

The prevalence of tongue tension in Chinese adolescent students singing belt.

By Karina Bes

WHY THIS RESEARCH?

Many voice teachers have noticed issues with tongue tension in Mandarin Chinese speakers, either for raising or pressing down the back of the tongue (Zhao, 2019).

My observations include:

- 1. Prevalence of tongue tension in belt (and even a retracted curled up tongue)**

Examples of the retracted, curled-up tongue



Sung on /ε/ vowel



Spoken on zhe

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> The realisation of the influence of native language acquirement on singing

TWO-PART RESEARCH



LITERATURE RESEARCH

PREVALENCE OF TONGUE TENSION

- * What is the tongue?
- * What is the preferred tongue position in belt?
- * Differences between English and Mandarin



MIXED-METHODS RESEARCH

REDUCING TONGUE TENSION

- * Spectrographic analysis
- * Semi-Structured Interview
- * Observations

PART 1: LITERATURE RESEARCH

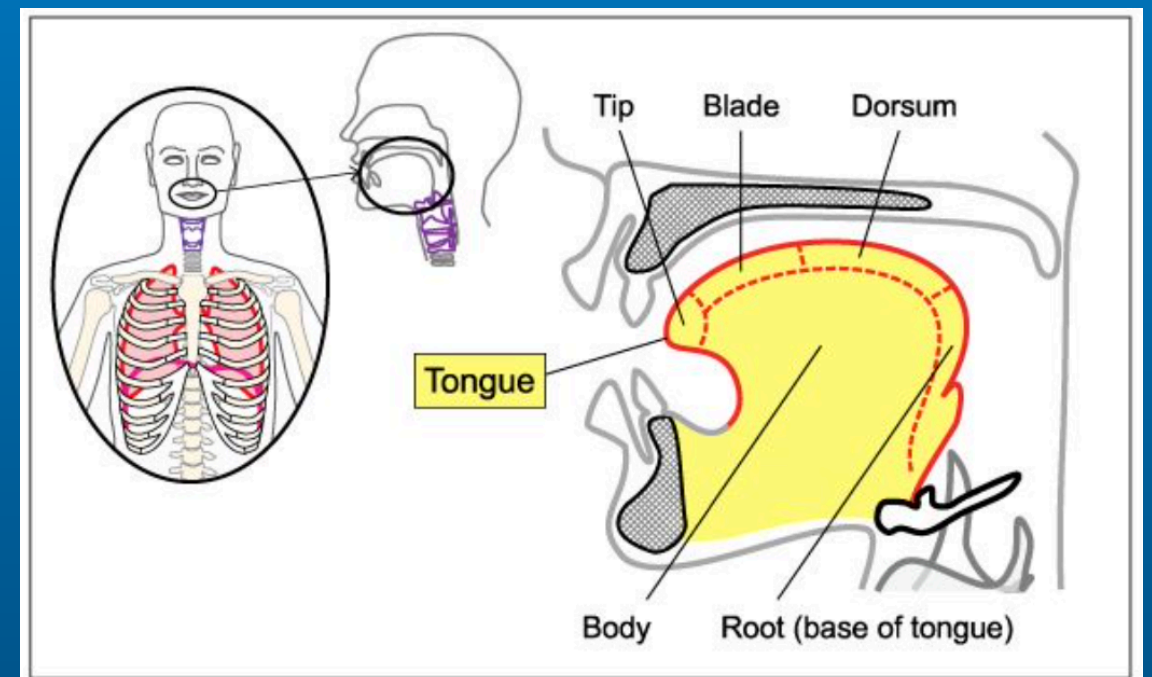
INTERESTING FINDINGS FROM THE LITERATURE

The tongue is a fascinating part of the human body: It plays an important, though often overlooked, part in voice production (Nair, 2021)

The preferred tongue position for belting is a high position - with a raised and forward dorsum (Klimek et al., 2005; LoVetri, Lesh and Woo, 1999)



Cultural differences



Steinhauer et al., 2017

INTERESTING FINDINGS FROM THE LITERATURE

The pronunciation of Mandarin Chinese and Roman Languages differ in many area's.

