

Segments predict non-native accents: Prosody lends little

We evaluated the non-native accentedness of speech to compare the various phonological properties of segments to those of prosody and fluency. Studies have shown from a non-phonological view that many learners attain fluency, but many more retain a noticeable accent (Moyer, 2005:45), and there is correlation with VOT and non-nativeness (Schmidt and Flege, 1995).

To see what phonological properties predict non-native accents, we collected the non-native speech data before and after instruction, and evaluated the data in terms of the distributional properties and rule application of consonants and vowels, as well as the prosodic rules of intonation and overall fluency. We also collected native speech data as a control group against which the non-native speech properties are evaluated. While accent reduction courses are offered in classroom instruction (Morales Pech and Izquierdo, 2011), internet markets (Blommaert, 2009), and speech therapy practices (Kohnert et al., 2003; Schmidt, 1997; Stockman et al., 2008; Wolfe et al., 2003), the non-native accents are known to persist regardless whether there is some treatment efficacy (e.g. Morales Pech and Izquierdo, 2011) or there is none (e.g. Ducate and Lomicka, 2009). The longitudinal results are particularly important, because non-native accents among adult learners due to age constraints (Scovel, 1988) can prohibit the attainment of native-like L2 pronunciation (Lenneberg, 1967). This paper provides the evidence of segmental prediction in non-native accents from the speech of 33 learners whose native language is American English. The learners took a five-week class for one hour per week in a U.S. college. Each week covered one of the following phonological aspects: consonantal distribution, vowel distribution, segmental rules, intonation rules, and rhythm rules. The non-native speech data were gathered from pre- and post-tests for production and comprehension. The recorded speech data were randomized and rated by phonetically trained native speakers in terms of consonantal distribution, vowel distribution, segmental rules, intonation rules, and rhythm rules. The raters ranked the phonological quality on a 7-point scale with 1 equal to non-native novice level and 7 equal to definitely native level. The raters also ranked accentedness of the whole utterance by answering two questions: Is one more natural than the other? If so, which one?

The results are the following. Figure 1 shows that the raters gave higher points for learner speech in post-test than pre-test, mainly in intonation and fluency, but not as much in segmental features of vowel and consonants. Figure 2 shows that the raters detected non-native accentedness in both pre- and post-test recordings with some improvement. Figure 3 shows that learner improvement did not cross over the ceiling between Ranks 5 (equal to non-native with high proficiency), and 6 (equal to perhaps native speech). The result supports the ceiling effects in line with Lenneberg (1967); Scovel (1969, 1988); Selinker(1972), Bley-Vroman (1989), Flege(1992, 1995), but not with Ioup et al (1994) and Bongaerts, Theo (1999, 2000). Figure 4 shows that learners significantly improved in their listening tests, which correlate to overall pronunciation goodness. The result also indicates that listening precedes pronunciation in learner speech, in line with Flege (1988:75), but not with Major (1995, 2001:55). Our results indicate that segmental phonology of consonants and vowels is what makes a non-native accent, although the prosodic features of fluency and intonation may improve a great deal.

