

The effects of web-based identification training on the perception of Korean vowels and codas by Mandarin learners of Korean

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Background

- Speech Learning Model (SLM, Flege 1995)
 - Learners' L2 sound perception ability can improve through sufficient naturalistic exposure
- Many researchers investigate the effects of training on the perception of L2 segments
 - Perception of L2 consonants
(Akahane-Yamada et al 1996, Iverson & Evans 2007, Pisoni et al 1994, Strange & Dittmann 1984)
 - Perception of L2 vowels
(Aliaga-García 2010, Iverson & Evans 2007, Rato 2014)

Perceptual training methods

- **Speaker variability** (Bradlow et al 1997, Iverson & Evans 2009, Lambacher et al 2005, Lively et al 1993, Rato, 2014)

High variability vs. low variability

- **Number of trained segments** (Nishi & Kewley-Port 2007, 2008)

Full sets vs. sub sets

- **Training tasks** (Ellis 2005, Jamieson & Moroson 1986, Logan & Pruitt 1995)

Identification vs. discrimination

- **Location of training** (Sakai & Moorman 2017)

Online at home vs. laboratory setting

Motivation for current study

- Focus on Korean vowels and codas that Mandarin learners show particular difficulty with (Han & Kim 2011, Kim 2010, 2016, Ryu 2018, Chang 2016)
 - To date, there are no studies of training on the perception of Korean vowels and codas by L2 learners.

Korean and Mandarin vowels and codas

	Standard Korean (Sohn 2001, Shin 2015)	Standard Mandarin (Duanum 2007, Lin 2007)
Vowel	7 vowels /a, e, i, ɨ, o, u, ʌ/	5 vowels /i, y, u, ə, a/
Codas	7 codas /t, k, p, n, m, ŋ, l/	2 codas /n, ŋ/

Motivation for current study

- Investigate the effects of two different types of phonetic instruction on L2 perception
 - To date, a scarcity of studies directly compare the effects of explicit and implicit instruction in L2 perception.

(Carlet 2017, Carlet & Cebrian 2015, Nozawa 2015, Pederson & Guion-Anderson 2010)

Explicit instruction

Learners attend to target sounds and they have conscious awareness of what is being learned during training

Implicit instruction

Learners are passively exposed to target sounds so that they do not know what is being learned during training

Research questions

Question 1: To what extent do Mandarin learners of Korean improve their perceptual accuracy in identifying Korean vowels and codas as a result of web-based high variability phonetic training (HPVT)?

Question 2: Does explicit instruction in training lead to greater improvement in the perception of Korean vowels and codas compared to implicit instruction, even when learners are exposed to identical L2 input during training?

Question 3: Can learning effects gained from web-based HVPT be successfully transferred to novel stimuli?

Participants

- 45 native Mandarin speakers (39 females, 6 males)
- Enrolled in beginner-level Korean courses at universities in Toronto



Vowel-trained group

Coda-trained group

Control group

Stimuli

- 98 monosyllabic Korean words including 7 vowels and codas
- Recorded by 6 native Korean speakers (3 females, 3 males)

Phase	Stimuli	Number of native Korean speakers	Number of stimuli
Training	49 words /hVC/	4 speakers	196 tokens
Pre-test		2 speakers	98 tokens
Post-test			
Generalization test	49 words /kVC/		

Procedure

	2 weeks			2-3 weeks	
	Pre-test	Training	Post-test	Generalization test	
Vowel-trained group	✓	✓	✓	✓	
Coda-trained group	✓	✓	✓		✓
Control group	✓		✓	✓	✓

Procedure

	Pre-, Post- and Generalization test	Online training
Groups	All groups	Two training groups
Location	Phonetics lab	Online in quiet place
Task	Identification task	Identification task (8 sessions)
Feedback	None	Immediate feedback
Talker	2 talkers (1 female, 1 male)	4 talkers (2 females, 2 males)

Identification task

- Asked to listen to a monosyllabic Korean word and to identify what they have heard
- Experimental groups were exposed to the same stimuli, but focused on different target segments