Three main differences are:

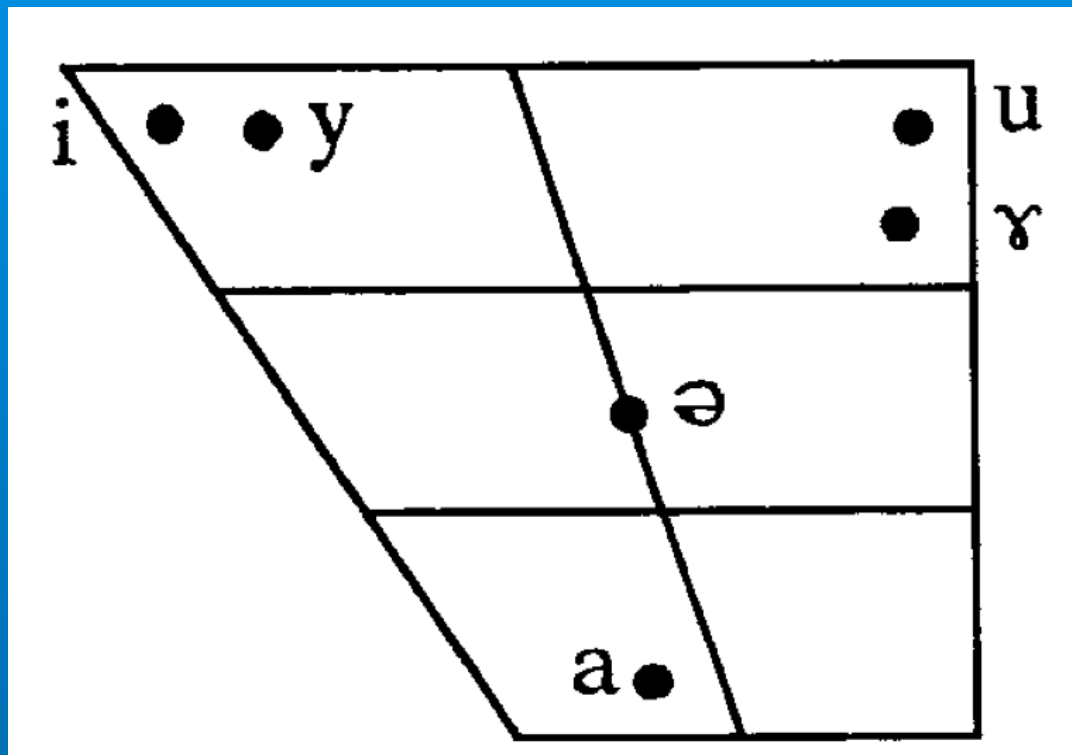
1. Chinese characters are pictorial. Pinyin is used to transcribe the Chinese characters into the Latin alphabets, but only represents the sounds of Mandarin Chinese characters (Odinye, 2015).

2. Sounds in Mandarin that are not used in western languages include (Chu & Petrus, 2021, in: Greschner, 2021; Wang, 2016):

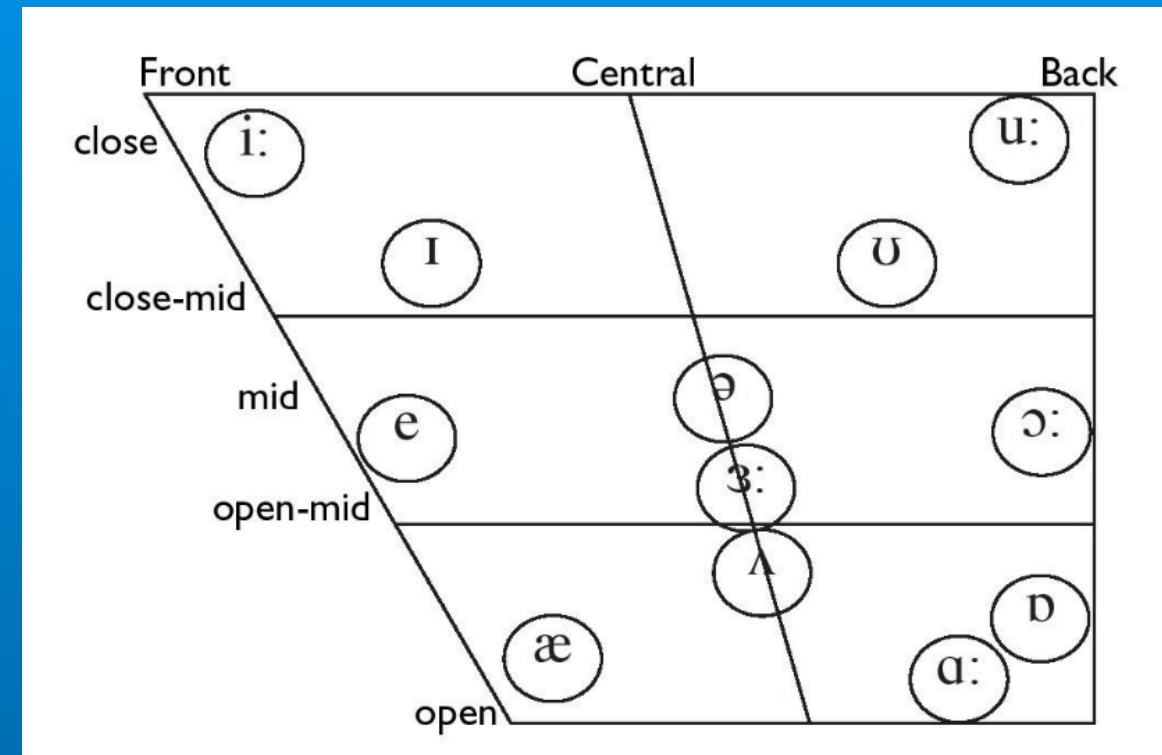
- Retroflex consonants (curled up tongue behind alveolar ridge).**
- Apical vowels (tongue remains in the position of the preceding consonant)**

