Computer-Assisted Perceptual Training on Korean Vowels by L2 Learners of Korean

Na-Young Ryu

UNIVERSITY OF TORONTO

June 20-22
University of Minnesota

2019 Annual Conference of American Association of Teachers of Korean

L2 speech perception

- Adult learners often struggle to acquire L2 sounds to a native-like performance level.
- Language-internal and external factors to account for the perceptual difficulty in L2 learning.

Linguistic factors	Non–linguistic factors
• L1 transfer (Best 1994, Flege 1995, 2003) • Markedness (Broselow & Xu 2004, Eckman 1997)	• L2 experience (Best & Strange 1992, Cebrian 2006) • Average age of L2 acquisition (Hyltenstam & Abrahamsso, 2003) • Length of L2 immersion (Flege, Frieda & Nozawa 1997) • Extent of daily L2 vs. L1 usage (Jia, Aaronson & Wu 2002)

Effects of L1 transfer on L2 vowel perception

- Mandarin learners of Korean have more difficulties with Korean vowels /o, u, ʌ/ than English learners of Korean.

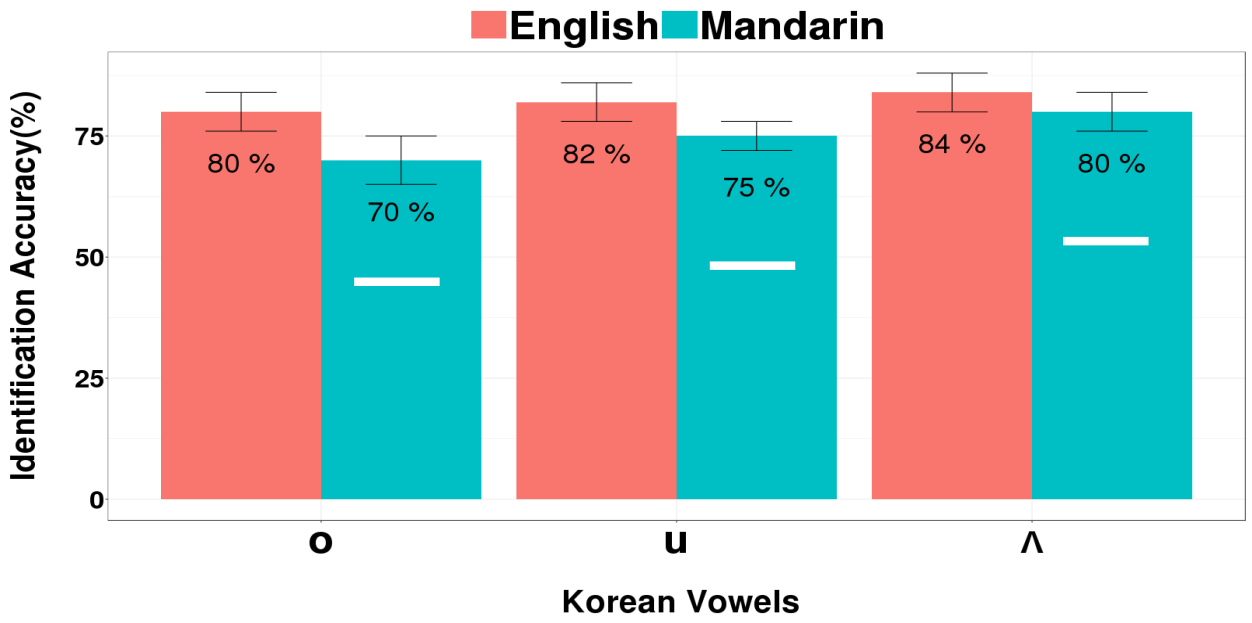


Figure 1. Identification accuracy of individual Korean vowels by L1 group (Ryu 2018)

Effects of L2 experience on L2 vowel perception

- Inexperienced learners of Korean have more difficulties with Korean vowels /o, u , ʌ/ than experienced learners of Korean.