Vowel identification task

1	2	3	4	5	6	7
ㅏ	ㅑ	ㅣ	ㅓ	ㅕ	ㅗ	ㅡ

请选出你所听到的元音。

1/196

Coda identification task

1	2	3	4	5	6	7
ㄱ	ㅋ	ㆁ	ㄴ	ㅇ	ㅇ	ㅇ

请选出你所听到的收音。

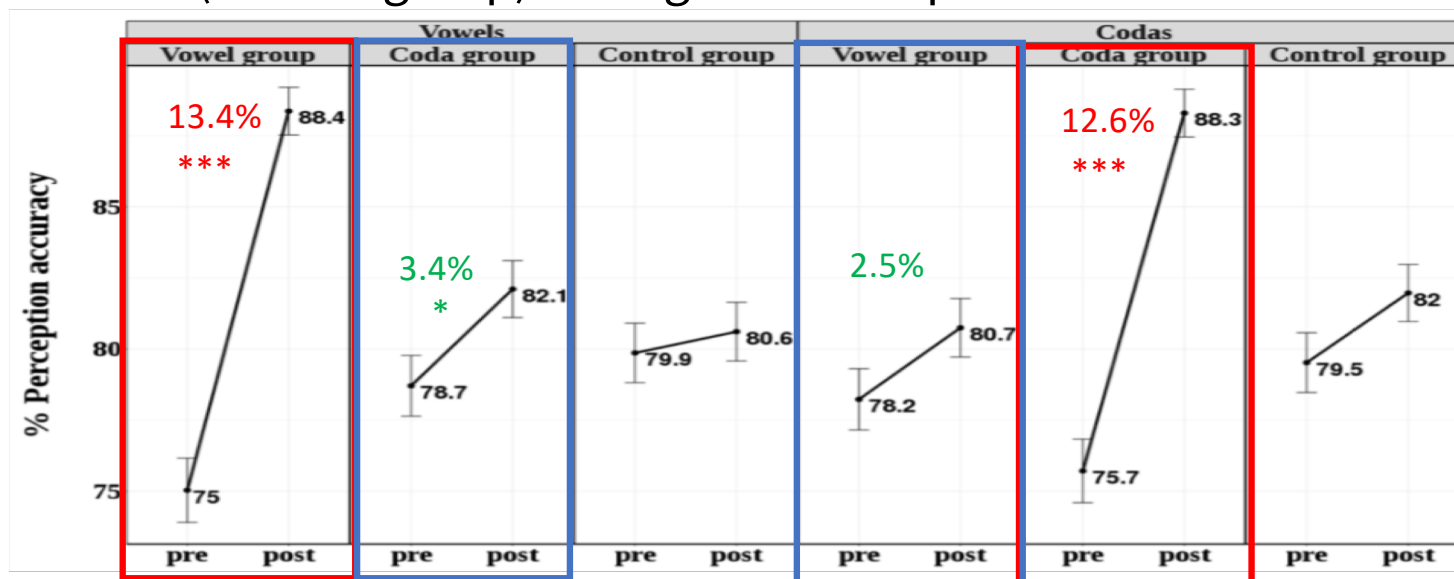
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Analysis of Korean perception performance

- A mixed-effects logistic model in R (Baayen 2008; R CoreTeam 2017)
 - The package *lme4* (Bates et al 2011)
 - Dependent variable: Response (correct:1, incorrect:0)
 - Fixed effects: Test (pre-test, post-test, generalization test),
group (vowel-trained, coda-trained and control group),
and their interactions
 - Random effects: Subjects, items

