

Main Points

- ✓ L1 phonological processes affect L2 production and perception differently
- ✓ Coda neutralization influences L2 perception more than L2 production.
- ✓ Errors are more consistent in production than in perception.
- ✓ Neutralization produces unspecified responses in perceptual identification.
- ✓ L1 coda neutralization affects both similar and non-similar segments in the L2.

Introduction

- **L1 phonological process affects L2 perception.**
 - Darcy *et al.* (2007): Inexperienced American English learners of French use L1 phonological process (i.e., *regressive place assimilation*) for L2 perception in lexical identification task.
 - ❖ *Regressive place assimilation: sweet melon* : swee[pm]elon
- **L1 phonological process affects L2 production.**
 - Lado (1957): Spanish learners of English often produce fricatives for intervocalic voiced stops due to L1 phonological process (i.e., *intervocalic spirantization*).
 - ❖ *Intervocalic Spirantization: d → δ / V _ V*
e.g., *lather* for *ladder*; *wreathing* for *reading*

Q1: Do L1 phonological processes have the same effects on L2 perception and production?

- **The perceptual similarity between L1 and L2 segments affect L2 perception and production.**
 - Speech Learning Model (Flege, 1995): Phonetic similarity between L1 and L2 sounds determines the degree to which L2 productions are entangled with L1 categories.

Q2: Does L1 phonological process affect all segments, or are they restricted to certain (i.e., perceptually similar) segments?

Case: Korean & English

- Segments (Schmidt, 1996; Park & de Jong, *in review*):
 - English stops are perceptually similar to Korean stops.
 - English non-sibilant fricatives are not perceptually similar to Korean categories.
- Phonological Process (Ahn, 1998):
 - Korean has neither laryngeal nor manner contrasts in final position (*coda neutralization*), while English does not have such restriction.

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3aSCb6. Neutralization in the perception and production of English coda obstruents by Korean learners of English

Hanyong Park, Yen-chen Hao, and Kenneth J. de Jong

(hanypark@indiana.edu, yehao@indiana.edu, and kdejong@indiana.edu; www.indiana.edu/~lsl)

Department of Linguistics, Indiana University

Reformulated Research Questions

1. Does coda neutralization have the same effects on Koreans' perception and production of English segments?
2. Are coda neutralization effects found with all English segments, or are they restricted to stops, which are more similar to segments in Korean?

Methods

1. Koreans' L2 Perception

- **Stimuli**
 - 4 Midwestern American English Speakers (2 males & 2 females)
 - Reading list of nonsense combinations of the low vowel /a/ with consonants /p b t d f v θ δ/ in CV and VC positions e.g., /pa/, /ba/, etc., for CV; /ap/, /ab/, etc. for VC.
 - Total stimuli: 64 (= 8 items x 2 positions x 4 talkers)
- **Listeners**
 - 40 native Korean college students in Korea, who have never lived in English speaking countries prior to the experiment.

• Procedures: Segment identification

- What is the consonant?

dog fell thin that fall yase sit zip pin ball pain law hall wood yes
d t θ δ f v s z p b r l h w y other ()

2. Koreans' L2 Production

- **Stimuli**
 - 4 native Koreans' reading of the same word list (twice)
 - Total stimuli: 160 (= {(2 talkers x 2 repetitions) + (2 talkers x 3 repetitions)} x 8 items x 2 positions)
- **Listeners**
 - 10 native speakers of American English in the U.S.

• Procedures: Segment identification (same task as above)

3. Analysis

- **Koreans' L2 Perception:** Koreans' segment identification accuracies for Americans' productions
- **Koreans' L2 Production:** Americans' segment identification accuracies for Koreans' productions
- **Coda neutralization effects:** Comparing CV and VC segment identification accuracies
- **Q1:** Comparing the perception and production results in VC
- **Q2:** Comparing the results for stops and fricatives in VC

Results

1. Koreans' L2 Perception

Response	Stops in CV				Stops in VC				Fricatives in VC					
	/p/	/b/	/t/	/d/	/p/	/b/	/t/	/d/	others	/f/	/v/	/θ/	/ð/	/h/
/p/	89				22	17	8		19	66		8		11
/b/		14	52			30			21		20	30		10
/t/				93			74				31		33	11
/d/							16	33	14		13	20		14

Table 1. Koreans' ID results (%) for English stops in CV. The results are based on 160 judgments (4 talkers x 40 listeners).