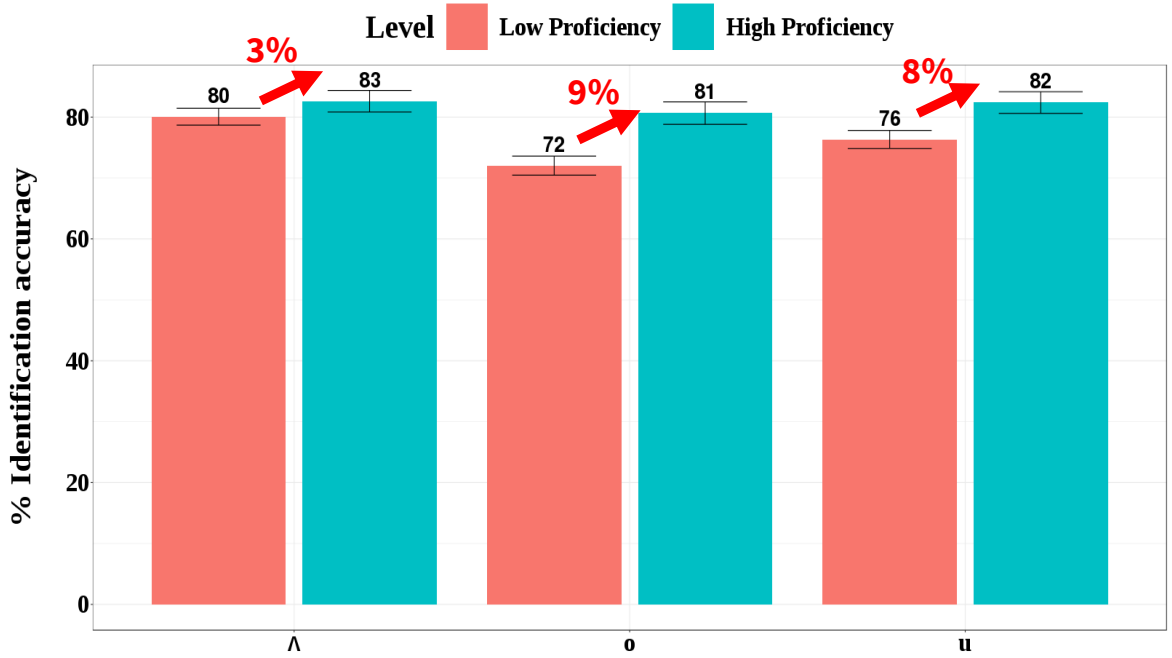


Figure 2. Identification accuracy of individual Korean vowels by L2 proficiency (Ryu 2018)

Motivation for current study

- The acquisition of Korean vowels /o, ʌ, u/ appear to be difficult for beginning Mandarin L2 learners.

- To date, there are no studies of web-based perceptual training on the perception of Korean vowels by L2 learners.

Goals and research questions

[Effects of online perceptual training on L2 perception]

- Question 1: Does ***web-based perceptual training*** enhance Mandarin L2 learners' perception of Korean vowels?

[Effects of explicit vs. implicit instruction on L2 perception]

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

[Effects of the generalization test]

- Question 3: Can the training effect be ***transferred*** to sounds in new phonetic contexts?

Effects of phonetic training on L2 perception

- Many researchers investigate the effects of phonetic training on the perception of L2 segments (Bradlow et al 1999, Iverson & Evans 2007, Aliaga-García 2010, Rato 2013, Thomson 2011 and many others)

✓ **Effects of speaker variability** (Bradlow et al 1997, Lively et al 1993, Wong 2013)
High variability phonetic training > Low variability phonetic training

✓ **Effects of training set sizes** (Nishi & Kewley-Port 2007)
Full set of vowels > Subset vowel set

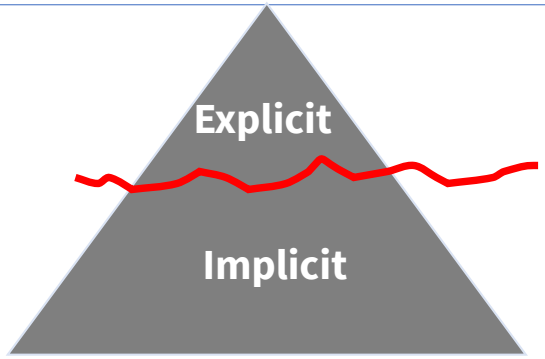
✓ **Effects of training location** (Sakai & Moorman 2017)
Home > Laboratory

Participants

- 45 Mandarin learners of Korean who enrolled in beginner-level Korean courses at universities in Toronto, Canada
- Randomly assigned to three groups:

Explicit training ($65)	Instructed to pay attention to **Korean vowels**
Implicit training ($65)	Instructed to pay attention to **Korean non-vowels**
No training ($25)	**Did not** receive online training

Effects of instruction on L2 perception



Consciousness

Explicit instruction	Learners **attend to target sounds** and **they have conscious awareness of what is being learned** during perceptual training
Implicit instruction	Learners **are passive exposed to target sounds** so that **they do not know what is being learned** during perceptual training

Procedure

	Pre-test	Online Training	Post-test	Generalization test
Vowel trained group	✓	✓	✓	✓
Non-vowel trained group	✓	✓	✓	
No training	✓		✓	✓

Design of the current experiment

	Pre-, Post- & Generalization test	Online training
Talker	2 (1 female, 1 male)	4 (2 female, 2 male)
Task	Identification task	Identification task (8 sessions)
Feedback	No	Yes
Platform	PsychoPy	jsPsych
Location	Phonetics Lab	Online

