Segments predict non-native accents

Prosody lends little

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Goals

※ What makes non-native accents?
- Native speakers almost always detect non-native accents
- Learners hardly feel that they acquired native-like accents
- Adults are not likely to attain native-like accents (Scovel, 1988)
  • L2 speech may improve to show different proficiency
  • People often mimic tonal properties, but not segmental ones
  • Learners’ L1s are recognized by accents, if not by face

※ Research Questions
- Are there phonological properties that signal non-native accents in a cross-sectional study?
  that a non-native can hardly attain in a longitudinal study?
- Are such properties SEGMENTAL or PROSODIC?

Goal:
To Compare segmental and prosodic properties and determine what makes non-native accents.
Studies on Developmental Results
- Comprehensibility, and fluency improved, but not in accentedness (Derwing, Munro, and Wiebe, 1998)
- Many learners attain fluency, but many more retain a noticeable accent (Moyer, 2005:45)
  • Rhythm correction in CALL improved intelligibility (Tajiama, Port and Dalby, 1997)
  • Correlation with VOT and non-nativeness (Schmidt and Flege, 1995).

Accent Reduction Training / Therapy
- Educational institutes
- Speech Therapists
  American Speech-Language-Hearing Association (ASHA), Voice & Speech Trainers Association (VASTA)
- Laborers care about accent-based decisions on employment
METHODS
Three Experiments
EXP1: L1 Korean, L2 English, 1 hour therapy for non-credit
EXP2: L1 Korean, L2 English, 3 hour 7 weeks class for credit
EXP3: L1 English, L2 Korean, 1 hour 5 weeks class for non-credit

Subjects
- One to one (Experiment 1)
- By groups and classes (Experiments 2 and 3)

Material
- Work on the difference between the native and target languages
- Consonants, Vowels, Segmental Rules, Intonation, Rhythm
- Much use of minimal pairs of words

Procedure
- Pre-test on Listening and Production
- Feedback on the pre-test
- Intervention (Training or Therapy)
- Post-test on Listening and Production
- Evaluation by Native Speakers, Experts, and Learners themselves
2.1 Subjects

※ 37 Learners of Korean Language whose L1 is English

<table>
<thead>
<tr>
<th></th>
<th>Native Speaker (N=9)</th>
<th>L2 High (N=14)</th>
<th>L2 Low (N=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening</td>
<td>97% (±3.5%)</td>
<td>80% (±3.6%)</td>
<td>62% (±8.9%)</td>
</tr>
<tr>
<td>Reading</td>
<td>Native</td>
<td>Good</td>
<td>Capable</td>
</tr>
<tr>
<td>PronGood</td>
<td>6.9 (±0.1)</td>
<td>3.6 (±0.5)</td>
<td>2.8 (±0.5)</td>
</tr>
<tr>
<td>HeritageSpkr</td>
<td>9 (100%)</td>
<td>2 (14%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>AGE</td>
<td>31.2 (±14.7)</td>
<td>21.5 (±5.4)</td>
<td>29.2 (±14.5)</td>
</tr>
<tr>
<td>Gender</td>
<td>5f, 4m</td>
<td>7f, 7m</td>
<td>10f, 4m</td>
</tr>
</tbody>
</table>

※ 14 Evaluators whose L1 is Korean

- 9 Evaluators for Accuracy and Fluency in Consonants, Vowels, Adjustments, Intonation, Rhythm
- 5 Evaluators for Naturalness in the recording pairs of before and after instruction
Free Korean Pronunciation Lessons!

Who? If you are a native speaker of American English, then we want you!

What? 5 pronunciation lessons of Korean plus pre and post tests

Why?

- Improve your Korean pronunciation
- Help us learn how to teach pronunciation well

$20 gift certificates!

to Starbucks or Yogurtland upon successful completion
Plus textbook and accompanying CD

Where? Center for Korean Studies Conference Room

How? Contact Jami Kim (kimjm7@hawaii.edu) for pre-test

When? Every Monday 3:30-4:30 pm (10/25 to 11/22) plus pre-post tests (Flexible time)
Will I gain Something?
2.2 Procedure

Listen and Repeat after model speech

Pre-test Listening

Pre-test Pronunciation
(Recording 1)

Evaluation

Feedback

Practice

Intervention

Post-test Pronunciation
(Recording 2)

Post-test Listening
2.3 Material

※ Criteria
- To measure as overall phonological aspects as possible: Consonants, Vowels, Segmental rules, Intonation, Rhythm.
- Each of the 5 components contains 5 different sentences
- Data taken from Choo and O’Grady (2003)

※ Sample data

1) **CONSONANT**: (byeo, ppyeo)ga bureojesseoyo.
   (rice plant, bone) has been broken.
2) **VOWEL**: (geuk, guk)i singgeoweoyo.
   (pole, soup) is not salty enough.
3) **SEGMENTAL RULE**: wen-nil-ieyo?
   What’s up?
4) **INTONATION**: Anyo, Doseogwane ilhareo gayo.
   No, I’m going to the library to work.
5) **Rhythm** (Sw(w) Sw(w)): huchu jom juseyo.
   Please give me the black pepper.
2.4 Evaluation

※ Listening evaluation in *Pre and Post*-test
By grading correct answers
eg.) (*별, 볼)에 쏘였어요. (*beol, bol)e ssoyeosseoyo.
I was bit by/on the (bee, cheek)