Figures

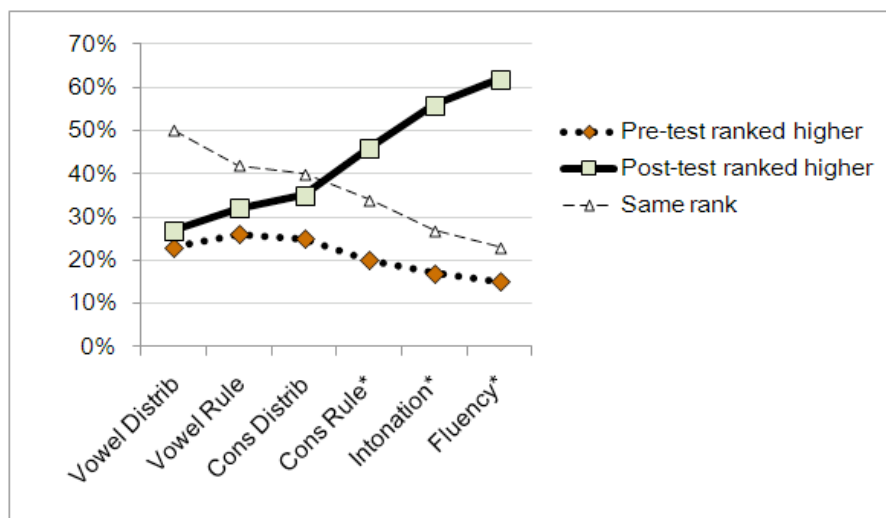


Figure 1. Rating results of pronunciation goodness for the learner speech before and after the instruction ($n=8071$, $*p<0.05$). The native speaker raters gave higher points for learner speech in post-test than pre-test. Vast improvement was shown in the non-segmental properties of fluency and intonation, but not in the segmental properties of vowel distribution, vowel rules, consonantal distribution, and consonantal rules. (*Notes:* Vowel Distrib = Vowel Distribution; Vowel Rule = Vowel Rule Application; Cons Distrib = Consonantal Distribution; Cons Rule = Consonantal rule application)

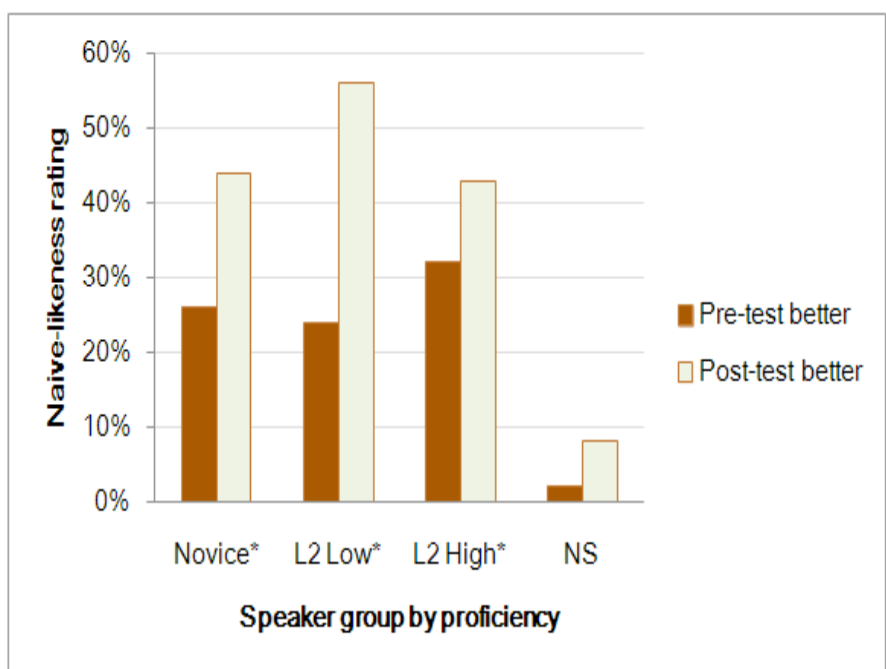


Figure 2. Native-likeness rating results of learner and native speech ($n=2616$, $*p<0.05$). The native speaker raters chose significantly bigger portion of learner speech to be more natural from the posttest recordings than pretest recordings. (*Notes:* NS= Native Speaker; L2 High = Learners with high proficiency; L2 Low = Learners with low proficiency; Novice= Learners with no background in the Korean language)