Online perceptual training programs

Web server

Develop online training program

jspsych

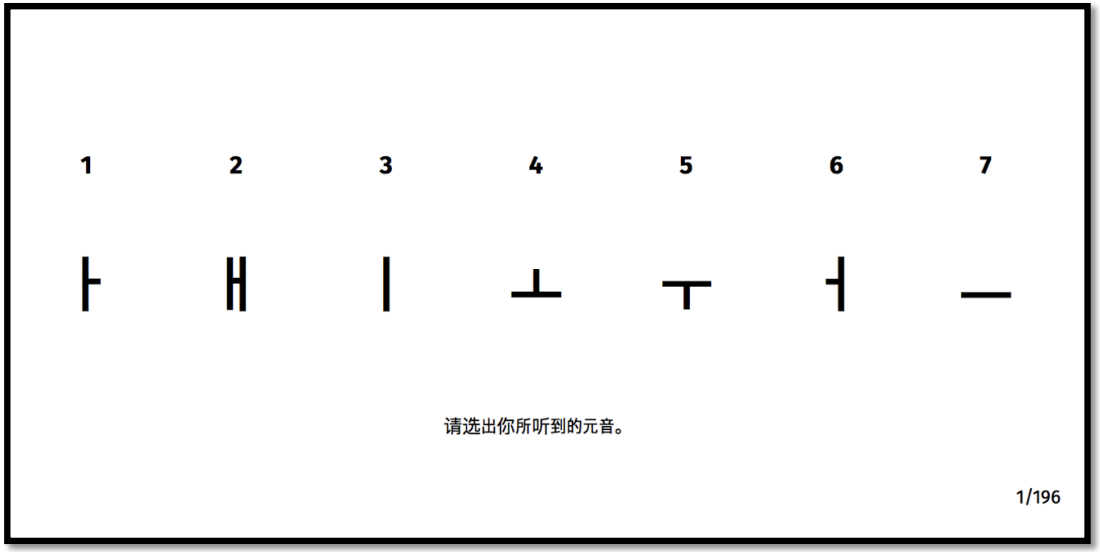
Learners

Auditory stimuli

- 98 monosyllabic Korean words (CVC) naturally produced by 6 native Korean speakers (3 females, 3 males) in their 20s.
  - Trained phonemes: **7 Korean vowels /a, e, i, o, u, ʌ, ɨ/**
  - Pre-test, post-test, and online training: 49 words **/hVC/**
  - Generalization test: 49 words **/kVC/**

Pre-, Post- and Generalization test: Identification

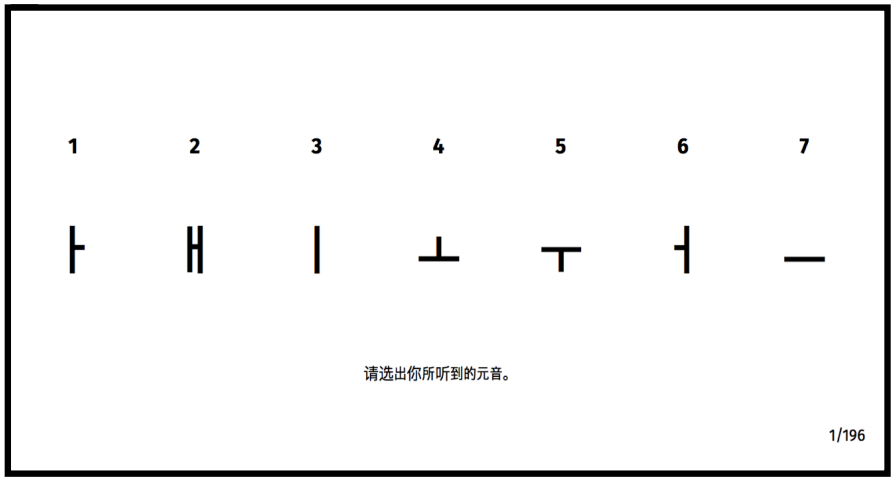
- All groups were asked to identify a sound they heard and press a corresponding button on the keyboard.