※ Pronunciation evaluation by NS raters
By 9 NS raters for Accuracy, and Fluency
➢ Practice with 2 human utterances
➢ 10-15 minutes rating per session
➢ 5 or 60 minutes brakes after every session,
➢ 25 sessions in total

By 5 NS raters for Accentedness
➢ Practice with 2 dog barks
➢ 10-15 minutes rating per session
➢ 5 or 60 minutes brakes after every session,
➢ 10 sessions in total
<table>
<thead>
<tr>
<th>Baseline</th>
<th>Is one more natural?</th>
<th>If yes, which one is better?</th>
</tr>
</thead>
<tbody>
<tr>
<td>test 1</td>
<td>dog-barks</td>
<td>Yes ____ / No ____</td>
</tr>
<tr>
<td>test 2</td>
<td>dog-growls</td>
<td>Yes ____ / No ____</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Words / Sentences</th>
<th>Is one more natural?</th>
<th>If yes, which one is better?</th>
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<tbody>
<tr>
<td>1 active</td>
<td>Yes ____ / No ____</td>
<td>1st ____ / 2nd ____</td>
</tr>
<tr>
<td>2 addition</td>
<td>Yes ____ / No ____</td>
<td>1st ____ / 2nd ____</td>
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</table>

**Breaks after every 15 minutes (music)**

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<th>If yes, which one is better?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Deliver …</td>
<td>Yes ____ / No ____</td>
<td>1st ____ / 2nd ____</td>
</tr>
<tr>
<td>2 There is</td>
<td>Yes ____ / No ____</td>
<td>1st ____ / 2nd ____</td>
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</table>

….. 250 pairs * 9 sessions

**Evaluation Method for Accentedness**
### Sample Evaluation Sheet for Accuracy and Fluency

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<tr>
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<th>3</th>
<th>4</th>
<th>5</th>
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<th>합계</th>
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<tr>
<td>학습자 최하급</td>
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<td>학습자 상급</td>
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7. “definitely” native and accurate pronunciation
6. “probably” native and correct pronunciation
5. “excellent” non-native and correct pronunciation
4. “high” non-native and probably correct pronunciation
3. “intermediate” non-native with borderline correctness of pronunciation
2. “low” non-native and somewhat incorrect pronunciation
1. “novice” non-native and definitely incorrect pronunciation,
0. “fluent but mistaken” pronunciation
Winning or Losing?
RESULTS
Rating results of pronunciation goodness in Pre- and Post-tests

(*p < 0.05)
Native-likeness rating results of learner and native speech

(*p < 0.05)
Figure 3

Pronunciation goodness rating results of learner and native speech

(*p < 0.05)
Correlation between listening test and pronunciation rank
DISCUSSION
Segmental properties make non-native Accents, while Intonation and Fluency lend little

- The raters gave higher points in post-test than pre-test pronunciation
  - mainly in intonation and fluency,
  - but not as much in segmental features of vowels and consonants (Fig. 1).

Non-native accents noticeable

- Raters detected non-native accentedness with great accuracy (Fig. 2 and 3)
- The result supports the ceiling effects
  - but not with Ioup et al. (1994) and Bongaerts, Theo (1999, 2000).

Listening precedes learner speech

- Listening score excels pronunciation score wrt. proficiency. (Fig. 4)
We made it!


Figure 4. Acoustic records of the learner speech for the English word *explanation*, spoken after instruction by a male Korean (This figure is reproduced from J-M. Kim, S. Flynn, and M. Oh. 2007: 237).
Figure 6. Types of phonological phenomena in L2 English by Korean speakers of different proficiency levels that are compared to those in loanwords and target speech for (a) word level and (b) sentence level production. The value decreases in accordance to the level of speaker proficiency (Loanword phonology occurrence (%) = 62>45>38>35>26, r=.87, n=2,160 in word-level production; 46>33>31>31>27, r=.71, n=2,152 in sentence level production). (This figure is reproduced from J-M. Kim, 2009:15).
Figure 2. *F0* slope values of the noun compounds are all negative; while those for the noun phrases are all greater in both learner and native speech (*F0* slope values (Hz) = -34.2, -27.7, -12.2 for the noun compounds, 22.7, 14.4, 7.5 for the noun phrases in learner speech; -37.9, -24.1, -26.1 for the noun compounds, 2.3, -1.8, -7.1 for the noun phrases in native speech; *n* = 1,368 at the significance level *p* ≤ .05). (Note: *NCisol* = noun compounds in isolation, *NCsent* = noun compounds in sentence, *NCpara* = noun compounds in paragraph, *NPisol* = noun phrases in isolation, *NPsent* = noun phrases in sentence, *NPpara* = noun phrases in paragraph) (This figure is reproduced from J-M. Kim, 2005:254).
Figures 3-5. Spectral pattern of stressed and reduced vowels in Korean English before and after instruction in comparison with those in the native speech ($n=2,140$ for stressed and reduced vowels)

(These figures are reproduced from J-M. Kim and O-H. Lee, 2005:84-6).
Figure 5: Pronunciation goodness rating results of (a) consonantal accuracy, (b) vowel accuracy, (c) phonological adjustment, (d) intonation, (e) rhythm, and (f) fluency for the learner speech before and after the instruction (A preliminary result from this study on Korean pronunciation by native speakers of English).