3. Mandarin Chinese has six single vowels: a [ɑ:], o [o:], e [ə:], i [i:], u [u:] and ü [y:], and there is no open version of vowels in Mandarin Chinese (Zhao, 2019).

Interesting Findings from the Literature



(Lee & Zee, 2003; Li, 2018)



(Kayes, 2013)

In a research amongst 300 voice teachers, it appears that native Chinese students have the most trouble in pronouncing the vowels /æ/, /ɛ/, /ɪ/, /a/ and /e/ (Lim, 2013).



Belt Vowels! (Titze, 2016)

CONCLUSIONS FROM THE LITERATURE

Differences in tongue position in the pronunciation of Mandarin Chinese versus English, can explain the prevalence of tongue tension amongst Chinese singers.

Chinese singers seem to have trouble in the pronunciation of certain vowels (Lim, 2013) - [æ], [ɛ], [a] and [e] - that are considered as “belty” vowels (Titze, 2016).

The phenomenon of the curled up tongue in belting in Chinese students can not directly be explained from previous research. There is a possibility that the apical vowels - where the tongue stays in the position of the previous consonant - play a part in this, in combination with the retroflex consonants.

PART 2: MIXED METHODS RESEARCH

METHODOLOGY

The goal of this study is to examine tongue tension in belting amongst Chinese musical theatre students, by measuring the effectiveness of certain exercises related to reducing tongue tension and finding an optimal tongue position in belt.