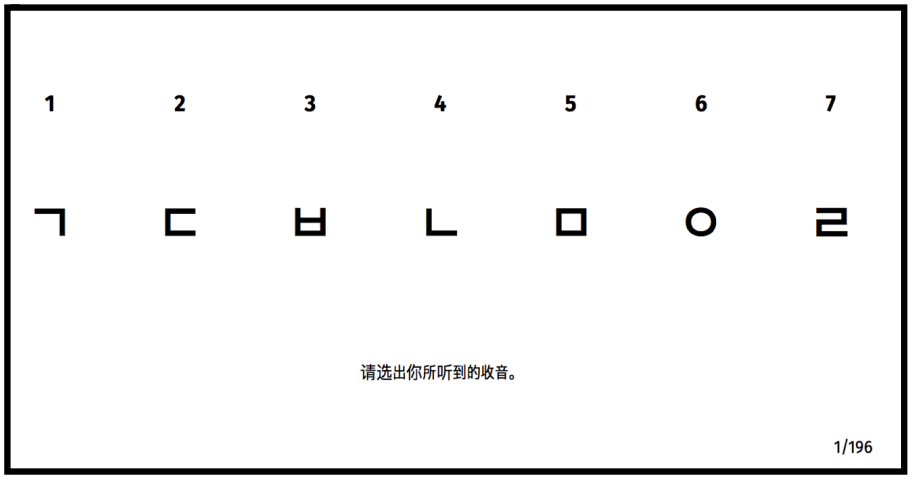
Online training: identification

- Both explicit and implicit training groups were **exposed to the same stimuli**, but focused on **different target segments**.

Explicit training: Vowel-trained group



Implicit training: Non vowel-trained group



Online perceptual training

- ID and PW were provided.
- Eight online sessions within two weeks
- No more than one training session per day.

Demo online training program:
http://exp.ddns.net/Exp/G1/

ID: P999
PW: test

Statistical analysis

- A mixed-effects logistic model in R (Baayen 2008; R CoreTeam 2012)
  - The package *lme4* (Bates et al 2011)
  - Dependent variable: Response (correct:1, incorrect:0)
  - Fixed effects: Test (pre-test, post-test, generalization test), group (G1, G2, G3), and their interactions
  - Random effects: Speakers, items

Effects of explicit vs. implicit instruction

Explicit training Significant improvement between pre- and post-test (12%)

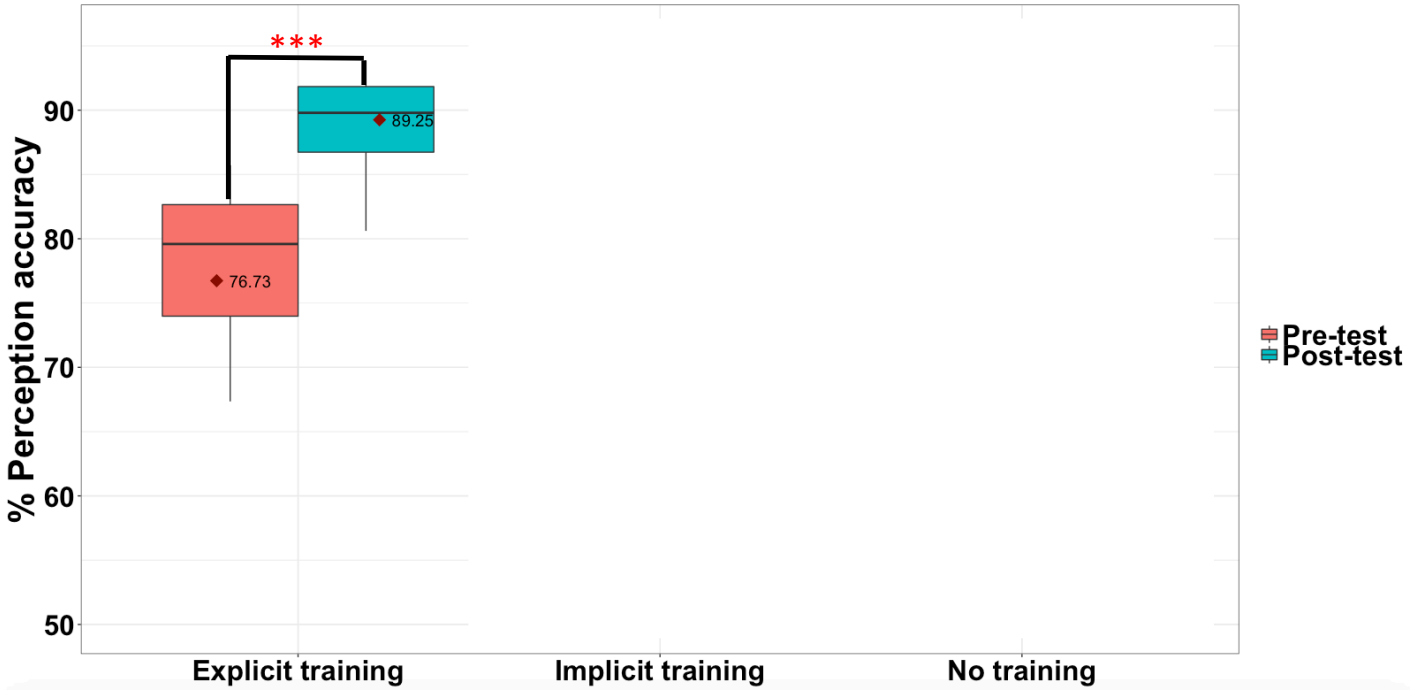


Figure 3. Identification accuracy of Korean vowels at pre-and post-test by group

Effects of explicit vs. implicit instruction

Implicit training Significant improvement between pre- and post-test (12%)

