First Language Attrition in Foreign Accent Detection

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1. Introduction

First language attrition research has demonstrated that long-term residence in a country where one's native language is not the dominant language can affect speakers/listeners' performance in their native language. Studies involving production are numerous (Bullock & Gerfen, 2004; Bullock, Dalola, & Gerfen, 2006; Colantoni & Gurlekian, 2004; de Leeuw, Schmid, & Mennen, in press; Dubois & Horvath, 1998; Major, 1992; McMahon, 2004; Seiko, 2002). The de Leeuw et al. study revealed that some NSs of German living in The Netherlands and Canada were perceived to have a foreign accent** by German monolingual listeners. However, research on first language attrition in perception is rare (Cancila, Celata, and Giannini, 2005; Ventureyra, Pallier, & Yoo, 2004). Ventureyra et al. found that Korean adoptees who had moved to France, Switzerland, or Belgium, as adults had lost their ability perceive contrasts in Korean stops. Cancila & Giannini observed L1 attrition in perception of Italian geminate consonants in the Lucchese community of San Francisco.

The present study expands the study of first language attrition of perception but perhaps it is the first to investigate attrition in the ability to detect a foreign accent in one's native language. It compares accent ratings of four different groups listening to Brazilian Portuguese spoken by native and nonnative speakers. The 25 speakers were 5 NSs and 20 NNSs who were native speakers of American English. The four listening groups were: (1) Brazilian Portuguese listeners in the US, (2) Brazilian Portuguese listeners in Brazil, (3) American English Listeners in the US, with Portuguese experience, (4) American English Listeners in Brazil, with Portuguese experience.

2. Method

2.1 Speakers and speech materials[1]

The 25 speaker participants were speakers of Brazilian Portuguese — 5 NSs and 20 NNSs. The NSs were Brazilians from three different Brazilian states (Amazônia, Santa Catarina, and São Paulo), three females and two males, aged 22-35, who had been living in the United States for an average of 1.8 years. The NNSs were NSs of American English from numerous American states, 12 males and 8 females aged, 19-45. They had all studied Brazilian Portuguese and 11 of them had visited or lived in Brazil, from one week to 6 years. Each speaker was recorded reading a short passage on carnival and samba, which was chosen because of the familiarity of the topics to both Brazilians and learners of Brazilian Portuguese (see Appendix A). The resulting 25 speech samples were then randomly ordered so that the listening test consisted of the speech samples of the 25 speakers, with each listener hearing the speakers in the same order. Although this technique does not control for order effect, any possible ordering affect should affect all four groups of listeners equally and thus should not interfere with the comparison among the four listener groups.

[1] The speakers and speech materials were identical to those used by Major, 2007.

2.2 Listeners

The four listener groups, consisting of 18 listeners per group, none of whom had participated as speakers. They were comprised of:

(1) BPLUS: Brazilian Portuguese listeners in the US (all NSs of Brazilian Portuguese), who had resided in the US for 8 years or more (mean 15.2 years).
(2) BPLBR: Brazilian Portuguese listeners in Brazil (all NSs of Brazilian Portuguese), who had never visited an English speaking country.
(3) AELUS: American English Listeners in the US (all NSs of American English), with Portuguese experience.
(4) AELBR: American English Listeners in Brazil (all NSs of American English), with Portuguese experience, who had resided in Brazil for 5 years or longer (mean 16.3 years).

2.3 Procedure[2]

A recorded message of the instructions for the listening test was played to each of the 72 listeners in English (see Appendix B). The listening test, consisting of speech samples of the 25 speakers, was then played to each listener. Upon hearing each speaker, the listener rated the speaker for degree of foreign accent on a 9-point scale, from 1 = no foreign accent to 9 = very strong foreign accent. A total of 1800 foreign accent ratings were obtained (72 listeners, each hearing 25 speakers).

3. Results

3.1 Comparison of individual speakers across groups

Figure 1 plots the mean accent ratings of all speakers by listening group. The scores range from 1.0 to 8.5 (1 = no foreign accent, 9 = very strong foreign accent).

[2] The procedure was the same that Major (2007) employed.

