Phonetic Interference of L3 Japanese on L2 English Word-Initial Stop Production in Mandarin Trilinguals

PRESENTER
Min **Zeng**
zengmin@fuji.waseda.jp

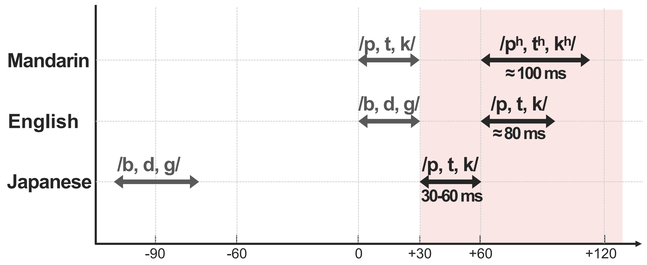
SUPERVISOR
Tetsuo **Harada**

Mandarin trilinguals learning L3 **Japanese produce** L2 **English /p, t, k/** with **VOT values** that **fall between** those by **Japanese** and **Mandarin bilinguals.**

MT = Mandarin trilinguals
JB = Japanese bilinguals
MB = Mandarin bilinguals

Background

A hierarchy in the Voice Onset Time (VOT) of word-initial voiceless stops: Mandarin > English > Japanese



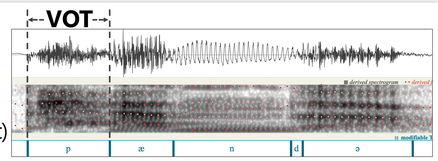
Few studies have been done on phonetic interference of the **L3** on the production and perception of the **L2**

Methods

ZH ENG JPN	JPN ENG	ZH ENG
#MT=31	#JB=34	#MB=26
ENG ≥ intermediate	ENG ≤ intermediate	ENG ≤ intermediate
JPN=advanced, LOR=3.71 years		

Word elicitation: **a brief definition** with **a picture**
"The target word is __."

1 **Waveform**
2 **Spectrogram**
3 **F2** (unclear burst)

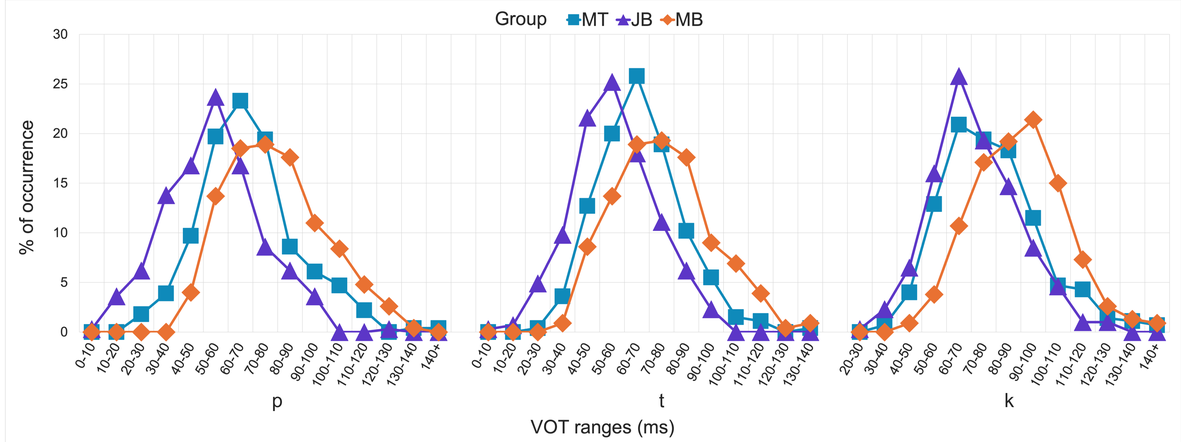


- **A Linear Mixed Model**
  - **2442 valid tokens** (dependent variable)
  - Fixed factor: **Group**
  - Random intercepts: Participant and Stimulus

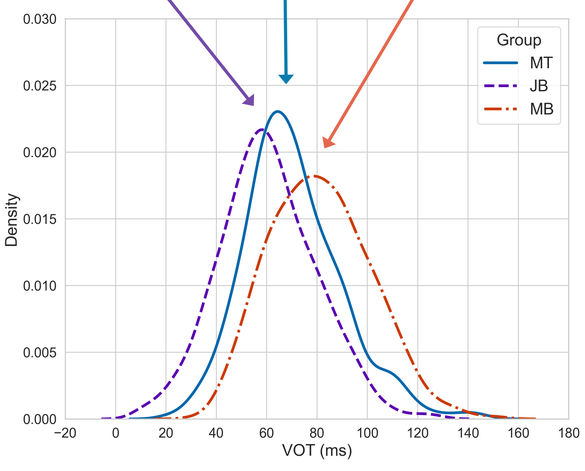
Results

RQ. How do **Mandarin trilinguals**, who are advanced in their L3 Japanese, produce English word-initial voiceless stops?