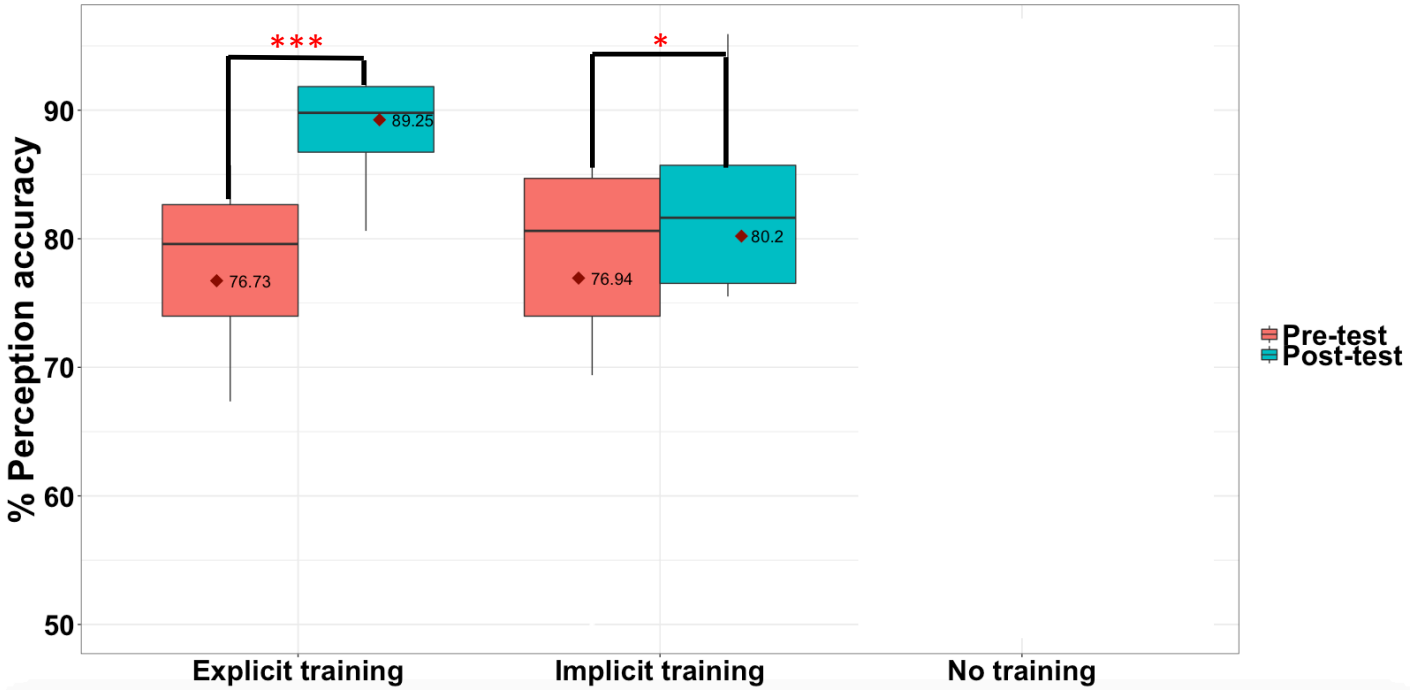


Figure 3. Identification accuracy of Korean vowels at pre-and post-test by group

Effects of explicit vs. implicit instruction

No training No significant improvement between pre- and post-test

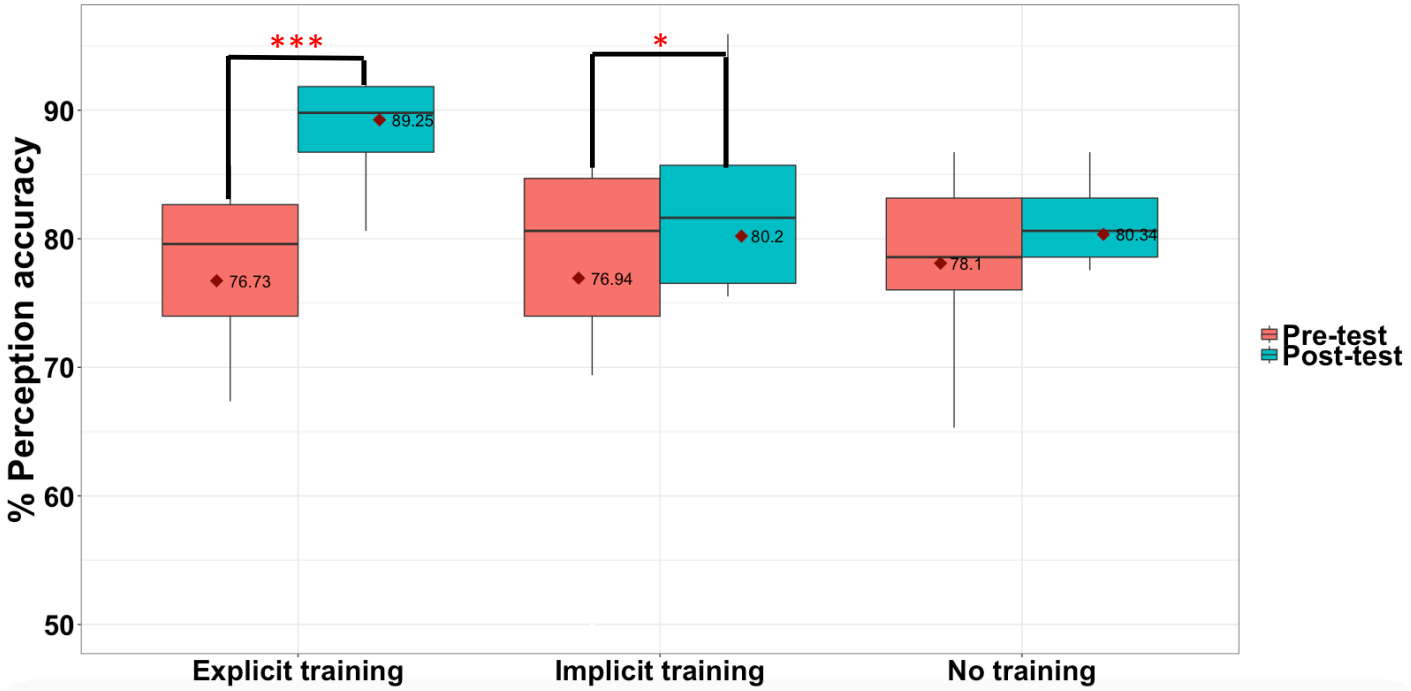


Figure 3. Identification accuracy of Korean vowels at pre-and post-test by group

Perception accuracy of individual Korean vowels

- The hierarchy of accurate perception at pre- test: **i > ɨ > ɑ > e > u > ʌ > o**
- Perception accuracy of Korean vowels /e, o, u, ʌ / significantly improved at post-test.