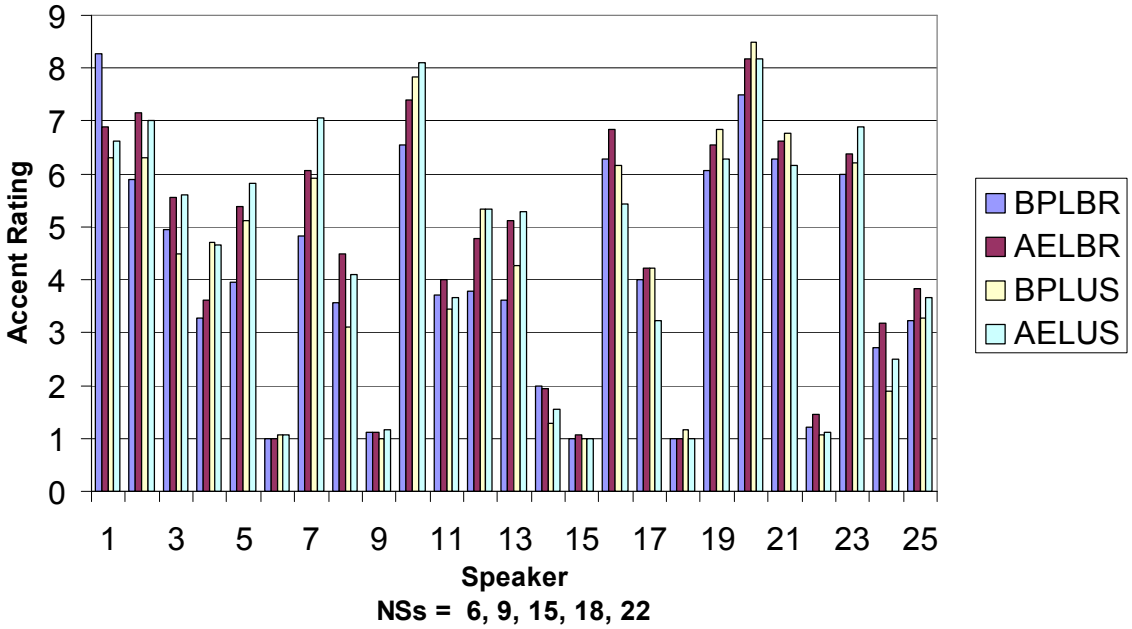

Figure 1. Mean accent ratings for each of the 25 speakers by listener group

3.2 Mean accent ratings for NSs and NNSs

Figure 2 illustrates the mean ratings by listener group for the NSs and NNSs. There was no overlap in the mean scores of the two speaker groups: the range of mean scores for the NSs was only 1.06-1.12, while the range of the scores for the NNSs was considerably higher: 4.82-5.36.

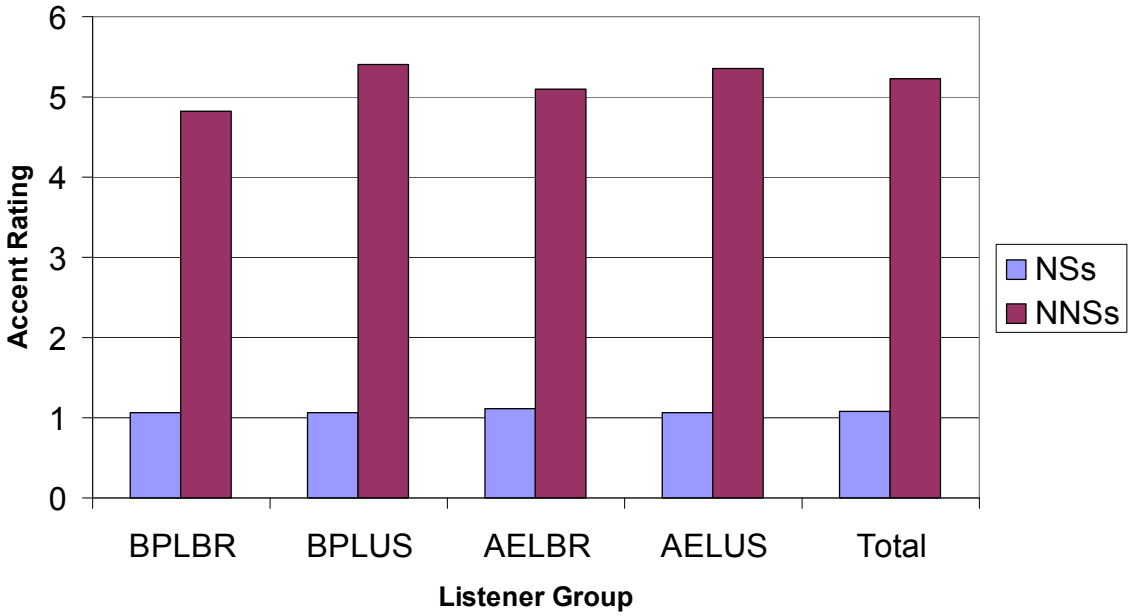

Figure 2. Mean accent ratings for NSs and NNSs by listener group

3.3 Comparison of speaker groups

In order to compare the differences between the ratings for the NSs and NNSs, two sets of scores were calculated: each listener's mean rating for all of the NSs and his or her mean rating for all of the NNSs. This resulted in two sets of scores: the mean for each listener's rating of the NSs and the mean for each listener's rating of the NNSs. *T* tests were employed to test whether the differences between ratings of the NSs and NNSs were significantly different for each listener group. All four pairwise comparisons were highly significant ($p < 0.0001$), indicating all four groups distinguished between NSs and NNSs.

3.4 Comparison of listener groups

Two one-way ANOVA analyses were employed to determine if there was significant variation across listener groups in their rating of the NSs and NNSs. The analyses yielded no significant differences in the ratings for NS but significant differences for those of the NNSs: $F(3, 360) = 4.9860$, $p < 0.01$.

