakers with noticeable non-native features in their speech. Thirteen teachers of Arabic assessed the speech production of all the subjects. The results showed that the judges correctly identified the three native speakers and the two non-native speakers as native and non-native, respectively. Julie and Laura were rated as native speakers by 8 of the 13 judges; 6 judges rated them both as native and 2 rated Julie but not Laura as native. The researchers stated that "[more] often than not, they pass as native speakers" (p. 80). The study by Ioup et al. (1988) makes a case against a critical period for accent, as both Julie and Laura were rated as native speakers by many of the judges.

Bongaerts, Van Summeren, Panken, Schils (1997) also attempted to assess whether late language learners, in particular Dutch learners of English, could achieve native-like pronunciation. The subjects were divided into 3 groups; 10 native speakers of English, 11 advanced, non-native speakers of English who began studies after they entered high school, and 20 native speakers of Dutch who varied greatly with respect to their command of English. The subjects were asked to read six sentences. Their elicited speech was tape recorded. The six sentences were chosen because they contained phonemes that were very similar and very different from Dutch.

Thirteen native speakers of British English were chosen as judges. Native speakers of English received very high scores, as expected (median 4.84). The scores for the highly successful learners were high (median 4.61), although not as high as the native speakers. Five of the highly successful learners were categorized as native-like. However, an analysis of each of the six sentences showed that all the native

speakers of English scored high in all sentences, but only three of the 5 successful learners of English scored high in all 6 sentences. The authors concluded that some learners can achieve native-like pronunciation. Therefore, the study constituted counterevidence that there is a sensitive period for accent.

However, supporters of the critical period for accent would argue that the sentences which elicited the subjects' speech were too limited. The six sentences were too rigorous and were produced under monitored conditions. Overall, proper sentence production does not mean that the learners have achieved phonological competence. Perhaps pronunciation should be measured by using more meaningful production tasks, such as spontaneously produced stories or anecdotes.

So far, the literature review presented here has surveyed the research that supports or denies a critical period for accent. Supporters of the critical period for accent argue that when a second language is learned after age six, native like pronunciation cannot be attained. On the other hand, those who dismiss the critical period for accent claim that a number of advanced learners can achieve native-like pronunciation. In view of what has been discussed, it appears that the evidence supporting or refuting the CP for pronunciation is still inconclusive. In order to refute the CP for accent, studies should continue to focus on very advanced adult learners, and should assess their pronunciation utilizing tasks that require language processing at levels deeper than mere oral recitation.

The current study set out to assess whether advanced learners of Spanish could achieve native-like pronunciation. This research is different from past studies in that, first, the subjects are advanced second language learners of Spanish. Second, the subjects' pronunciation was measured not utilizing a sentence or paragraph production task, but a language processing task: informal speech production. Third, the judges were all NSs currently residing in Puerto Rico and who possessed limited English proficiency. Judges claimed that they had neither lived in the continental United States nor been

exposed to accented Spanish (by English speakers). The following are the research questions asked:

1. Can advanced learners of Spanish be judged native-like in their pronunciation of Spanish?
2. Is there a significant difference between the scores assigned to the NSs and the advanced NNSs?

Research Design

Subjects

Four groups of subjects took part in this study. Group I (Table 1) served as the control group, and it consisted of 10 native speakers of Spanish (3 males and 7 females; mean age 29.3) from different Spanish-speaking countries. All of these subjects were graduate students in Hispanic Linguistics or Hispanic Literatures at the University of Minnesota, and all were Spanish-language instructors. All of the subjects in Group I came to the US to pursue graduate studies (mean arrival date is 3.3 years).