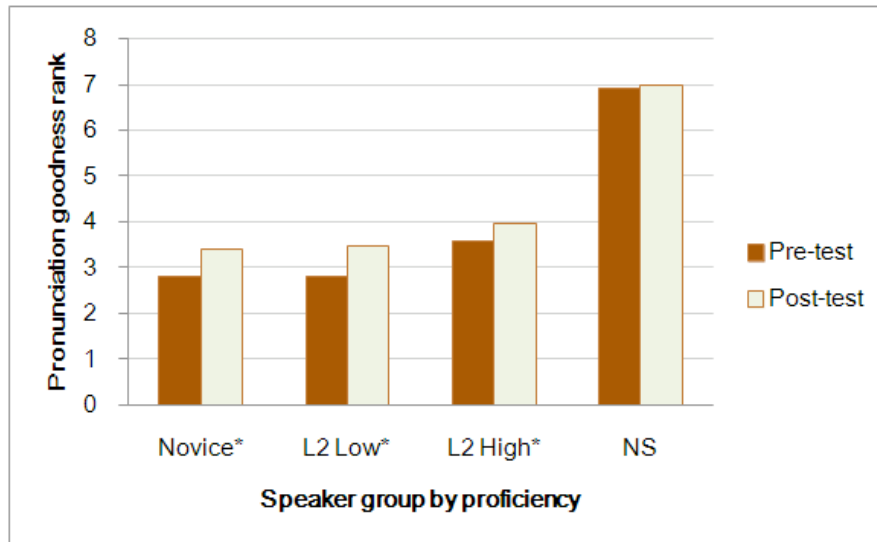


Figure 3. Pronunciation goodness rating results of learner and native speech ($n=2616$, $*p<0.05$). The native speaker raters ranked significantly lower for all groups of learner speech than for native speech. The learner improvement did not cross over the ceiling between Ranks 5 (equal to non-native with high proficiency), and 6 (equal to perhaps native speech). (Notes: NS= Native Speaker; L2 High = Learners with high proficiency; L2 Low = Learners with low proficiency; Novice= Learners with no background in the Korean language.)

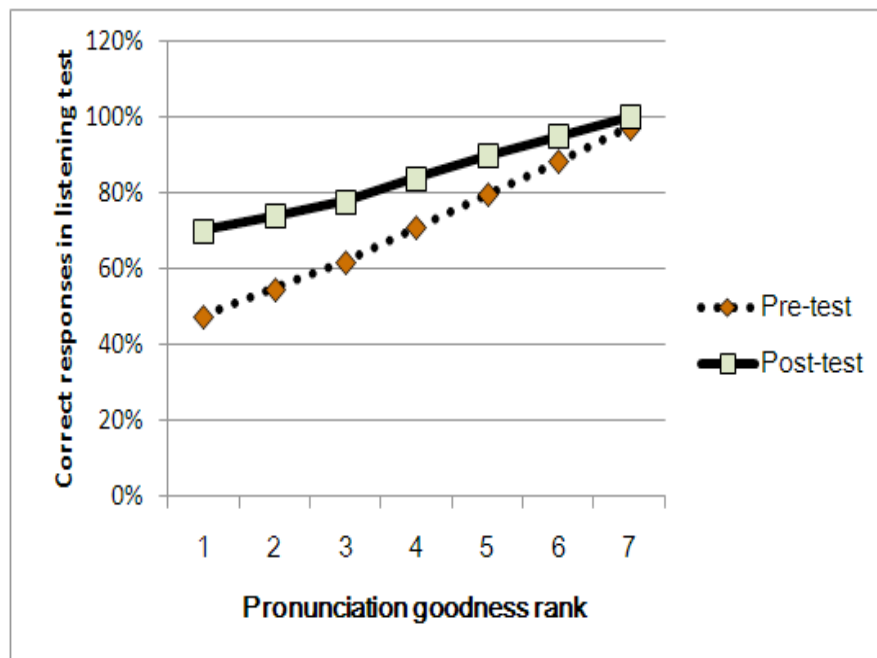


Figure 4: Correlation between listening test and pronunciation rank. The pronunciation goodness ranks positively correlate with correct responses in listening test. ($n=4036$; $r=0.81$). The chance-level listening proficiency (48%) coincides with the very wrong pronunciation (rank 1), while the marginal-level of pronunciation proficiency as to correct or wrong (rank 3) coincides with the 60-80% of accuracy in listening. Listening precedes pronunciation in learner speech.

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