EFFECTIVENESS

QUANTITATIVE

Spectrographic analysis

QUALITATIVE

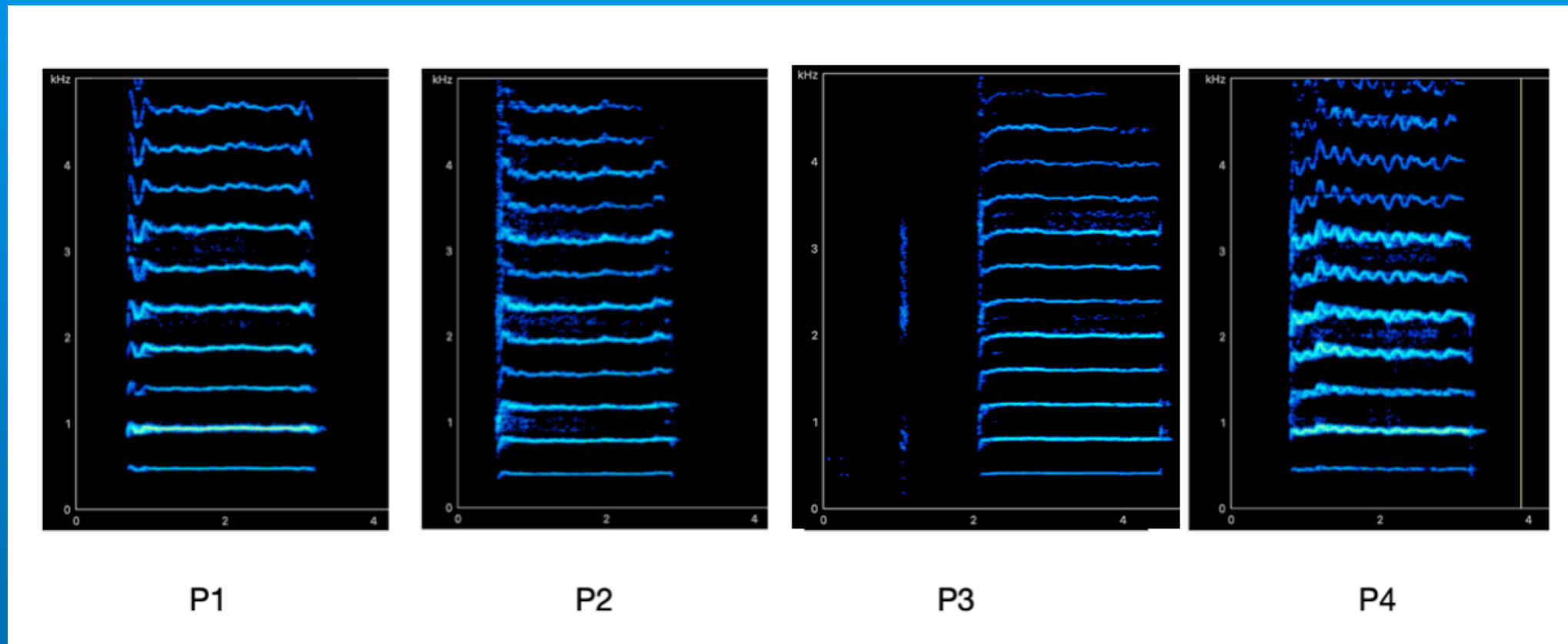
Observations
Semi-structured interview

ETHICAL CONSIDERATIONS

- * Insider Research (Unluer, 2012)
- * Risk of Stigmatising

HYPOTHESIS 1

The vowels /i/ and /a/ will be easier to belt for Chinese students than /ε/ and /e/.



Example /ε/ vowel

What am I looking for?

- * Used strategy.
In this case, first formant/second harmonic strategy, where the second harmonic is strengthened and fundamental frequency is weaker (Titze, 2016, Bozeman, 2013, Bourne & Garnier, 2012)
- * Alignment of the F2-H5 (Bestebreurtje & Schutte, 2000).
- * Abnormalities

HYPOTHESIS 1 - CONCLUSION

The vowels /i/ and /a/ will be easier to belt for Chinese students than /ɛ/ and /e/.

The vowels /a/ and /e/ appeared to be the “easiest” to belt for these students.

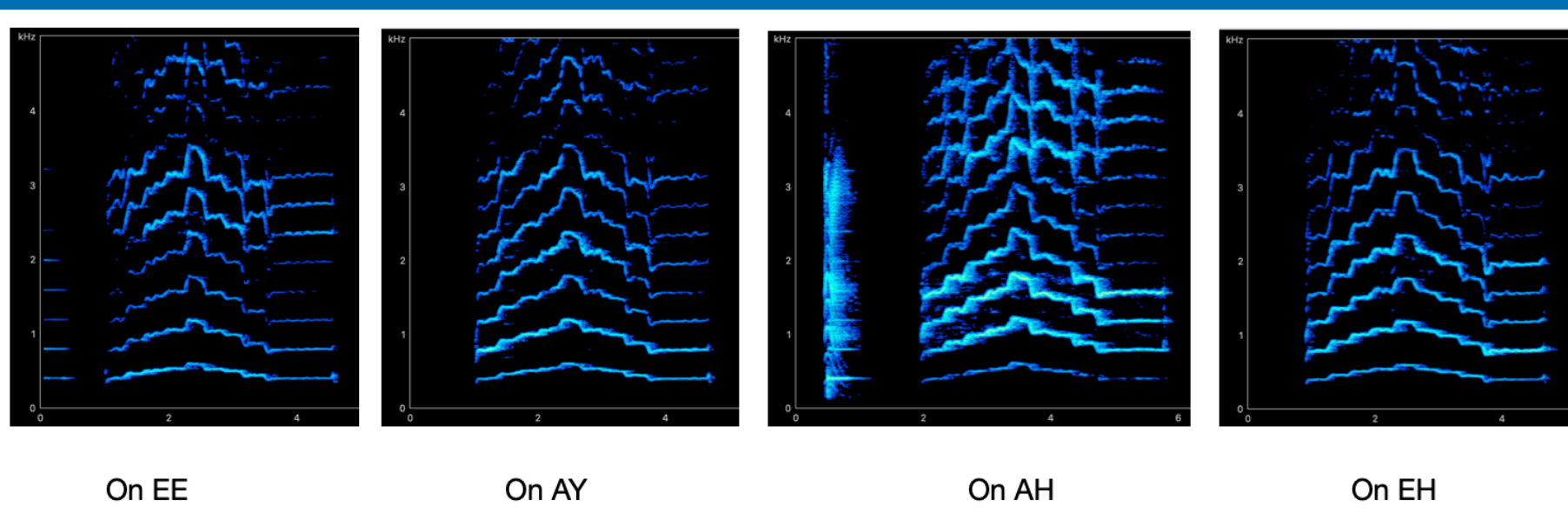
For these two vowels, the participants seemed to favour the first formant/second harmonic resonance strategy.