Group II (see Table 2) consisted of 14 native speakers of English (5 males and 9 females; mean age 27.8). All of these subjects were graduate students in Hispanic Literatures or Linguistics at the University of Minnesota, and all were Spanish-language instructors who had received formal training in linguistics or languages. All of the subjects in Group II were the key subjects in the experiment, and were selected because they are considered to be highly successful learners with an excellent command of Spanish. They can be regarded as late learners of Spanish, who at least initially acquired the language in an instructional setting. Most of them started their language education late in junior high or early in high school (mean age 15, range 13-17). None of them had been exposed to a Spanish speaking environment before that time. After graduating from High School, a number of the subjects went on to major in Spanish. During the course of their studies,

most of the subjects had spent some time either studying, working in or visiting a Spanish-speaking country (mean time abroad 1.5 years) All the subjects reported that they used Spanish at work and at school. All but subjects 7, 8 and 11, reported that Spanish is not their primary language of communication at home. Subject 7 indicated that Spanish is used at home, as the spouse is a native-speaker of Spanish. Subject 8 indicated that Spanish is used at home continuously, as the spouse is a Spanish teacher at the secondary education level and they enjoy using their Spanish daily. Subject 11 reported that Spanish is the language at home because the roommate is a Spanish speaker. All the subjects indicated that they have a motivation to learn the language because they have always been interested in Spanish culture and its people, and they believe that it is important to be fluent in a second language.

Group III consisted of 5 learners of Spanish (2 males and 3 females; mean age 23.2) who are not considered highly proficient in the language (See Table 3). The subjects in this group are either in the process of completing a Bachelor's Degree in Spanish or have finished their degree. For the most part, they all started language learning at the high school level (mean age 14.6), and their first experience took place in an instructional setting. The subjects in this group claimed that they used Spanish at work or school, but not one used Spanish at home.

Group IV consisted of 12 judges (see Table 4). Twelve monolingual native speakers of Spanish (5 males and 7 females, mean age 30) were chosen to rate the speech samples. Self report indicated that the judges possessed low English proficiency, although they had all completed English courses at the college level in Puerto Rico. Judges were all born and raised in Puerto Rico, and currently resided in the island. All of the judges were graduate students in the social sciences and literatures at different institutions in Puerto Rico. Only three of the judges had received some form of formal training in languages or linguistics. None of the judges had lived in the continental United States, but most had traveled to the States. The judges claimed, however, that they had not been exposed to accented Spanish (by English speakers).

Table 1. Group 1 (native speakers of Spanish)

Subjects	Age	Gender	Graduate Study	Instructor of Spanish	Formal Training in Linguistics or Languages	Time Livin in the US (years)
1	31	M	Linguistics	Y	Y	2
2	36	F	Literature	Y	Y	5
3	28	F	Literature	Y	Y	4
4	29	F	Linguistics	Y	Y	3
5	25	M	Literature	Y	Y	2
6	31	F	Literature	Y	Y	5
7	30	F	Literature	Y	Y	3
8	24	F	Literature	Y	Y	2
9	29	M	Literature	Y	Y	3
10	30	F	Literature	Y	Y	4

Instrumentation

The subjects (Group I, II, III and VI) had to complete a consent form (See Appendix A) and a biographical survey (See Appendix B) which documented their age, sex, education, and (for groups II and III) motivation for studying the language, time abroad, etc. Speech samples from 29 subjects (Group I, II and III) were elicited using informal speech production, elicited by a request to recount a happy episode in the subject's life. All speech samples were rated for accent by subjects in Group IV using the following 4 point scale: 1 - strong foreign accent: definitely non native; 2 - noticeable foreign accent; 3 - near native, but slight foreign accent; 4 - no foreign accent at all: definitely native. For the present study, the scale appears in English. However, to facilitate the rating by the judges, the scale was translated to Spanish (1 - Acento Fuerte, definitivamente NO es un nativo-hablante, 2 - Se le nota un acento, 3 - Casi nativo-hablante, 4 - No tiene acento, definitivamente SI es un nativo-hablante). Originally, a five-point scale was adopted (1 - Heavily Accented, 2 - Noticeable Foreign Accent, 3 - Near-native, 4 - Appears Native, 5 - Unmistakably Native). However, the first judges

Table 2. Group 2 (advanced non-native speakers of Spanish)

