



Effects of L1 phonotactic constraints on L2 coda perception: A case study with native English and Mandarin learners of Korean

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1. Goals

To Investigate how Mandarin and English L2 learners perceive Korean codas in relation to L1 transfer and markedness.

- Examine effects of:
 - L1 coda inventories
 - Preceding vowels
 - Relative markedness

2. Background

Table 1. Mandarin, Korean and English syllable structure and coda inventories

	Mandarin	Korean	Canadian English
Syllable structure	CVN	CVC	CCCVC
Syllable codas	-	Obstruents /p, t, k/	Obstruents /p, t, k, b, d, g/
	Nasals /n, ŋ/	Nasals /n, m, ŋ/ Liquid /l/	Nasals /n, m, ŋ/ Glides /w, y/ Liquids /r, l/

3. Questions & Hypotheses

(1) Effects of L1 coda inventories on L2 coda perception

- Question 1:** Do second language learners with different language backgrounds perform differently on non-native vowel production and perception?
- Hypothesis 1:** English learners will outperform Mandarin learners with only two nasal codas /n, ŋ/, in perceiving Korean codas.

Table 2. Predicted difficulty with Korean codas for Mandarin and English learners of Korean

	Korean nasal codas	Korean stop codas
Mandarin	[m] - difficulty [n, ŋ] - No difficulty	[p, t, k] - most difficulty
English	[n, m, ŋ] - No difficulty	[p, t, k] - No difficulty

(2) Effects of preceding vowels on L2 coda perception

- Questions 2:** To what extent to preceding vowels constrain the perception of Korean syllable codas?
- Hypothesis 2:** In Mandarin, the nasal place tends to co-vary with the backness of the preceding vowels. Thus, Mandarin listeners are more sensitive to preceding vowels when perceiving Korean nasal codas, while English listeners are not influenced by Korean vowel contexts when perceiving Korean codas.

Table 3. Predicted difficulty with Korean nasal codas according to preceding vowels

	Preceding vowel /a/	Preceding vowel /i/	Preceding vowel /u/
Mandarin	Misidentify /n/ as /ŋ/	Misidentify /ŋ/ as /n/	Misidentify /n/ as /ŋ/
English	No difficulty	No difficulty	No difficulty

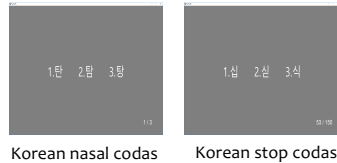
(3) Effects of markedness on L2 coda perception

- Question 3:** Can the differential difficulty of L2 coda perception be accounted for from a markedness perspective?
- Hypothesis 3:** Prediction of the order of perception accuracy for Korean codas is as follows:

Coronals /n, t/, bilabials /m, p/ > dorsals /ŋ, k/

4. Methods

- Participants:** 86 subjects participated in the identification task.
 - Mandarin learners of Korean: 38 (35 female, 3 male)
 - English learners of Korean: 28 (22 female, 6 male)
 - Native Korean speakers: 10 (6 female, 4 male)
- Stimuli:** 150 monosyllabic words containing stops and nasals in coda position.
 - 105 stimuli containing stop codas
 - 45 stimuli containing nasal codas
- Procedure:** Participants were asked to identify what they heard by pressing a corresponding button on the keyboard. Participants completed Block 1 (nasal codas) followed by Block 2 (stop codas) using PsychoPy (Peirce 2007).



5. Statistical Analysis

- A mixed-effects logistic model in R (Baayen 2008; R Core Team 2012)
 - The package *lme4* (Bates et al 2011)
 - Dependent variable: Response (correct:1, incorrect:0)
 - Fixed effects: learners' native language
 - Random effect: speakers, items

6. Results

(1) Effects of L1 coda inventories on perception of Korean codas

- English listeners show higher identification accuracy for Korean nasal and stop codas than Mandarin listeners.
- English and Mandarin learners are able to perceive Korean nasals more accurately than stops in coda position.

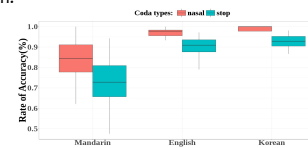


Figure 1. Identification accuracy of Korean nasal and stop codas by L1 group

- Perception accuracy ranking for each Korean nasal coda differs according to L1 background.

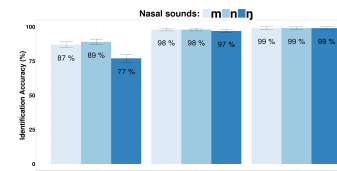


Figure 2. Identification accuracy of Korean nasal codas by L1 group

- Due to L1 difference, the two groups display different perceptual biases in their error patterns.
- Mandarin learners are confused between Korean /n/ and /ŋ/

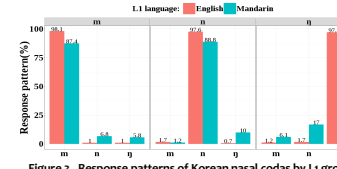


Figure 3. Response patterns of Korean nasal codas by L1 group

- Perception accuracy ranking for Korean stop codas: Dorsal /k/ is perceived least accurately.

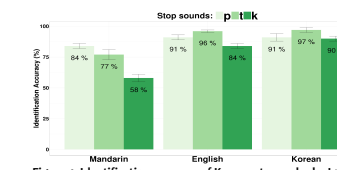


Figure 4. Identification accuracy of Korean stop codas by L1 group

- Mandarin learners often misidentify /t/ as /k/ and vice versa.

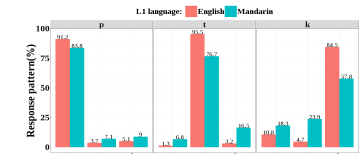


Figure 5. Response patterns of Korean stop codas by L1 group

(2) Effects of preceding vowels on perception of Korean nasal codas

- Only for Mandarin learners, the height of the vowel influences the perception of Korean nasal codas.

Table 4. Perception accuracy of Korean nasal codas based on the preceding vowels

	[a]	[i]	[u]
Mandarin	m > ŋ > n	n > m > ŋ	n > m > ŋ
English	m = n = ŋ	m = n = ŋ	m = n = ŋ

(3) Effects of markedness on perception of Korean codas

- Dorsals are more marked so they are more difficult for L2 learners to acquire.

Table 5. Perception accuracy of Korean codas based on markedness

	Mandarin listeners	English listeners
Nasal codas	Coronal, bilabial /n, m/ > dorsal /ŋ/	n = m = ŋ
Stop codas	Coronal, bilabial /t, p/ > dorsal /k/	Coronal, bilabial /t, p/ > dorsal /k/

7. Conclusion

- L2 learners' error patterns of Korean codas cannot be fully explained by either L1 transfer or universal markedness, suggesting other factors can affect L2 acquisition.

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