Effects of explicit vs. implicit instruction on L2 perception

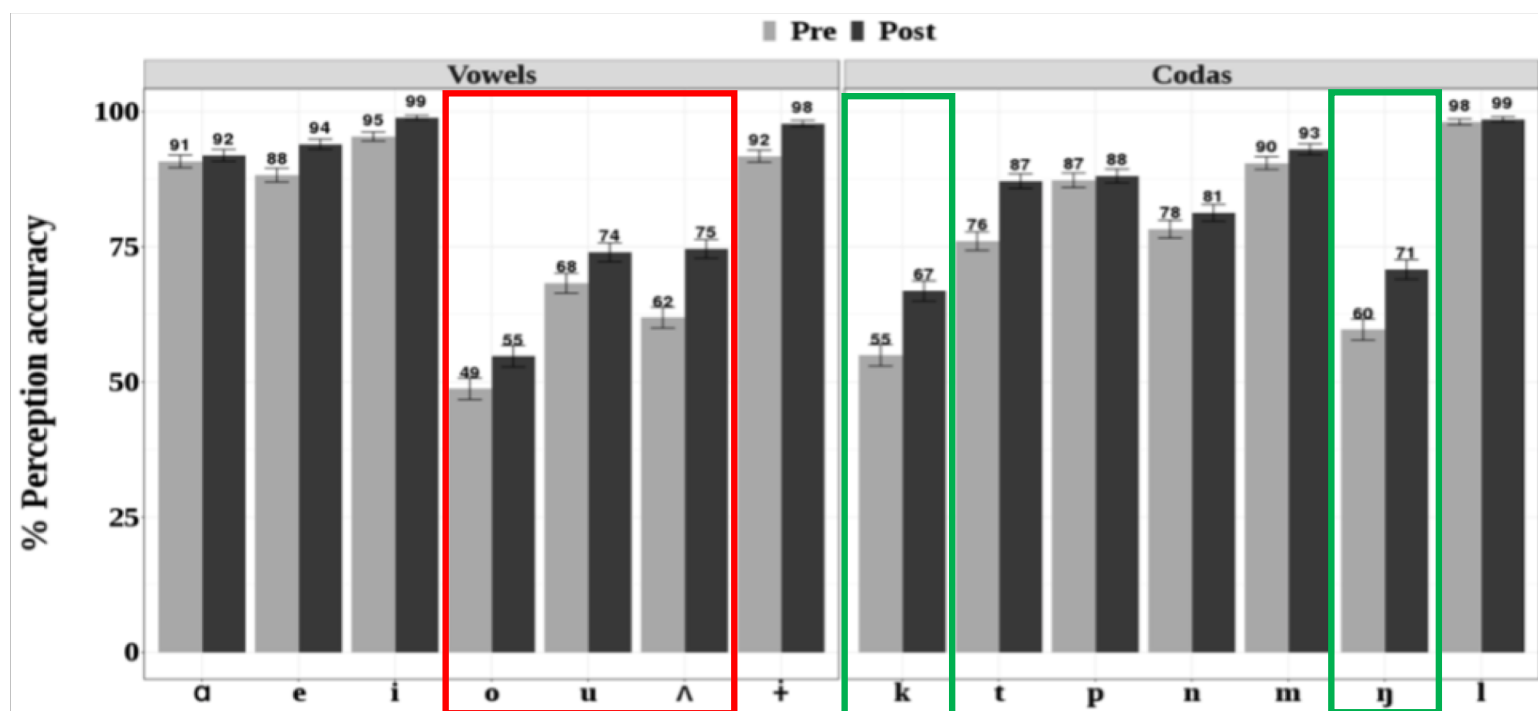
- Explicit instruction: Significant improvement for both vowels and codas
- Implicit instruction: Significant improvement for vowels
No significant improvement for codas
- No instruction (control group): No significant improvement



Identification accuracy for Korean vowels and codas across here groups at pre-and post-test

Perception accuracy of individual Korean vowels and codas

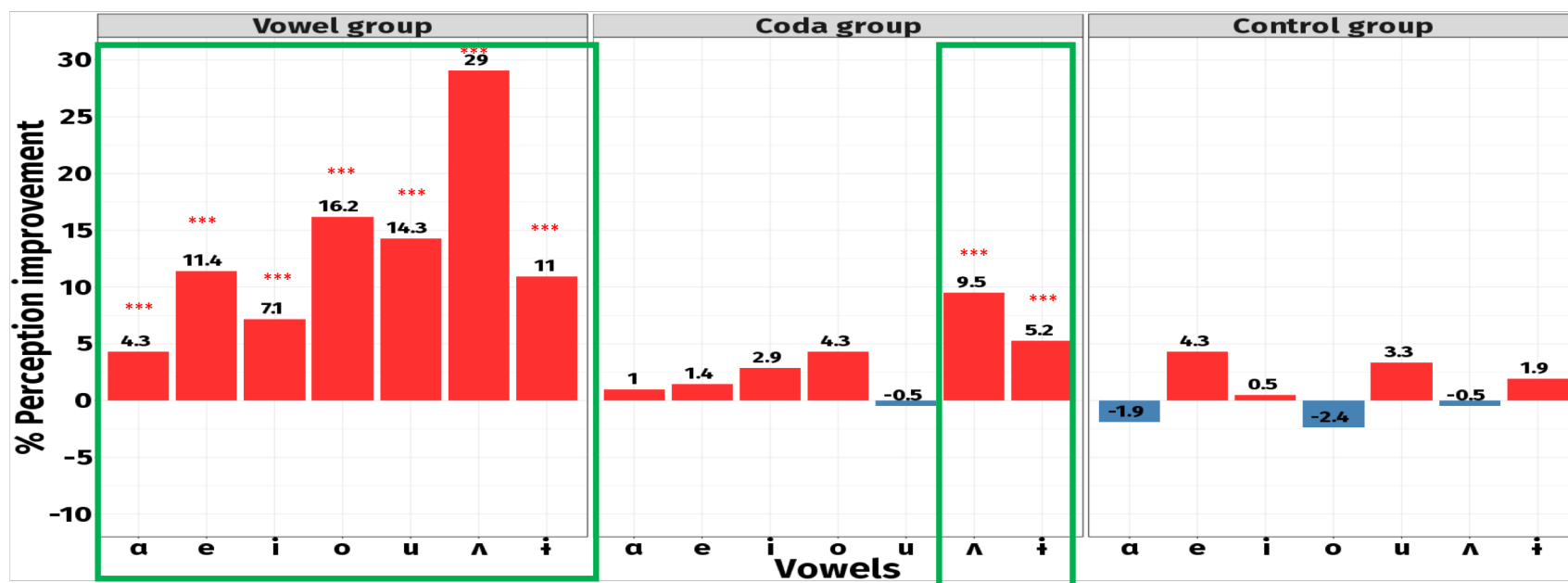
- The hierarchy of difficulty of Korean vowel perception: $o > \Lambda > u > e > a, > i > i$
- The hierarchy of difficulty of Korean coda perception: $k > \eta > t > n > p > m > l$