Subject	Gndr.	Age	Graduate Studies	Spanish Language Instructor	Age of L2 Learning	Learning Environ-ment	College Degree	Time Abroad (years)	Use of L2 at Work or School	Use of L2 at at Home
1	F	26	Ling.	Y	16	Classroom	Spanish	0.5	Y	N
2	F	27	Lit.	Y	16	Classroom	Spanish	0.5	Y	N
3	M	23	Ling.	Y	15	Classroom	Spanish	3.0	Y	N
4	F	27	Lit.	Y	16	Classroom	Spanish	1.0	Y	N
5	M	29	Lit.	Y	15	Classroom	Spanish	1.0	Y	N
6	M	26	Ling.	Y	13	Classroom	Spanish and German	1.0	Y	Y
7	F	26	Lit.	Y	13	Classroom	Spanish	3.0	Y	Y
8	M	32	Lit.	Y	15	Classroom	Education and Spanish	2.0	Y	Y
9	M	29	Lit.	Y	15	Classroom	Spanish	1.0	Y	N
10	F	30	Lit.	Y	14	Classroom	Spanish	0.5	Y	N
11	F	24	Lit.	Y	14	Classroom	Spanish	2.0	Y	Y
12	F	28	Lit.	Y	15	Classroom	Spanish	1.5	Y	N
13	F	27	Lit.	Y	17	Classroom	Spanish	3.0	Y	N
14	F	35	Lit	Y	16	Classroom	Spanish and French	1.0	Y	N

Table 3. Group III (non-native speakers of Spanish)

Subjects	Gender	Age	Age of L2 Learning	Time Abroad (years)	Use of L2 at Work/ School	Use of L2 at Home
1	M	21	16	1.0	Y	N
2	F	24	15	0.5	Y	N
3	M	20	14	0.5	Y	N
4	F	26	13	0.5	Y	N
5	F	25	15	0.5	Y	N

Table 4. Group IV (judges)

Subjects	Gender	Age	Graduate Studies	English Proficiency	Formal Training in Lin or Lit	Exposed to accented Spanish	Traveled to the U.S.	Lived the US (years)
1	M	28	History	N	N	N	Y	N
2	F	30	Edu	N	Y	N	N	N
3	M	29	Edu	N	N	N	Y	N
4	F	27	Lit	N	N	N	N	N
5	M	32	Lit	N	N	N	Y	N
6	F	39	Lin	N	Y	N	Y	N
7	M	28	Lit	N	N	N	Y	N
8	F	26	Lit	N	N	N	Y	N
9	M	31	Lit	N	N	N	Y	N
10	F	30	Lin	N	Y	N	N	N
11	F	29	Lit	N	N	N	Y	N
12	F	30	Lit	N	N	N	Y	N

to rate the speech samples demonstrated confusion between the meaning of "3" and "4". To avoid confusion and disagreement, the four-point scale was adopted.

Data Collection Procedures

1. Collection of Speech samples

All subjects were seen individually in a quiet, climate control room at the Language Laboratories of the University of Minnesota. All the recordings were done at different dates and times during a two week period. The instructions were given by the researcher, who also collected the data. The informal speech was elicited by asking the subjects to narrate a happy episode in their life. The researcher asked the subjects to narrate the story using natural speech, and to limit themselves to three minutes. Their production was taped on a Sony tape recorder using 60 minute-high quality/metal tapes. A tape was used for each subject. After the taping of the informal speech production of all subjects, 29 speech samples had been collected.

2. Preparation of Speech Samples for Rating

Each of the 29 samples was edited and a 15 second speech sample was selected for each. The 15 sec. segments were made to shorten the speech samples and guarantee that the judges would not become wearied. Most important, it was done to assure that all the informal speech samples were as close as possible to a native-like pronunciation and had no "slip of the tongue", hesitation, or any characteristic, such as syntactic errors, that would cause the NSs to rate the subjects as non-native speakers. The purpose was to ensure that when the judges rated the speech samples, their best phonological production was utilized for assessment unconfounded by syntactic or lexical errors. In the end, each participant had a 15 sec. recording of an informal speech sample, for a total of 29 speech samples.

3. Rating of Speech Samples

For each of the 12 judges a tape was made containing all 29 15-sec. speech samples. All samples were set randomly at 4 seconds apart.

