

Effect of Orthography on L2 Production of Mandarin Tones

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Introduction

L2 production of tones has been widely discussed; however, the role of orthography in the learning process has received little attention.

- e.g. Alphabetic writing systems (correspondence between letter and phoneme): facilitate L2 pronunciation [1]

Orthographies in Mandarin and Cantonese:

Chinese character	Shared by Mandarin and Cantonese	represent meaning directly but provide few cues for pronunciation	馬 (/ma/ with a falling-rising tone; 'horse')
Pinyin	Mandarin only	represent Mandarin pronunciation	mǎ (/ma/ with a falling-rising tone; 'horse')

Tone information is transparent in Pinyin but opaque in Chinese character.

Tones in Mandarin and Cantonese:

(pitch values on a 5-point scale from low (=1) to high (=5))

	Mandarin		Cantonese	
T1	55 (mā)	High-level	55	High-level
T2	35 (má)	Mid-rising	25	High-rising
T3	214 (mǎ)	Falling-rising	33	Mid-level
T4	51 (mà)	High-falling	21	Low-falling
T5	--	----	23	Low-rising
T6	--	----	22	Low-level

Tonal correspondence between Mandarin and Cantonese:

Cantonese Tone	Mandarin Tone	%Correspondence
T1[55]	T1[55]	93%
T2[25]	T3[214]	89%
T3[33]	T4[51]	91%
T4[21]	T2[35]	93%
T5[23]	T3[214]	76%
T6[22]	T4[51]	94%

The shared orthography (Chinese characters) may activate the L1 phonological representations for Cantonese learners of Mandarin. [3]

Research Questions

- Would Pinyin and characters affect L2 production differently?
- Would L2 proficiency interact with the effects of Pinyin and character?

Method

Subjects

- 11 native speakers of Hong Kong Cantonese; learn Mandarin since primary school; Varying amount of Mandarin exposures.
- 2 proficiency groups (based on the accuracy score in the parallel perception study with around 40 subjects [4]):
 - 8 high proficiency (averaged accuracy 97.9%)
 - 3 low proficiency (averaged accuracy 88.5%)

Procedures

- The stimuli were presented to the subjects on paper
- Pinyin tasks come before the Chinese character tasks
- Three repetitions recorded with no carrier phrase
- Two native Mandarin speaker as transcribers
- Speech rate calculated to confirm the proficiency difference (syllable/second) (3 highest proficiency vs. 3 lowest proficiency)

Materials

Pinyin tasks:

- 8 monosyllabic tokens (2 monosyllables × 4 tones);
- 96 disyllabic tokens (4 possible tones for first syllable × 4 possible tones for second syllable × 6 items)

Chinese character tasks:

- 34 monosyllabic tokens (10 T1 + 6 T2 + 8 T3 + 10 T4)
- 96 disyllabic words (4 possible tones for first syllable × 4 possible tones for second syllable × 6 items)

