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Vowel Raising in Chengdu Dialect of Mandarin

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BACKGROUND

- Raising phenomenon in Chengdu dialect: (He & Rao, 2013)
- 1950s-born: /a/ as [æ] in /an/;
- Younger: /a/ as [ε] in /an/
- Lack acoustic evidence
- Summary of previous studies:

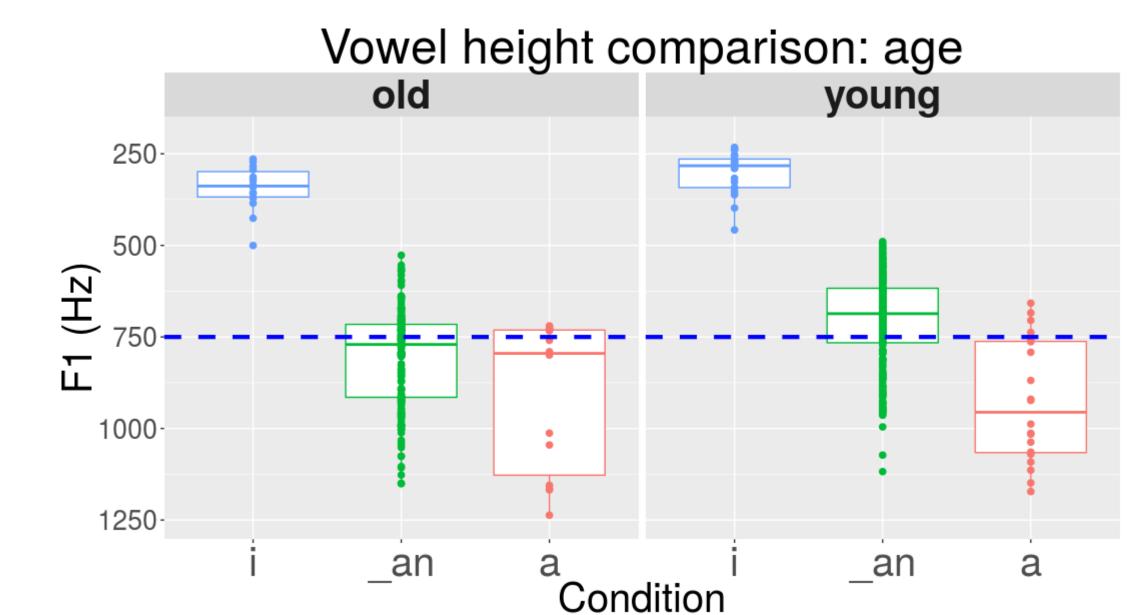
Year of Analysis	1941	1956	1956	c.a. 1982	c.a. 1983	c.a. 2006
Published in	Yang (1984)	Zhen (1958)	Zhen, Hao and Chen (1960)	Liang (<mark>1982</mark>)	Zhen (1983)	He and Rao (2013)
/iai/	a	3	ε	3	NA	3
/ian/	e	æ	3	ε	$\tilde{f \epsilon}$	æ/ε
/yan/	e	æ	3	3	$\tilde{f \epsilon}$	æ/ε
/Can/	a	Α	æ	NA	ã	æ/ε
/uan/	a	A	æ	NA	ã	NA