The vowel /ɛ/ appeared to be the hardest vowel, especially from the participants point of view. It was also the only vowel where the curled up tongue phenomenon was visible during the recording session.

Hypothesis 2

Effective exercises for the correct tongue-placement in belting (high tongue) will show a change in the second formant.

Participants were asked to perform the following task:



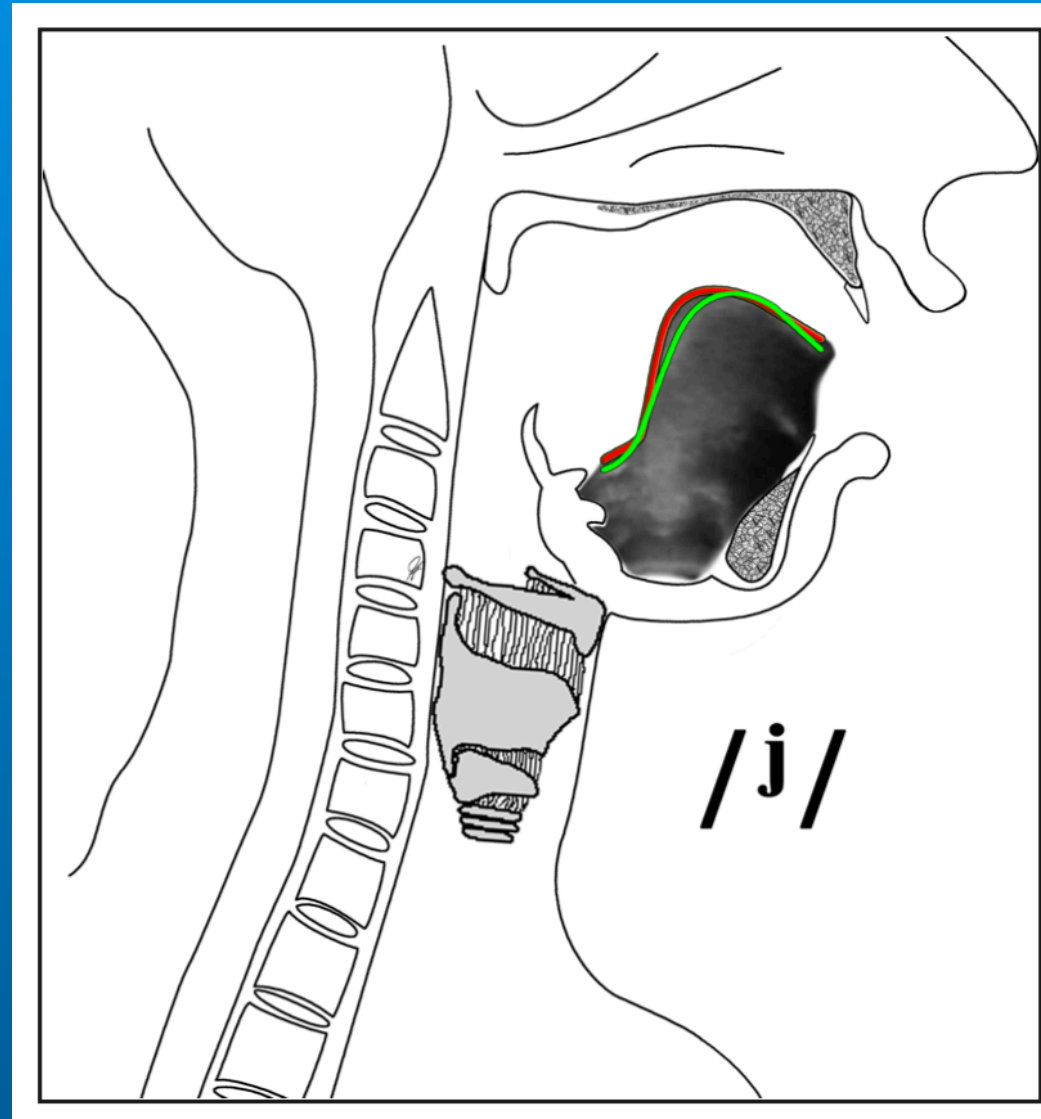
Hypothesis 2

ROUND 1: No intervention

ROUND 2: Placing a /j/ consonant in front of the vowel

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Nair, 2021

Hypothesis 2

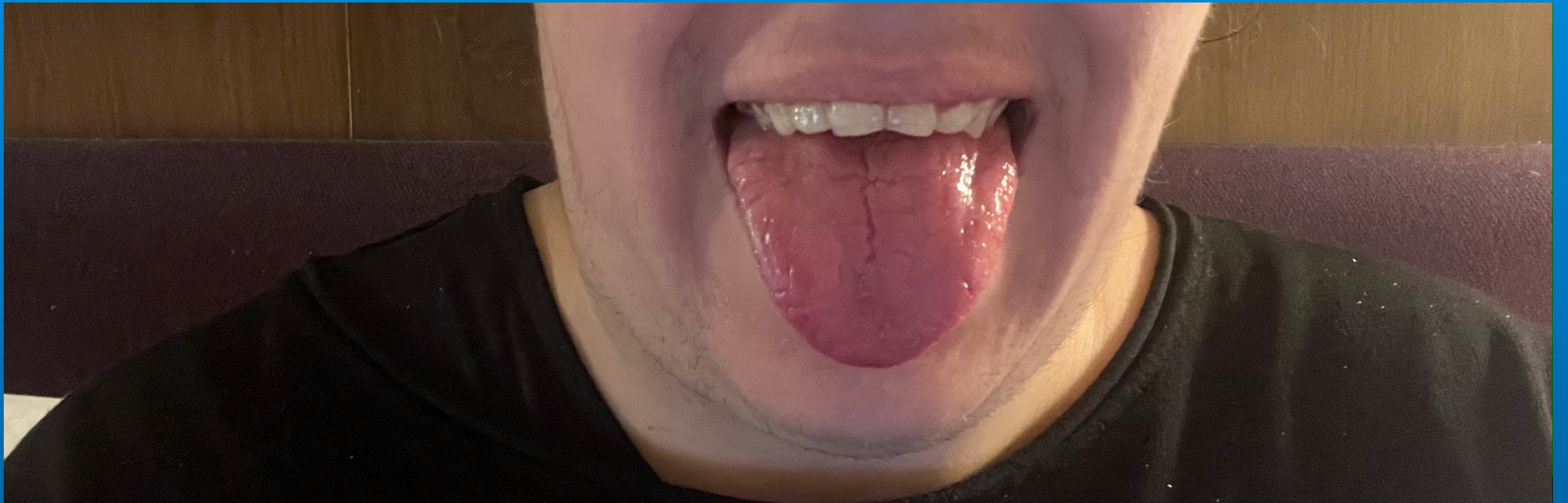
ROUND 1: No intervention

ROUND 2: Placing a /j/ consonant in front of the vowel

ROUND 3: Sticking out the tongue

Hypothesis 2

ROUND 3: Sticking out the tongue



Hypothesis 2

ROUND 1: No intervention

ROUND 2: Placing a /j/ consonant in front of the vowel

ROUND 3: Sticking out the tongue

ROUND 4: Holding a straw

Hypothesis 2

ROUND 4: Holding a straw



Hypothesis 2

ROUND 1: No intervention

ROUND 2: Placing a /j/ consonant in front of the vowel

ROUND 3: Sticking out the tongue

ROUND 4: Holding a straw

ROUND 5: Explanation about the optimal tongue position

HYPOTHESIS 2 - CONCLUSION

Effective exercises for the correct tongue-placement in belting (high tongue) will show a change in the second formant.