Table 2. Koreans' Segment ID results (%) for English stops in VC.

Table 3. Koreans' Segment ID results (%) for English fricatives in VC.

* Simplified confusion matrices.

* Responses less than 7% are not shown. (Chance level = 6.7%)

• Coda neutralization effects

- ✓ Overall segment identification accuracy is lower in VC.
 - This was observed in both stops and fricatives.
 - Overall ID accuracies for stops in CV & VC: 73% vs. 39%
 - Overall ID accuracies for fricatives in CV & VC: 59% vs. 32%
- ✓ A lot of "Others" responses (15%) for stops in VC (Table 2).
 - "Others": checked marks such as "X" or Korean symbols (very few)
- ✓ A lot of "/h/" (12%) & "/f/" (19%) responses (total: 28%) for fricatives in VC (Table 3).

2. Koreans' L2 Production

- Overall segment identification accuracy *is not* lower in VC.
 - Overall ID accuracies for stops in CV & VC: 58% vs. 57%
 - Overall ID accuracies for fricatives in CV & VC: 26% vs. 35%

Response	Fricatives in CV				Fricatives in VC			
	/f/	/v/	/θ/	/ð/	/f/	/v/	/θ/	/ð/
/f/	54	8			61	12		
/v/	12	29	10	8	20	33		
/θ/	14				24		30	
/ð/				8	8		18	16

Table 4. Americans' Segment ID results (%) for English fricatives in CV. The results are based on 40 judgments (4 Korean talkers x 10 listeners).

Table 5. Americans' Segment ID results (%) for English fricatives in VC.

- Voicing patterns are consistent for production of coronal and labial stops, but not for perception of coronal and labial stops (Tables 1&2 vs. Tables 6&7)
- **Coda neutralization effect**
- Production of stops tends toward "voiceless" in CV (Table 6). while errors are bi-directional in VC (Table 7).

Response	Stops in CV				Stops in VC			
	/p/	/b/	/t/	/d/	/p/	/b/	/t/	/d/
/p/	98				72	10		
/b/		60	34		22	34		
/t/		30		68			47	8
/d/		16	12	22	32		10	72

Table 6. Americans' Segment ID results (%) for English stops in CV.

Table 7. Americans' Segment ID results (%) for English stops in VC.

Summary & Discussion

- **Q1: Does Korean coda neutralization have the same effects on L2 perception and production?**
 - **No.** Coda neutralization effects are stronger in L2 perception than L2 production.
 - Koreans' ID accuracies (i.e., *L2 perception*) are lower in VC than in CV. However, Koreans' production accuracies (i.e., *Americans' ID*) are not.
- **Sub-point: Production Consistency**
 - Direction of errors is more consistent in L2 production than in L2 perception.
 - The error patterns for labial and coronal stops are different in perception, but the same in production.
 - This suggests a tendency of production of deeply entrenched L1 categories in L2 productions.
 - e.g., Voicing errors of stops toward "voiceless" in CV may due to using phonemically voiceless Korean stops for both voiced and voiceless English stops.
- **Sub-point: Perceptual Underspecification**
 - "/h/" responses for fricatives in VC suggest that listeners choose a generic fricative label for frication or aspiration.
 - "Others" responses for stops in VC appear to be generic responses for neutralized stops.
 - Generic responses are not an option in production.
 - Preponderance of "/f/" responses suggest that "/f/" is a prototypical English category to Koreans.
 - Curiously "/f/" responses are also prevalent in L2 production.

■ Q2: Are coda neutralization effects restricted to stops, which are transferred from Korean?

- **No.** In L2 perception, coda neutralization effects affect both stops and fricatives, though the effects are somewhat different one from another.
- ID accuracies for both stops and fricatives decrease in VC (only in L2 perception).
- However, the error patterns are different: "Others" responses for stops (Table 2) vs. "/h/" & "/f/" responses for fricatives (Table 3).

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