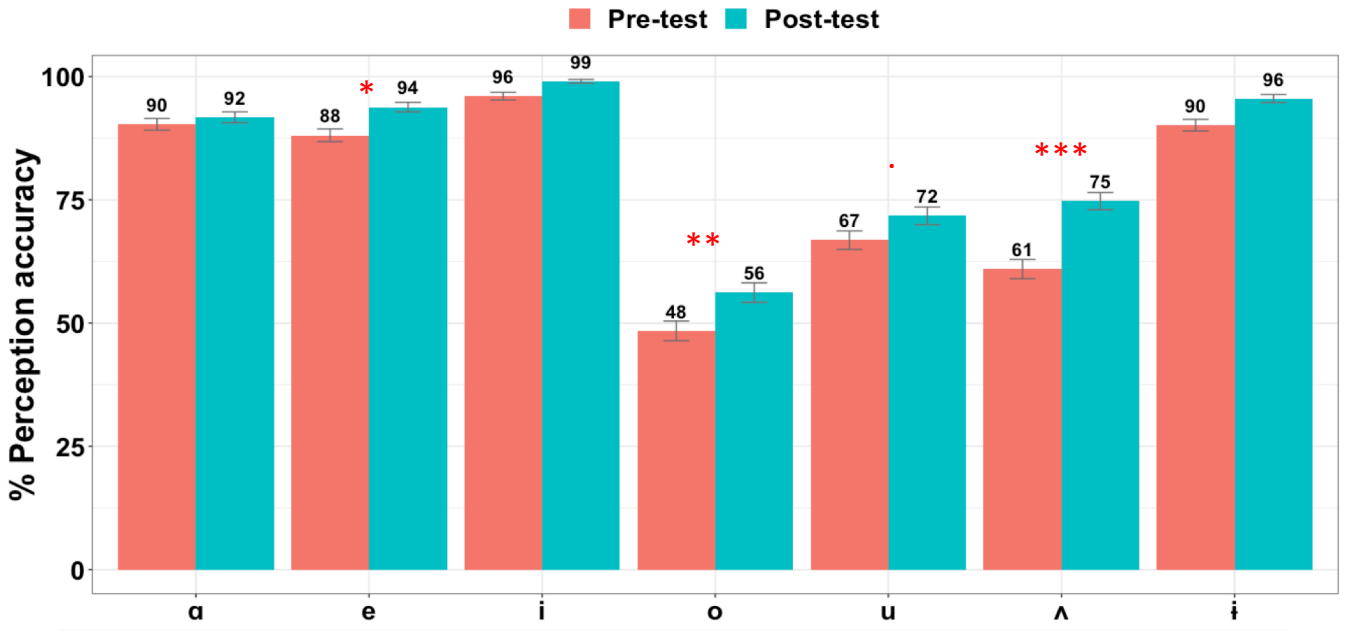


Figure 4. Perception accuracy of each Korean vowels at pre- and post-test

Improvement of perception accuracy of Korean vowels

- Perception accuracy of all vowels in explicit training improved.

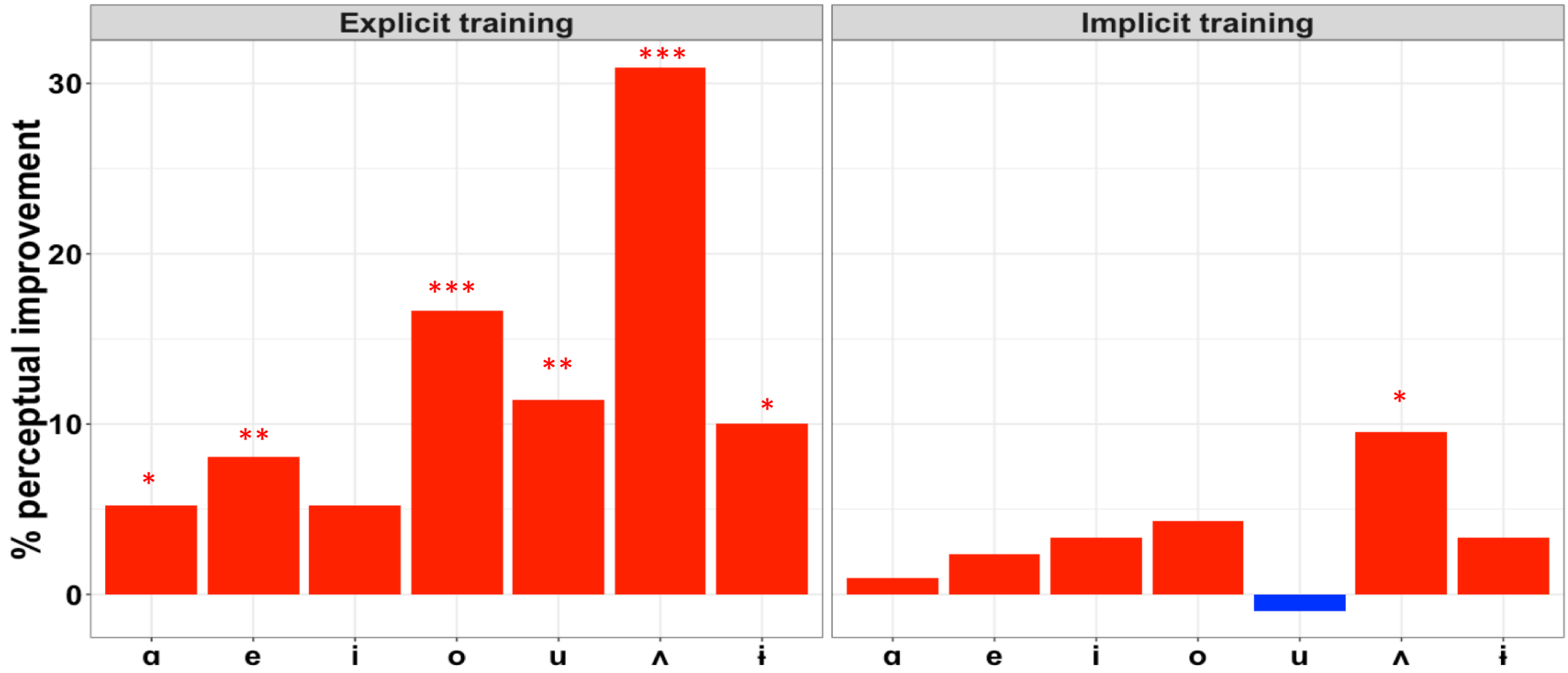


Figure 5. Perception improvement of individual vowels by group

Development of L2 vowel perception during training

- There was a gradual increase across the sessions during online training (84.9% ~ 92.3%).
- Importance of immediate feedback and the location of training.