All groups' identification accuracy of individual Korean vowels and codas at pre-test and post-test

Perceptual improvement of Korean vowels by group

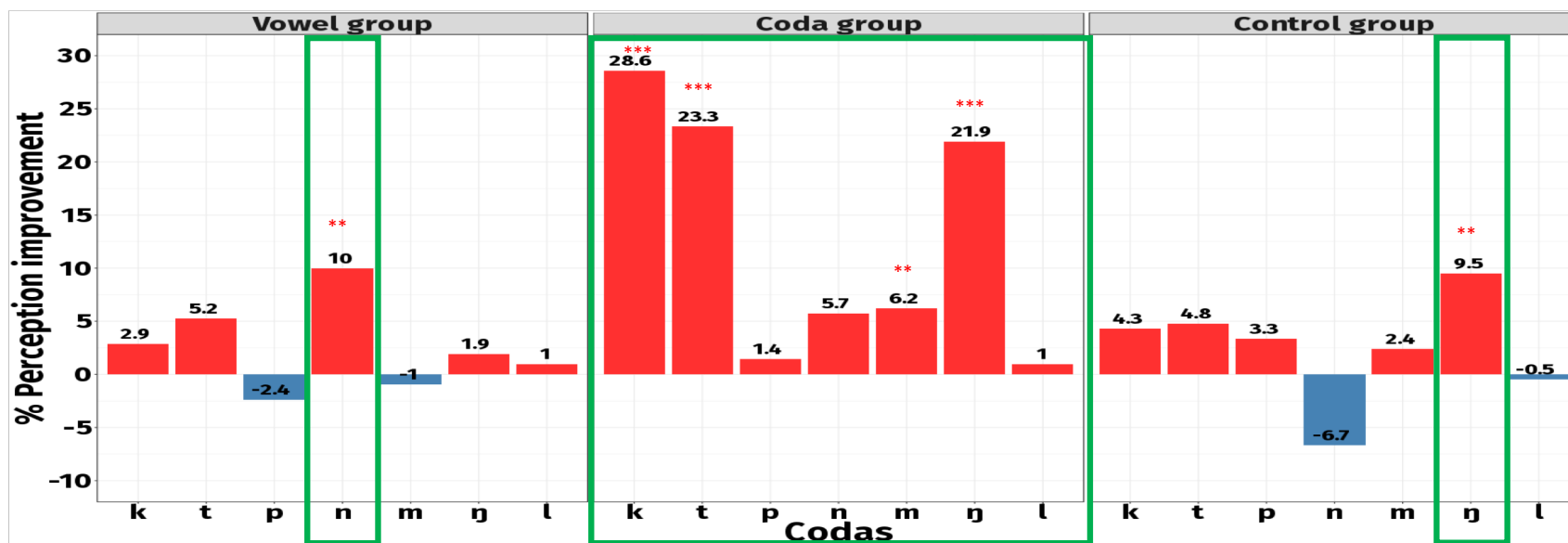
- Explicit instruction: Perception of **all Korean vowels** significantly improved.
- Implicit instruction: Perception of **vowels /i, ʌ/** significantly improved.
- No instruction: **No** significant improvement.