Effective exercises indeed show a change in the second formant, usually showing the formant tuning strategy of the first formant/second harmonic.

The feedback and experience from the participants are not always reflected in the quantitative data: what they are physically doing is not always the same as what they think they are doing.

With an exception of the final intervention, there is no strategy that fits all participants, but here it should be said that the participants are familiar with this teaching style.

CONCLUSION

- * Although the amount of research around the topic of belting has been increasing rapidly, there is still a long way to go to get a thorough understanding of this voice quality. With more Chinese students that aspire a career in Musical Theatre, it is important that factors such as language development and tongue positions in their native language, are being examined to help them live up to their full potential.
- * The participants in this research seemed to use different strategies for belting, but pre-dominantly a first formant/second harmonic strategy for all vowels. The vowels /a/ and /e/ were the preferred vowels for belt quality in this research, which doesn't differ from earlier studies with Western participants, while the sustained /ε/ vowel was perceived as the most difficult vowel. During the observations of the vowel /ε/, the phenomenon of the curled up tongue, that is often prevalent in beginning Chinese musical theatre students, was observed.
- * Looking at effective exercises to reduce tongue tension, it can be concluded that certain exercises work for certain individuals, but not for others. In any case, these exercises increased the participants' awareness of the importance of tongue positions in sound production. It was shown that a slight modification of an element in the vocal tract could have a significant impact on voice quality.

LITERATURE LIST

Bourne, T. and Garnier, M. (2012) 'Physiological and acoustic characteristics of the female music theater voice', Journal of the Acoustical Society of America, 131 (2), pp.1586-1594.

Bozeman, K. (2013) Practical Vocal Acoustics Pedagogic Applications. 1st Ed. Hillsdale: Pendragon Press.

Greschner, D. (2021) 'Singing in Mandarin Chinese', Journal of Singing, 78(1), pp. 135-139.

Kayes, G. (2013) Singing and the Actor, 2nd Ed. Bloomsbury Methuen Drama.

Klimek, M., Obert, K. and Steinhauer, K. (2005). Estill voice training system. Level two, Figure combinations for six voice qualities: workbook, Pittsburgh: Estill Voice Training Systems International.

Lee, W. and Zee, E. (2003) 'Standard Chinese (Beijing)', Journal of the International Phonetic Association, 33(1), pp. 109-112.

Li, C. (2018) Diction for Mandarin/Chinese singers: a methodology to achieve resonant tone and vowel unification in Western Choral Music, Graduate Thesis, University of South Carolina, Ann Arbor: ProQuest LLC.

Lim, H. (2013) The perceptions of Voice Teachers regarding English pronunciation difficulty among native Chinese, Japanese and Korean students. Unpublished Graduate Thesis. Ballstate University, Indiana.

Lovetri, J., Lesh, S. And Woo, P. (1999) 'Preliminary Study on the Ability of Trained Singers to Control the Intrinsic and Extrinsic Laryngeal Musculature', Journal of Voice, 13(2), pp. 219-226.

Nair, A. (2021) The Tongue as a gateway to Voice, Resonance, Style, and Intelligibility. 1st Ed. San Diego: Plural Publishing Inc.

LITERATURE LIST

- Odinye, S. (2015) 'Phonology of Mandarin Chinese: A comparison of Pinyin and IPA', Quarterly Journal of Chinese Studies, 4(2), pp. 51-58.
- Steinhauer, K., McDonald Klimek, M. and Estill, J. (2017) The Estill Voice Model, Theory and Translation. Pittsburgh Pennsylvania, Estill Voice International.
- Titze, I. (2016) 'The Case of the Missing or Depressed Fundamental: Belting and Trumpeting', Journal of Singing, 73(1), pp. 53–54.
- Unluer, S. (2012) 'Being an Insider Researcher While Conducting Case Study Research', The Qualitative Report, 17(58), pp. 1-14
- Wang, W. (2016) Chinese Linguistics. In: Sin-wai, C (Eds) The Routledge Encyclopaedia of Chinese Language, 1st Ed, Oxon: Routledge, pp. 174-183
- Zhao, R. (2019) How does the pronunciation of native languages affect beginning singers? A research focusing on native Mandarin Chinese and American English speaking singers, Unpublished Graduate Thesis. <https://researchrepository.wvu.edu/etd/3857>