The tapes were sent to San Juan, Puerto Rico. A close personal friend of the researcher found judges who were all seen individually at different locations in San Juan. Originally, 22 judges had been chosen, but 10 were eliminated because they had lived in the United States, had higher English proficiency or had been exposed to accented Spanish. Such factors could have affected the results, as they might cause tolerance to accent variation. The tapes were played on a Sony tape player. The judges were asked to wear headphones, and were told that they would listen to a number of speech samples. They were also told that the player would not stop after each sample. When rating the speech samples for accent, judges were told to limit themselves to phonological aspects of the samples. The judges recorded their responses on a sheet of paper placed before them on a table at which they sat. The sheet of paper was numbered with subjects 1 - 29, and each subject numbered included the rating scale (1, 2, 3, 4) and an explanation for each number was placed right under the number.

Data Analysis Procedures

First, inter-rater reliability was measured by using Pearson Correlations. Second, research question one was answered by means of analyzing the data qualitatively, to determine whether ANNSs of Spanish can be judged native-like in pronunciation. Third, research question two was answered using a t-test (two tailed) to determine whether there was a significant difference between the ratings of NSs and advanced NNSs.

Results and Analysis

Results for the Pearson Correlations are available in Tables 5 and 6. Inter-rater reliability means the raters consistently gave the same rating because they were using the same standards and have no errors. The closer the correlation to +1 or -1, the more agreement between the judges. Positive one means the judges consistently gave high scores or

low scores to the subjects, and a negative one means that the judges gave opposite scores. The standard deviation for the correlations shows the range of values for the frequencies found in the normal distribution that is bell shaped. For instance, if the correlation is .7 and the standard deviation is .2, then approximately 68% of the correlations fall between .5 and .9. For Group I (NSs), the correlations could not be calculated because ratings were all one value (4) which made the standard deviation 0. Although Group I did not contribute to the correlations, it can be argued that all the judges were in agreement 100%. Therefore, one could say that their inter-rater reliability was perfect because they rated the same subjects with the same score. For Group II (ANNSs) the mean overall consistency was high r = .78 (see Table 5). The mean overall consistency for Group III (NANNSs) was also high r = .77 (see Table 6).

Table 5. Inter-rater reliability/pearson correlations: Group II (ANNSs)

	Judge												
r	1	2	3	4	5	6	7	8	9	10	11	12	Overall
M	.84	.84	.68	.81	.76	.75	.75	.84	.85	.62	.84	.79	.78
SD	.17	.17	.09	.10	.12	.08	.07	.17	.16	.13	.17	.09	.14

Table 6. Inter-rater reliability/pearson correlations: Group III (NANNSs)

	Judge												
r	1	2	3	4	5	6	7	8	9	10	11	12	Overall
M	.85	.85	.77	.62	.85	.75	.85	.77	.80	.68	.77	.68	.77
SD	.10	.10	.20	.15	.10	.18	.10	.20	.13	.18	.20	.18	.17

Scores per subject for Groups I, II and III are available in Tables 7, 8 and 9, respectively. For each of the groups, mean scores and standard

deviations per subject were calculated and averaged across all judges. These scores are represented in Tables 10, 11 and 12, together with group means. Table 10 clearly shows that the Native-speakers of Spanish received very high scores (group mean 4.00). All the NSs were rated as NSs of the language. Table 11 indicates that the scores for the advanced NNSs were high, but not as high as those of the NSs: Individual means ranged from 2.75 to 4.00 (group mean 3.23). The non-advanced NNSs' scores were the lowest: Individual means ranged from 1.00 to 2.42 (group mean 1.95).

It is now possible to answer research question one. That is, can advanced learners of Spanish be judged native-like in their pronunciation of Spanish? The answer is yes, as the data indicated that many of the raters judged the ANNSs (Group II) to be native-like in pronunciation. Note that subjects 2, 4, 6, 8, 11, 13 all received scores of 4, indicating that they were judged as NSs by some of the judges. In spite of being rated as near-native only on some occasions, participant 13, for instance, passed as native speaker in most instances. The ratings of subjects 6, 8 and 11, indicated that they received perfect scores from all judges. The judges were in agreement 100%. Therefore, subjects 6, 8, and 11 passed as native speakers of Spanish in all instances.