Perception improvement of individual vowels by group

Perceptual improvement of Korean codas by group

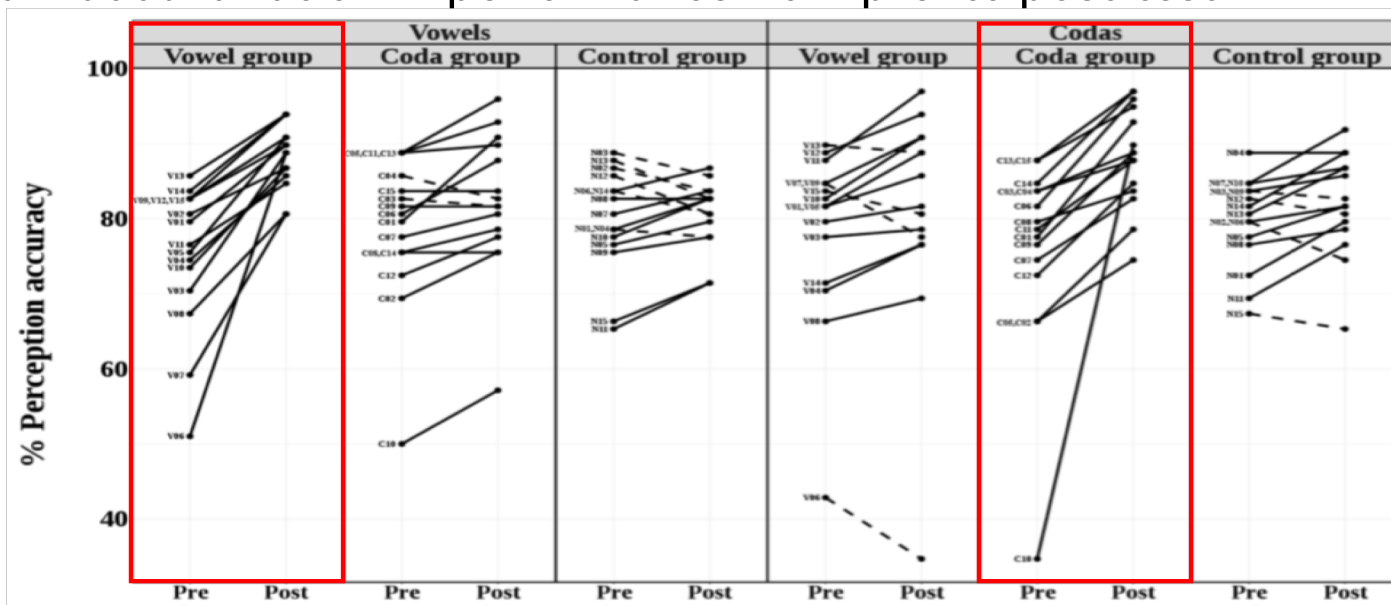
- Explicit instruction: Perception of **Korean codas /k, t, m, ŋ/** significantly improved.
- Implicit instruction: Perception of **Korean coda /n/** significantly improved.
- No instruction: Perception of **Korean coda /ŋ/** significantly improved.



Perception improvement of individual codas by group

Individual learners' improvement in perception

- Explicit instruction groups
 - Every learner showed improvement from pre- to post-test
- Implicit instruction and no training groups
 - Individual variation in performance from pre- to post-test



Individual learners' perception improvement of Korean vowels and codas from pre-to post-test

Generalization effects of training

Both explicit training groups maintained their increase in accuracy with novel stimuli

Table 2. Mean accuracy scores for Korean vowels and codas at pre-test, post-test and generalization test

	Korean vowels			Korean codas		
	Pre-test	Post-test	Generalization test	Pre-test	Post-test	Generalization test
Vowel-trained group	75.03 (43.30)	88.37 (32.07)	88.64 (31.74)	75.71 (42.90)	88.30 (32.15)	87.28 (33.33)
Control group	79.86 (40.12)	80.61 (39.55)	85.58 (35.14)	79.52 (40.37)	81.97 (38.45)	81.02 (39.23)

13%

13%

Conclusions

This study examined the effects of web-based perceptual training on the perception of Korean vowels and codas and compared explicit and implicit instruction methods.

Effects	Results
Effects of web-based HVPT	Vowel-trained group: Significant vowel improvement after training Coda-trained group: Significant coda improvement after training Control group: No significant improvement for both vowels and coda
Effects of explicit vs. implicit instruction on L2 perception	Explicit instruction: Significant improvement for both vowels and codas Implicit instruction: Significant improvement for vowels No significant improvement for codas
Effects of generalization tests	Explicitly trained groups – Generalization effects ✓ Control group – No effects ✗

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