Relating production and perception of L2 tone

Citation for published version:
Kirby, J & L Giang. 2018, 'Relating production and perception of L2 tone' LabPhon 16, Lisbon, Portugal, 19/06/18 - 22/06/18.

Link:
Link to publication record in Edinburgh Research Explorer

Document Version:
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1. INTRODUCTION

What is the relationship between L2 production & perception?

- Flege (1999): (segmental) L2 production accuracy limited by perception: correlations may exist, but predicted to be modest in advanced learners.
- Strange (1995): perceptual difficulties may persist even after production is mastered: performance may be uncorrelated
- For tone, consensus seems to be that production leads perception (Yang, 2012)

Our study: speakers of a non-tonal language (Khmer) speaking a tonal L2 (Southern Vietnamese)

1. How well do Khmer-dominant speakers distinguish L2 tones in production?
2. What dimensions are used by Khmer and Vietnamese listeners in perception?
3. How can we measure the relationship between L2 production and perception?

Idea 1: How well does perception predict similarity to a native target?
Idea 2: How well does perception predict distance between L2 productions?

3. PRODUCTION

![Diagram showing mean Fréchet distances between Kh and Vn productions.]

Observations
- Pitch range compression, typical of both tonal and non-tonal L2 (e.g. Chin, 1974; Meerman et al., 1998)
- Turning point difficulties (Flege et al., 2003)
- 212/214 merger

Correlations
- Distance correlates most strongly with Khmer age
- EDUCATION correlated with both AGE (-0.6) and PCT VIETNAMESE USAGE (0.6)

Variation
- Older speakers have a tendency to produce all tones in one of two "registers"

4. AX DISCRIMINATION

![Bar chart showing mean discrimination accuracy across speakers.]

Observations
- Vn 89% Kh 71%
- Khmers have most difficulty when pitch ranges overlap
- 212/214 hard for everyone

Correlations
- EDUCATION best predicts overall Kh accuracy (0.5)
- Negative correlation with AGE (-0.4)
- USAGE not correlated (0)

Variation
- Perception can be good if productions are distinct, even if "non-native" (e.g. KF1 212/212, 212/214, 212/214)
- Perception can be poor even when production is objectively native-like (e.g. KM10 33/21, 33/212)

5. PRODUCTION:PERCEPTION

Idea 1: distance from native target ~ mean discrimination accuracy

For each speaker, correlate distance from Kh to Vn tone (“production accuracy”) with mean discrimination accuracy over all pairs (“perception accuracy”)
- Correlation weak (p=0.3), but in expected direction

Idea 2: distance between L2 pairs ~ pairwise discrimination accuracy

Does distance between a Kh speaker’s own productions, regardless of similarity to Vn targets, correlate with accuracy for that particular tone pair?
- Similar strength of correlation (p=0.3)

6. CONCLUSIONS

1. Perceptual difficulties may persist even if production is ‘mastered’
2. Perceptual difficulties may (also) be related to speaker-specific acoustic separation (at least for tone)
3. ‘Accuracy’ in L2 tone mastery involves more than just approximating a native speaker target