A t-test was used to assess research question two: Is there a significant difference between the scores assigned to the NSs (Group I) and the advanced NNSs (Group II)? Results indicated that the scores were significantly different ($p < .05$, Table 13). In other words, the scores could not have occurred by chance alone.

Discussion and Conclusions

The aim of this study was to assess whether advanced language learners of Spanish who are native speakers of English can achieve a native-like pronunciation. Unlike most research on age related difference in ultimate attainment, this study included subjects who were advanced second language learners. These were subjects who learned

Table 7. Scores per subject - Group I (native speakers of Spanish)

	Judge											
Participant	1	2	3	4	5	6	7	8	9	10	11	12
1	4	4	4	4	4	4	4	4	4	4	4	4
2	4	4	4	4	4	4	4	4	4	4	4	4
3	4	4	4	4	4	4	4	4	4	4	4	4
4	4	4	4	4	4	4	4	4	4	4	4	4
5	4	4	4	4	4	4	4	4	4	4	4	4
6	4	4	4	4	4	4	4	4	4	4	4	4
7	4	4	4	4	4	4	4	4	4	4	4	4
8	4	4	4	4	4	4	4	4	4	4	4	4
9	4	4	4	4	4	4	4	4	4	4	4	4
10	4	4	4	4	4	4	4	4	4	4	4	4

Table 8. Scores per subject: Group II (advanced NNSs)

	Judge											
Participant	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	3	3	3	3	3	3	3	3	3	3
2	3	3	3	3	4	3	4	3	3	4	3	3
3	3	3	3	3	3	3	3	3	3	3	3	3
4	3	3	4	3	3	3	4	3	3	4	3	4
5	3	3	3	3	3	3	3	3	3	3	3	3
6	4	4	4	4	4	4	4	4	4	4	4	4
7	3	3	3	3	3	3	3	3	3	3	3	3
8	4	4	4	4	4	4	4	4	4	4	4	4
9	3	3	3	3	3	3	3	3	3	3	3	3
10	3	3	3	2	3	2	3	3	3	2	3	3
11	4	4	4	4	4	4	4	4	4	4	4	4
12	3	3	3	3	3	3	3	3	3	3	3	3
13	4	4	3	4	4	3	4	4	4	3	4	4
14	3	3	3	3	3	3	3	3	3	3	3	3

Table 9. Scores per subject: Group III (non-advanced NNSs)

	Judge											
Participant	1	2	3	4	5	6	7	8	9	10	11	12
1	2	2	2	3	2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2	2	3	3	2	3
3	2	2	3	2	2	3	2	3	3	2	3	2
4	2	2	2	2	2	2	2	2	2	2	2	2
5	1	1	1	1	1	1	1	1	1	1	1	1

Table 10. Mean score and standard deviation per participant averaged across all judges (Group I - NSs)

Participant	Mean	SD
1	4.00	0
2	4.00	0
3	4.00	0
4	4.00	0
5	4.00	0
6	4.00	0
7	4.00	0
8	4.00	0
9	4.00	0
10	4.00	0
Mean Group	4.00	0

Spanish late in junior high or early high school (mean age = 15**)**, and who obviously learned the L2 long after the postulated close of the critical period for pronunciation. This study was also different from past studies in that the subjects' pronunciation was measured not utilizing a sentence or paragraph production task, but using an informal speech production. Furthermore, the judges possessed low English proficiency, and had little or no exposure to accented Spanish.