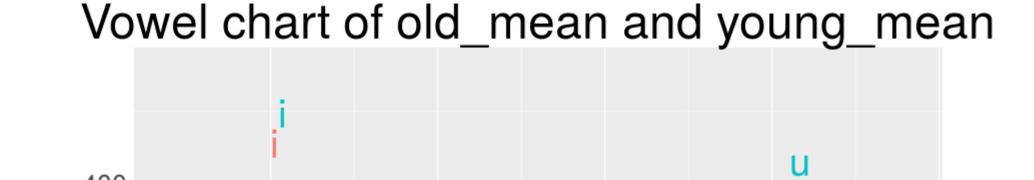
RESEARCH QUESTIONS

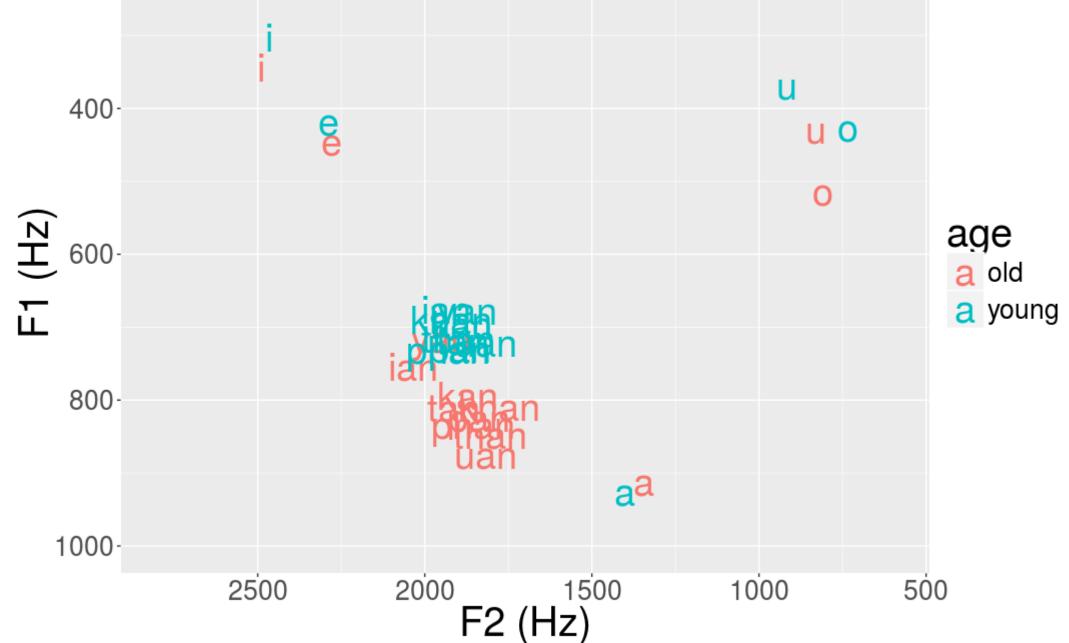
- 1. Age: Does the young age group raise /a/ more than the older age group when /a/ is followed by a nasal coda /n/?
- 2. Gender: Within each age group, do female subjects exhibit more raising?
- 3. Phonological environment: Is the height of /a/ different in different phonological environments?

Young speakers raise /an/:

- Younger vs. Older:
- F1 of /a/ in /-an/ for younger group lower than older group (p < .001);
- > vowel height of /an/ for younger group higher than for older
- the younger age group raises /an/ more than the older age group;
- → confirms the conclusion of He and Rao (2013) that young speakers raise /an/.
- Calculation:
- Formula: the height of /an/ between /a/ (lowest) and /i/ (highest); $Height_{/an/} = \frac{F1_{/a/} - F1_{/an/}}{F1_{/a/} - F1_{/i/}} \times 100\%$
- Height of /an/ on the scale with two ref vowels:
- Younger group 35.3%;
- Older group 18.4%;
- support that the younger group raises /an/ more.
- Plot: F1 of /an/ of different group (normalized) (see right)







Old male speakers: /uan/ patterns with /Can/

ian yan uan pan tan kanphanthankhan a Condition

METHODS & ANALYSIS

	Partcipants	Age	Gender	ParentsChengdu?	YrsInChengdu
Young Age Group		25-27 26-28	Male Female	y/n y	17.1 19.0
Old Age Group	4 3	56-59 43-57	Male Female	NA NA	52.5 47.0

- Tasks: Reading a list of characters in quiet condition
- Material:

• Participants:

Condition	Environment						
			an	an	an		
EXPERIMENTAL	Unaspirated	p	pan1	pan2	pan3		
		t	tan1	tan2	tan3		
		k	kan1	kan2	kan3		
	Aspirated	ph	phan1	phan2	phan3		
		th	than1	than2	than3		
		kh	khan1	khan2	khan3		
			ian	uan	yan		
		0	ian1	uan1	yan1		
	Diphthong	0	ian2	uan2	yan2		
		0	ian3	uan3	yan3		
			a	i	u	e	0
REFERENCE	Reference	t	ta1	ti1	tu1	te1	to1
	reference	t	ta2	ti2	tu2	te2	to2

- Analysis:
- F1 value of our target vowels → vowel height;
- Extract the F1 value using Praat:
- Most tokens: at the most stable part in the spectrogram of most tokens
- Diphthong environment: highest point of F1 in the syllable.