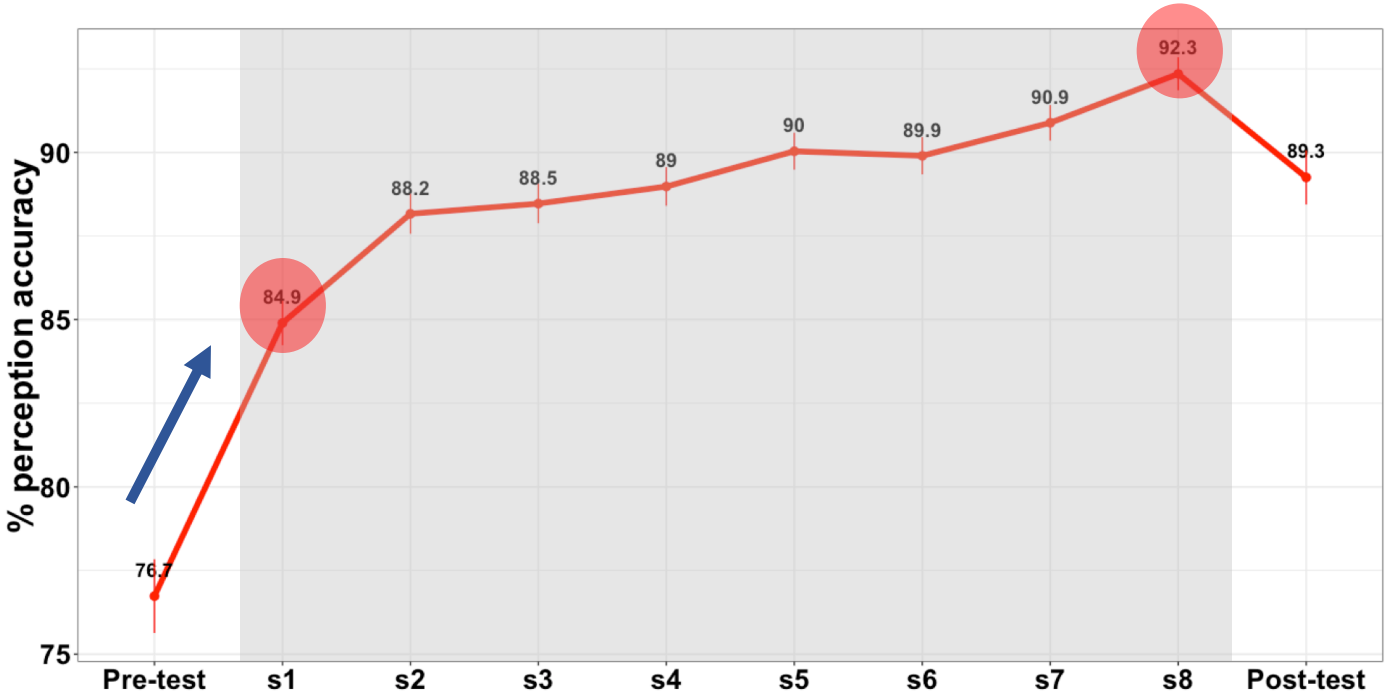


Figure 6. Improvement on perception accuracy of Korean vowels during online training

Generalization effects of training

- Generalization effects to new words (kVC) found in explicit training.

Figure 7. Effects of generalization test by group

Conclusion

[Effects of web-based auditory training on L2 perception]

- High variability web-based phonetic training increases accuracy of Mandarin speakers' perception of Korean vowels.

[Effects of explicit vs. implicit instruction on L2 perception]

- Explicit instruction is more beneficial for improving Korean vowels than implicit instruction.

[Effects of generalization test on L2 perception]

- Learners are able to generalize the knowledge obtained from training to a novel phonetic context.

Pedagogical implications

- **Laboratory-based training vs. Web-based training**
  - The web-based auditory training program shows positive learning effects while providing a more learner-friendly learning environment.
- **Use of explicit instruction with feedback contributes to L2 learning and teaching.**
  - Language instructors can benefit from explicit instruction on L2 speech perception in class.
- **Learners are passively exposed to L2 vowels, they can acquire some knowledge unconsciously.**
  - Language instructors need to **provide enough L2 sound input for learners** in class, and also **encourage students to expose themselves to their target language** outside of the classroom.

Acknowledgements

- Yoonjung Kang, Philip Monahan and Jessamyn Schertz for their valuable comments.
- Kyoungrok Ko and Yujeong Choi for their help recruiting participants.
- Hyoung Seok Kwon for technical support.
- Research assistant Min Ji Heo for running the experiments.
- Mandarin undergraduate students who participated in the experiments.
- SSHRC institutional grant for experiment participant costs

Contact & Technical Assistance

류나영

nayoung.ryu@mail.utoronto.ca
ryu_nayoung@hotmail.com