Table 11. Mean score and standard deviation per participant averaged across all judges (Group II - advanced NNSs)

Participant	Mean	SD
1	3.00	0
2	3.25	.45
3	3.00	0
4	3.33	.49
5	3.00	0
6	4.00	0
7	3.00	0
8	4.00	0
9	3.00	0
10	2.75	.45
11	4.00	0
12	3.00	0
13	3.75	.45
14	3.00	0
Mean Group	3.23	.48

Table 12. Mean score and standard deviation per participant averaged across all judges (Group III - non advanced NNSs)

Subjects	Mean	SD
1	2.08	.29
2	2.25	.45
3	2.42	.51
4	2.00	0
5	1.00	0
Mean Group	1.95	.59

The main result of this study was that 3 subjects were identified as NSs by all judges. One of these subjects began learning Spanish at the

Table 13. Descriptive Statistics and t-test for Group I and Group II

NSs - Group I			NNSs - Group II			
n	m	sd	n	m	sd	p value
120	4.00	0	168	3.23	.48	1.61 E-40*

*$p < .05$

age of 13, one at age 14, and one at age 15. The study also found that some of the advanced non-native speakers received ratings that were comparable to those assigned to the native speakers. Therefore, some subjects could sometimes pass as native speakers of Spanish.

In view of these results, we could argue that advanced learners of Spanish can achieve native-like pronunciation. This study identified some individuals who attained a native-like level of performance in the pronunciation of an L2, in spite of a late start. Do we then have sufficient evidence to challenge a critical period for pronunciation? Our results clearly suggest that it is possible to achieve an authentic, native-like pronunciation of an L2 after the critical period, which may be as early as age 6.

The question that arises then is what makes some of the advanced learners in this study capable of attaining a native-like pronunciation. A possibility is that the critical period occurs later than age 6: during adolescence. It is possible that these learners may not be bound to a critical period because they possess a greater neurocognitive flexibility that other learners may not hold. Certain learner characteristics and learning contexts may work to help them delay a critical period for accent. Motivation, for instance could certainly be a primary factor. As we recall, all subjects possessed high levels of integrative and instrumental motivation. Other factors that could contribute to high levels of native-like pronunciation could be the time spent studying/visiting abroad, and the time spent using the language at work, school and at home. It seems that the learners in this study who had spent the greatest time studying or visiting a Spanish speaking country, and used

the L2 daily, achieved high levels of native-like pronunciation. Nevertheless, systematic research is needed to assess the correlation between those factors and the attainment of L2 native-like pronunciation.

Limitations

As in any research, there are limitations to our study. First, this study did not measure syntactic or pragmatic knowledge. Although some of the NNSs were rated as NSs in their pronunciation skills, it does not follow that they have also achieved native-like proficiency with regard to syntax and pragmatics. Also, although the judges were asked to assess the speech samples based on phonological features, it is possible that the judges may have focused on other features, such as grammar, to assess the subjects' pronunciation. If that was the case, the ratings could have been affected by the judges' assessment of features other than pronunciation.

Many would argue that editing the speech samples to 15 sec. each did not allow the judges to listen to aspects that may have easily identified the subjects as NNSs. However, it is possible that samples of over 15 sec., would have bored the judges. Also, as the present study measured pronunciation alone, it was important to ensure that when judges rated the speech samples, the "best" production, free of syntactic or lexical errors, was utilized for assessment. Finally, as pronunciation is subjective, it is possible that the results could vary if the existing samples were judged in another location. We must also point out that for English speakers, Spanish is an easy language to produce. Therefore, we cannot generalize that native-like pronunciation can be acquired in other languages.

Future Research

Further research should assess whether the advanced NNSs in this study would be judged as NSs by NSs in other geographical areas.

Therefore, tapes should be sent elsewhere. Studies should focus on examining and correlating large numbers of advanced learners whose initial exposure to the language was in the classroom or a natural setting. Research should also examine advanced NNSs who have lived abroad for a number of years and are currently residing in an L2 speaking country. When replicating studies, the judges should reside in the L2 country and should be monolinguals to avoid tolerance of accent variation. The NSs and the NNSs should also speak the judges' language dialect. Judges should also be asked on what they based their ratings. Retrospective interviews would allow for an assessment as to what constitutes a NS.

Finally, other languages and groups should be studied following the above recommendations. Once we establish that advanced L2 learners can achieve native-like pronunciation, we should focus on identifying the variables which may help NNSs achieve native-like pronunciation.