1 VOT distributions of each stop revealed a hierarchy in VOT ranges: JB < MT < MB

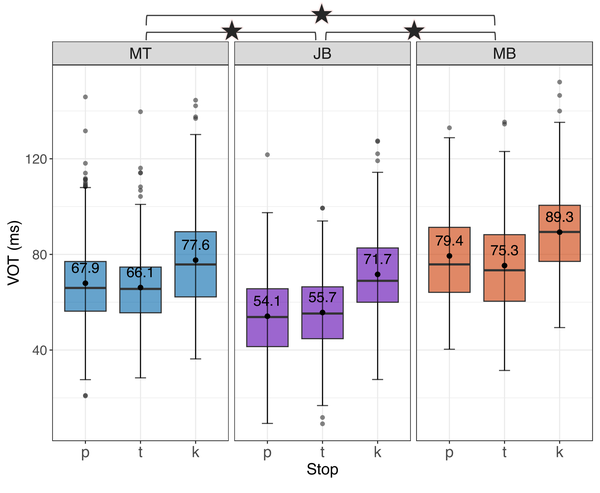


2 Overall VOT distributions showed different regions of concentration: JB ≈ 60 < MT ≈ 70 < MB ≈ 80 (ms)



3 Significant difference among 3 groups' mean VOT values: JB < MT < MB

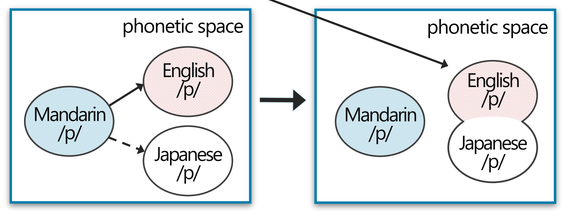
Group ($\chi2(2) = 31.9, p < 0.001$) ($\eta2 = 0.16$) ★ = significant *p* value



Distribution patterns: **MT** and **JB** showed distinctive peaks ***vs.*** **MB** showed a flatter-topped distribution

Discussion

1 Mandarin trilinguals formed a composite L2-L3 phonetic category (SLM-r)



2 Divergence from native norms

Japanese bilinguals exhibited longer VOT values than those observed in Japanese L1 production.

Mandarin bilinguals produced English /p, t, k/ in a native-English-like manner (≈ 80 ms).

Conclusion

Mandarin trilinguals' production of L2 English word-initial voiceless **stops exhibited interference** from the **phonetic systems** of **L1 Mandarin** and **L3 Japanese.**

References

Ding, H., Zhan, Y., Liao, S., & Yuan, J. (2018). Production of English stops by Mandarin Chinese learners. *Proceedings 9th international conference on speech prosody*, 888–892. (p. 889)

Feng, Q., & Busà, M. G. (2023). Acquiring Italian stop consonants: A challenge for Mandarin Chinese-speaking learners. *Second Language Research*, *39*(3), 759–783. (p. 772)

Flege, J. E., Aoyama, K., & Bohn, O.-S. (2021). The revised speech learning model (SLM-r) applied. In R. Wayland (Ed.), *Second language speech learning: Theoretical and empirical progress* (pp. 84–118). Cambridge University Press. (pp. 85-86)

Flege, J. E., & Bohn, O.-S. (2021). The revised speech learning model (SLM-r). In R. Wayland (Ed.), *Second language speech learning: Theoretical and empirical progress* (pp. 3–83). Cambridge University Press. (pp. 40-41, 64)

Harada, T. (2007). The production of voice onset time (VOT) by English-speaking children in a Japanese immersion program. *International Review of Applied Linguistics in Language Teaching*, *45*(4), 353–378. (p. 372)

Liu, J., & Lin, J. (2021). A cross-linguistic study of L3 phonological acquisition of stop contrasts. *SAGE Open*, *11*(1), 1–15. (p. 11)

Riney, T. J., Takagi, N., Ota, K., & Uchida, Y. (2007). The intermediate degree of VOT in Japanese initial voiceless stops. *Journal of Phonetics*, *35*(3), 439–443. (p. 439)

Yang, J. (2021). Comparison of VOTs in Mandarin–English bilingual children and corresponding monolingual children and adults. *Second Language Research*, *37*(1), 3–26. (p. 20)

- **Supplementary information**
  - **2442 valid tokens** = (91 participants * 9 words * 3 repetitions) - 15 unmeasurable tokens
  - **Post-hoc results**

Group	Estimate	SE	df	*t* ratio	*p* value
MT vs. JB	0.493	0.167	88	2.957	0.012*
MT vs. MB	-0.492	0.178	88	-2.757	0.021*
JB vs. MB	-0.985	0.175	88	-5.633	< 0.001*