RESULTS: GENDER & PHONOLOGICAL ENVIRONMENT

RESULTS: AGE

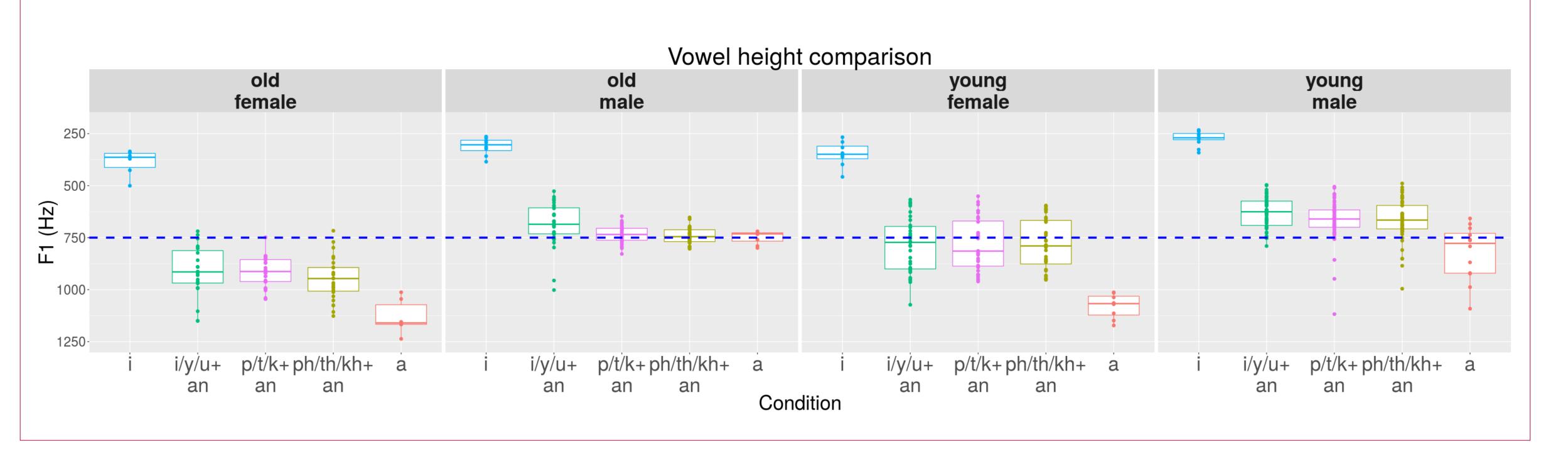
Gender:

Within each age group, the female speakers raise lanl more than the male speakers:

- Young group: difference in F1 value of /an/ and /a/:
- Female: 295.00 (p = .000); Male: 75.97 (p < .001);
- Older group: difference in F1 value of /an/ and /a/:
 - Female: 206.34 (ρ =.000); Male: 28.23 (ρ >.05);

Phonological Environment:

- Unasiprated vs. Aspirated vs. Diphothong: no significant difference between the height of /a/;
- Diphthong environment: the height of /a/ is higher in [yan] than in [uan]



DISCUSSION

- Previous observation confirmed:
- Young speakers raise the vowel /a/ in /an/;
- Young female speakers lead the change.
- Women are the innovators in unconscious sound change (Labov, 1990, pp. 215-218).
- No difference between the aspirated and unaspirated conditions
- Difference in vowel height between /uan/, /ian/ and /yan/:[front] feature influences the height of /a/.
- /ian/ and /yan/ raise first, /uan/ later?
- Further investigation:
- participants with a more diverse age differences;
- Phonological environments: other conditions?

CONCLUSIONS and FUTURE WORK

- The raising of /a/ in young speakers of Chengdu dialect in /Van/, /Can/ and /Chan/ are all attested;
- Female speakers lead the change;
- No difference between aspirated and unaspirated conditions.
- /uan/ does not pattern with /ian/ and /yan/:
 - For some older speakers, the /a/ in /uan/ lower than the reference /a/; vowel frontness may play a role.
- Future study:
 - Better quality recordings;
 - Subjects from a more diverse backgrounds;
 - Include other vowels to test potential chain shift.

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