	High proficiency	Low proficiency
Character	2.19	1.89
Pinyin	1.91	1.76

Results

1. Overall error rates

Subjects	Pinyin task	Chinese character task
H	4.4%	3.9%
L	26.9%	9.4%

H: High proficiency; L: Low proficiency

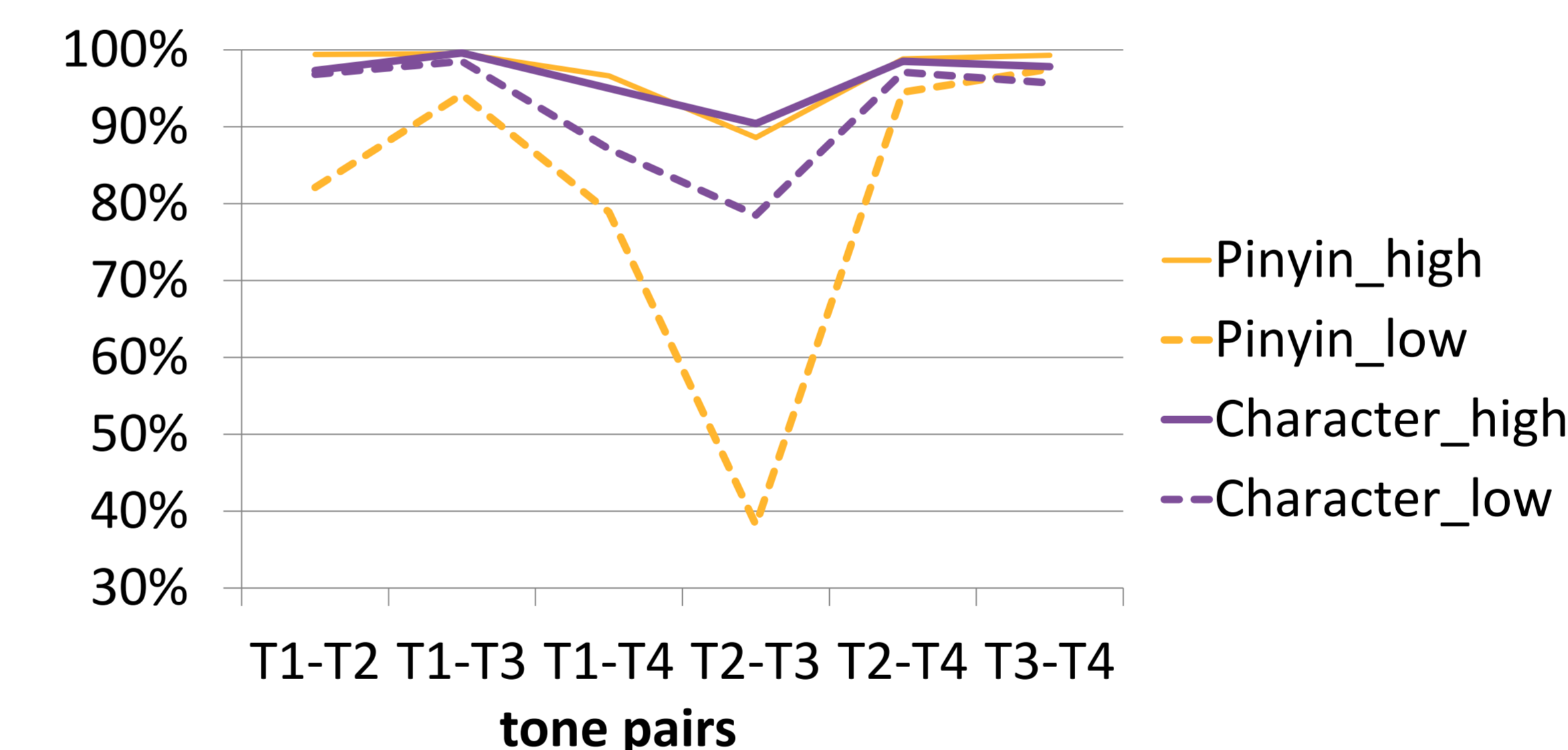
Subjects with low proficiency make more errors than subjects with high proficiency in both tasks [p<0.001].

T2-T3 is the most confusable tone pair, followed by T1-T4.