Pedagogical Implications

As with any research, this one too has pedagogical implications. There may be a strong correlation between learners' motivation and attainment of native-like pronunciation. Therefore, language teachers should focus on paying attention to students' motivation and constantly make reference to the learners' motivation through classroom activities and lesson plans.

Although the correlation between the kind and amount of L2 input and the attainment of native-like pronunciation has yet to be established (to my knowledge), teachers should also suggest that students spend time in an L2 country. In addition to promoting study abroad, teachers can develop classroom assignments and activities that may require the students to be in contact with L2 native speakers, for instance, personality interviews or community service. Teachers may want to spend time teaching L2 learners to be aware of phonetic differences between the L1 and L2, and help students establish new phonetic categories. Finally,

as language defines groups, and proper usage of that language, including pronunciation, permits membership in that group, some L2 learners may wish to become native-like in pronunciation to integrate into a cultural group or community. Therefore, for those who are interested in becoming native-like in pronunciation, this study demonstrated that it may be possible.

Notes

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2 Throughout this work, the notion of "critical period" and "sensitive period" are treated the same. An excellent discussion of the topic is available in Oyama's (1979) work.

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APPENDIX A

Consent/Release Form

You are invited to be in a research study that will measure the pronunciation of native and non-native speakers of Spanish. You were selected as a participant because you are either a native speaker of the language or an advance learner. We ask that you read this form and ask any questions you may have before agreeing to be in te study.

The purpose of the study is: to assess if advance language learners of Spanish can attain native-like pronunciation.
If you agree to be in this study, we will ask you to recount a happy episode in your life. Your informal speech production will be tape recorded. The entire process will last no more than 15 minutes.

You will receive no compensation for participating in the study.

The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be kept in a locked file; only the researcher will have access. No-one, but the researcher, will have access to the tape recordings. The recordings will never be published and will not be released to the public.

Your decision whether or not to participate will not affect your current or future relations with the University. If you decide to participate, you are free to withdraw at any time without affecting those relationships.

You will be given a copy of this form to keep for your records.

Statement of Consent:

I have read the above information. I have asked questions and received answers. I consent to participate in the study.

Name _____

Signature _____Date _____

Signature of Investigator _____Date _____

APPENDIX B

Biographical survey/Personal data

Age_____ Gender _____ Field of Study _____
Level of Study _____

Undergraduate Degree _____

Are (were) you an instructor of Spanish? _____
Where? _____

What have you taught? _____

Have you received formal training in linguistics or languages? _____

When did you begin L2 study (age)? _____

Was your first language exposure in a classroom or natural? _____

Have you spent time studying/living abroad? _____ Amount of time
_____

Do you use the L2 at school and at work? _____

Do you use the L2 at home? _____

How would you describe your proficiency?
low____ mid ____ high ___
Explain _____
_____

What is your motivation for studying the L2?
_____
_____

APPENDIX C

Sample Assessment Sheet

Please, listen to the following 29 speech samples and record your answer on this sheet.

1. Sample 1

1	2
strong foreign accent; definitely non native	noticeable foreign accent
3	4
near native, but slight foreign accent	no foreign accent at all; definitely native

2. Sample 2

1	2
strong foreign accent; definitely non native	noticeable foreign accent
3	4
near native, but slight foreign accent	no foreign accent at all; definitely native

3. Sample 3

1	2
strong foreign accent; definitely non native	noticeable foreign accent
3	4
near native, but slight foreign accent	no foreign accent at all; definitely native

4. Sample 4

1	2
strong foreign accent; definitely non native	noticeable foreign accent
3	4
near native, but slight foreign accent	no foreign accent at all; definitely native

5. Sample 5

1	2

strong foreign accent; definitely non native

2
noticeable foreign accent

3
near native, but slight foreign accent

4
no foreign accent at all; definitely native

6. Sample 6

1
strong foreign accent; definitely non native

2
noticeable foreign accent

3
near native, but slight foreign accent

4
no foreign accent at all; definitely native