The role of native language experience in the perception of L2 speech sounds：

The case of the perception of English nasal coda contrasts by Xiang Chinese and Cantonese Chinese learners

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Introduction

- Human beings are born with the ability to perceive any sound that occurs in human languages across the world
- During the first year of life, however, humans undergo a perceptual reorganization
- The L1 sound system “filters out” non-native speech sounds, resulting in non-native (including L2) speech learning difficulties.

- The Speech Learning Model (Flege,1995), the Perceptual Assimilation Model [e.g Best, 1995], the Second Language Linguistic Perception model [Escudero,2005], and the Native Language Magnet Model [e.g Iverson & Kuhl, 1995].
- In contrast to the vowel perception by Chinese Learners of English (CLE), few studies on consonant perception by CLE
- The role of native language experience ignored

Research questions

- How native language experience (Xiang and Cantonese) affects the perception of English nasal coda contrasts?
- Are there any differences in performance between the two groups?
- Does vowel quality affect nasal perception?

Method

- Participants
  - 15 Beijing vs.15 Changsha & 15 Guangzhou Cantonese
  - With roughly the same proficiency in English

- The phonology of nasal codas in four languages

英

(-n/-ŋ)	Beijing	Changsha	Cantonese	English
/i/	鬓 – 病(51)	冰(41)	/pin/边(55)	
/ɪ/			/pɪŋ/兵(55)	sin-sing
/u/			/pun/本(35)	
/ʊ/			/pʊŋ/甭(35)	
/y/		君(33)		
/ɔ/			赶 - 港(35)	gone-gong
/ʌ/				sun-sung
/ə/	笨 – 蹦(51)	根(33)		
/a/	办 – 棒(51)	板(33)	山 – 生(55)	
/ɐ/			新 – 生(55)	
/æ/				pan-pang

- Stimuli
  - Targeted VC syllables were clipped from the actual English words *sin, sing, sun, sung, pan and pang*
  - /ɪn/-/ɪŋ/, /ʌn/-/ʌŋ/ and /æn/-/æŋ/
  - 4 tokens for each syllables, 24 tokens altogether

Syllable Contrasts	Syllable Duration (ms)	Vowel	
		f0(Hz)	Intensity(dB)
/ɪn/	284.8	130.8	72.3
/ɪŋ/	273.3	128.7	72.4
/ʌn/	274.3	124.8	72.7
/ʌŋ/	278.6	126.8	72.9
/æn/	314.3	126.1	72.3
/æŋ/	345.1	127.0	72.5

- Procedure
  - AXB discrimination test
  - Each type of contrast (/ɪn/-/ɪŋ/, /ʌn/-/ʌŋ/ and /æn/-/æŋ/) was tested by 16 AXB trials.
  - 48 trials altogether in a single randomized block
  - The experiment was automatically controlled by the speech software Praat

Results

Nasal Contrasts				
Language group	/ɪn/-/ɪŋ/	/ʌn/-/ʌŋ/	/æn/-/æŋ/	Overall
Beijing	84.8	78.1	95.4	86.1
	(17.4)	(16.3)	(6.5)	
Changsha	62.6	59.3	85.6	69.2
	(12.8)	(13.9)	(12.6)	
Cantonese	62.4	58.4	87.6	69.5
	(18.2)	(18.9)	(13.2)	

Discussion

- Best & Tyler's perceptual assimilation model-L2 (2007) confirmed
- No significant differences between two groups: two possibilities
  - 1) NO nasal contrasts with high vowels leads to similar perceptual pattern to Changsha speakers
  - 2) Phonological system possessed by Young Cantonese speakers differs from that by old generation
- /ʌn/-/ʌŋ/ & /ɪn/-/ɪŋ/< /æn/-/æŋ/: vowel quality affect nasal perception confirmed (Zee 1981; Kluge et al 2007; Cheng & Guion-Anderson)

- Its of interest to investigate the perception of /ʌn/-/ʌŋ/ in noise condition as well as by L2 learners with different native language backgrounds
- Overall, /ʌn/-/ʌŋ/ & /ɪn/-/ɪŋ/ < /æn/-/æŋ/; no differences in performances on /ʌn/-/ʌŋ/ & /ɪn/-/ɪŋ/
- Separately, for Changsha & Cantonese, /ʌn/-/ʌŋ/ & /ɪn/-/ɪŋ/ < /æn/-/æŋ/; no differences in performances on /ʌn/-/ʌŋ/ & /ɪn/-/ɪŋ/.
- By contrasts, for Beijing, no differences in performance on /æn/-/æŋ/ & /ɪn/-/ɪŋ/; /ʌn/-/ʌŋ/ & /ɪn/-/ɪŋ/
  - English nasal coda perception was constrained by both native language experience and phonetic-universal property

Conclusion

- The perception of English nasal coda contrasts is affected significantly by native language experience (Xiang & Cantonese)
- No differences in performance between the two groups
- Both linguistic experience and phonetic-universal property play a role in the perception of English nasal coda contrasts

- Further study should control subjects' proficiency in both Mandarin & English
- Linguistic experience constantly shapes listeners' perceptual ability (plasticity of speech perception) (Best & Tyler 2007: 24), so how "Chinese" L1 and L2 shape English (L3) perception? (cf. in a 18th oriental-cocosda paper)

Thanks