Second language perceptual epenthesis is a result of perceiving allophones as joint indicators of segment category and prosodic location.

Interactions between Koreans' Perception of Epenthetic Syllables and Coda Neutralization

Kenneth de Jong & Hanyong Park
Linguistics, Indiana University

Second Language Perceptual Effects

1) Korean listeners count extra syllables when listening to stimuli with coda consonants (Lim, 2003). e.g., /tap/ ➡ /tapi/

2) Korean listeners have particular difficulties in perceiving neutralized aspects of coda consonants, especially voicing (de Jong, Silbert & Park, *in review*).

Question

When perceivers add final syllable, are coda consonants in an onset, and not subject to neutralization?

Previous Work

Malecot (1958), Silverman (1992), Kim-Renaud (1977): Epenthesis is Burst Perception: English speakers release coda consonants, and the release is interpreted as an additional syllable.

Tajima, Erickson & Nagao (2000): Epenthesis is Segment Dependent. Labials and stops are more likely to exhibit epenthesis in production then coronals and fricatives.

Kang (2003): Epenthesis driven by Neutralization 1. Epenthesis and resyllabification remove the coda consonant and put the vowel in open syllable, allowing for voiced-consonant induced lengthening to be un-neutralized.

Park & de Jong (2006): Epenthesis driven by Neutralization 2. Epenthesis puts consonant in a position without neutralization; it may help get around neutralization problem.

Methods - Production

Stimuli

- 4 Midwestern American English speakers, 2 male, 2 female, born in mid 1970's
- Nonsense syllables orthographically cued
- Anterior obstruents mixed with vowel /a/
- 3 Prosodic positions: CV, VC, VCV (current analyses focus on VC)
- Consonants = /p b f v t d s z θ ð/

Acoustic Analyses

- Presence of noise in the consonant (burst or fricative noise) listened for and examined visually in waveforms & spectrograms

	Audible Noise	Visible on Waveform & Spectrogram
/p/	3/4 (1/4 weak)	2/4
/b/	1/4	1/4
/t/	All	All
/d/	All	All
/f/	All (3/4weak)	3/4
/v/	All (3/4weak)	3/4
/s/	All	All
/z/	All	All
/θ/	All (1/4weak)	All
/ð/	All (1/4weak)	All

Methods - Perception

Listeners

- 20 Korean learners without experience in English speaking countries
- Run in Kyonggi University (near Seoul)

Procedure - Identification

- Free-field presentation in groups of approximately 10
- Identification from 15 alternatives on a paper form. Alternatives determined from pilot work; option of write-in (other:____)

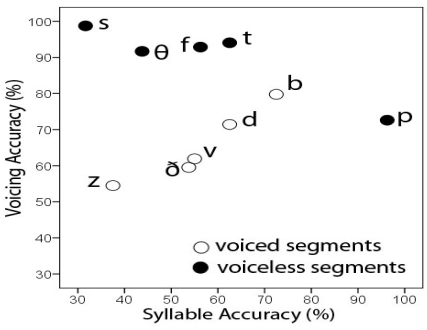
Procedure - Syllabification

- Free-field presentation in groups of 10 (Different session from Id. task)
- Circle number of syllables for each stimulus

Analysis

- Calculate voicing accuracy per segment/per listener
- Calculate syllabification accuracy per segment/per listener

Results by Segment



Epenthesis Results

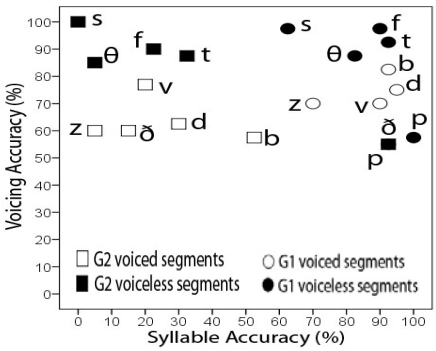
- Voiced/voiceless pairs exhibit similar rates of epenthesis (contra Kang, 2003)
- Fricatives exhibit more epenthesis, especially /s/ and /z/
- Coronals exhibit more epenthesis

Identification Results

- Voicing accuracy does not correlate with epenthesis rate
- Difference in voicing accuracy for voiced and voiceless segments does; high rates of epenthesis go with a strong tendency to call segments voiceless

Subject Group Results

Listeners grouped by their likelihood of hearing epenthetic vowels - high likelihood (G2, squares to the left) and low likelihood (G1, circles to the right).



Group Differences

- Listeners with more epenthesis are not more accurate with voicing
- Pattern of intersegment differences in accuracy appears nearly identical in both groups.

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Tentative Conclusions

- Voicing is not a major factor in epenthesis.
- Noise salience is. Coronals and fricatives tend to elicit epenthetic responses.
- Epenthesis does not positively correlate with de-neutralization of voicing contrasts. It doesn't help.
- Epenthesis does positively correlate with a tendency to label segments as voiceless. When listeners 'hear' an additional syllable, they believe the previous segment must be voiceless to account for the lack of voicing power in the epenthetic vowel.
- Results suggest a model in which listeners identify segment and context in an integrated fashion, and make judgments about segment *and* context on the basis of this integrated percept.
- While syllable counting tasks can index this integrated perception, learners can improve more rapidly on such metalinguistic tasks than on lower level segmental identification.

References

De Jong, K.J., N.H. Silbert, & H. Park (*in review*). Segmental generalization in second language learning. *Language Learning.*

Kang, Y.J. (2003). Perceptual similarity in loanword adaptation: Adaptation of English post-vocalic word-final stops in Korean. *Phonology*, 20: 219 - 273.

Kim-Renaud, Y.K. (1977). Syllable boundary phenomena in Korean. *Korean Studies*, 1: 243 - 273.

Lim, B.J. (2003). *Perception, Production, and Orthography in Syllabificaiion in Korean and English.* Ph.D. Dissertation, Indiana University

Malecot, A. (1958). The role of releases in the identification of released final stops. *Language*, 34: 370 - 380.

Park, H., & K.J. de Jong (2006). Native Koreans' perception of voicing in VC position: Prosodic restructuring effects on consonant identification. *IULC Working Papers – Online*, **6**-04.

Silverman, D. (1992). Multiple scansions in loanword phonology: evidence from Cantonese. *Phonology*, 9: 289-328.

Tajima, K., D. Erickson, & K. Nagao (2000). Phonetic analysis of vowel epenthesis in native Japanese speakers' production of English words. *Proceedings of the Fourteenth General Meeting of the Phonetic Society of Japan.*