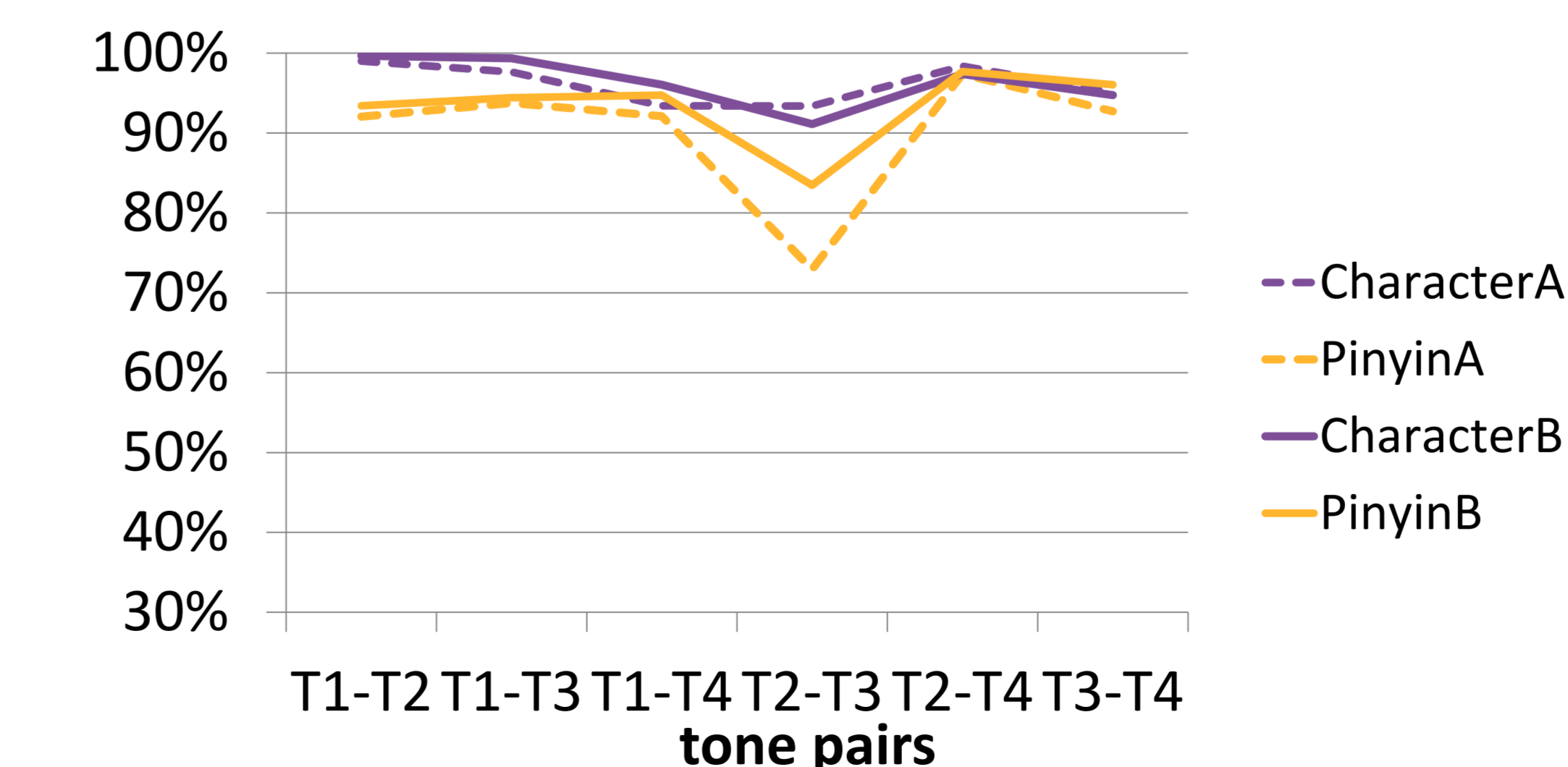
Orthography had a significant effect [p<0.05] on the error rates depending on the proficiency of the subjects.

Low Proficiency: Character > Pinyin
High Proficiency: Character ≈ Pinyin

2. Tonal error pattern in both tasks (accuracy rate)



3. Accuracy rate in our perception study [4]



Discussions

- Orthography effect found in subjects with low L2 proficiency: benefit from L1 phonology due to high tonal correspondence [5]
- Comparable effect in high proficiency group: no need to rely on L1 phonology
- Another possibility: Unfamiliarity with Pinyin causes more errors in Pinyin than character tasks. Further study can compare Guangzhou Cantonese speakers with better Pinyin proficiency.
- Most confusable tone pairs: T2-T3: corroborate previous studies on different L1 backgrounds
T1-T4: Cantonese allotone T1 [55] vs [51] [6]
- Similar patterns found in both perception and production tasks

References

- [1] Young-Scholten, M. and Archibald, J., "Second language syllable structure", in J. Archibald [Ed], Second Language Acquisition and Linguistic Theory, 64-97, Blackwell, 2000. [2] Zhang, L., & Gao, S. "Putonghua zi yin ren ji xun lian 12 jiang", [12 Lecture series of the recognition and memorization of Mandarin pronunciation]. Joint Publishing Co. Ltd. 2000. [3] Chu, P. C. K. "Towards a Model of Second Language Word Production and Recognition in Mandarin". Proceedings of the International Conference on Chinese Language Learning and Teaching in the Digital Age, Hong Kong, China, 2011. [4] Xu, R. B., Li, J., and Mok P. P. K. "The Effect of Orthography on L2 Perception", submitted to The 4th International Symposium on Tonal Aspects of Languages, 2014. [5] Kroll, J.F., Stewart, E. "Category interference in translation and picture naming: Evidence for asymmetric connections between bilingual memory representations." Journal of Memory and Language. 1994;33:149-174. [6] Matthews, S., and Yip, V., Cantonese: a comprehensive grammar, 1994.