In order to determine possible significant differences between groups, ANOVA pairwise comparisons were employed. Table 1 shows that of the 6 pairwise comparisons (Bonferroni adjusted), two proved to be significant at $p < 0.01$. The only significant differences were for groups residing in different countries (BPLUS vs. BPLBR and AELUS vs. BPLBR).

Table 1. Pairwise ANOVA Analyses of ratings for NNSs

Group	BPLBR	BPLUS	AELBR	AELUS
BPLBR				
BPLUS	$p < 0.01$			
AELBR	Ns	ns		
AELUS	$p < 0.01$	ns	ns	

4. Discussion

None of the four groups had difficulty distinguishing between NSs and NNSs. This is hardly surprising given that Major (2007) found even speakers unfamiliar with Portuguese (native listeners of American English in the US and nonnative listeners of English in the US) could distinguish between NSs and NNSs of Brazilian Portuguese. When comparing different listener groups (all living in the US), he also found very few differences across groups, suggesting that neither the NL of the listener nor the familiarity with the language had much effect on the rating of foreign accents.

The present study, however, differs from Major's (2007) in two major respects: familiarity with the language and country of residence. In this study two groups were living in the US and two were living in Brazil, and all four groups were familiar with Portuguese. When comparing different listening groups, there were no significant differences in the ratings of the NSs; however, there were two significant differences in the ratings of the NNSs (Table 1). It is noteworthy that the only significant differences were between groups living in different countries: the Brazilian Portuguese listeners living in the US versus those living in Brazil (BPLUS vs. BPLBR) and the American English listeners in the US versus the Brazilian Portuguese listeners in Brazil (AELUS vs. BPLBR). However, there were no significant differences for the other four comparisons: AELBR vs. BPLBR, AELBR vs. BPLUS, AELUS vs. BPLUS, and AELUS vs. AELBR. What these results suggest is that first language attrition in the perception of foreign accent resulted in the different ratings of the NNSs by the

BPLUS group. Furthermore, place of residence seems to have affected even the nonnative listeners. Although there were no statistically significant differences between AELBR and AELUS, there were differences between AELUS and BPLBR, but no differences between AELBR and BPLBR. This suggests that living in Brazil has made the foreign accent perception of the AELBR group more similar to that of the BPLBR group.

There are some additional trends that seem to indicate that place of residence affects both native and nonnative listeners. Table 2 shows the number of NS ratings given to NNSs and the number of NNS ratings assigned to NSs. Because the numbers are small, a statistical analysis would not be appropriate. Nevertheless, out of 360 ratings there were only 3 NS ratings for a NNS by the BPLBR group, and all for the same speaker. This speaker was more advanced than any of the other NNSs, having lived in Brazil for 6 years and written her PhD dissertation in Portuguese (speaker 14 in Figure 1). On the other hand, the BPLUS group gave 9 NS ratings for NNSs, including 5 ratings for speaker 14 and 4 ratings for 2 other speakers. It is curious, though, that the AELBR group assigned more NS ratings (34) than the AELUS group (15).[3] In the rating of the NSs, however, there do not seem to be any trends indicating L1 attrition, which is not surprising, given there were no statistically significant differences in any of the 6 pairwise comparisons (see also Major, 2007).

Table 2. Number of NS ratings for NNSs and NNS ratings for NSs

Group	BPLBR	BPLUS	AELBR	AELUS
Number of NS ratings for NNSs (n = 360 each group)	3 (same speaker)	9 (3 speakers)	34	15
Number of NNS ratings for NSs (n = 90 each group)	6	5	9	5

5. Conclusions

This study has tested the effect of living abroad on listeners' ratings of foreign accents. There are several conclusions:

(1) No L1 attrition occurred in the ability to distinguish NSs from NNSs. In fact, all four groups could easily distinguish between NSs and NNSs.
(2) No L1 attrition occurred in ability to rate NSs.
(3) L1 attrition occurred in Brazilian listeners' ratings of NNSs.
(4) Country of residence affected Brazilian listeners more than Americans listeners.
(5) When comparing the ratings for NNSs, the country of residence seems to have been more of a factor than being a native or nonnative listener.

The general conclusion can be stated simply: listeners' foreign accent ratings of their NL spoken by nonnatives are affected by long-term residence in a country where that language is not the dominant language.

[3] Perhaps proficiency in Portuguese could be a factor; however, proficiency was not determined for either group. It is entirely possible that some listeners in the US were more proficient in Portuguese than some of the listeners in Brazil.

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Appendix A

Reading Passage

A primeira escola de samba nasceu no Estácio — portanto no asfalto e não no morro — fez a sua primeira aparição oficial no desfile da Praça Onze. A tradição da brincadeira de rua já existia há muito tempo no Distrito Federal, mas sem nenhum tipo de organização musical.

Appendix B

Directions to Listeners

You will be hearing a short text of Portuguese read by Americans and Brazilians. Listen to each speaker and rate the speaker for degree of foreign accent, by placing an "X" in the appropriate box.

1= No foreign accent

9 = Very strong foreign accent

Specifically, "1" means the speaker sounds like a native speaker of Brazilian Portuguese and 9 sounds like a nonnative speaker of Portuguese with a very strong foreign accent.