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How Cantonese listeners process Mandarin tones: Implications for the L2 phonological lexicon

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Interlanguage speech intelligibility effect (Hayes-Harb et al. 2008)

Interlanguage speech intelligibility effect for the listener (ISIB-Listener)

Non-native listeners are better than **native listeners** in understanding **accented speech**

e.g. Cantonese accented English 'give' /giv/ → /gif/

Interlanguage speech intelligibility effect for the talker (ISIB-Talker)

Non-native listeners are better in understanding **accented speech** than **native speech**

e.g. /bed/ vs. /bet/


Pronunciation relationships between Cantonese and Mandarin words

- There are many homophones in Cantonese and Mandarin

Character / meaning	聲 'sound'	星 'star'	尾 'tail'	美 'beauty'
Cantonese pronunciation	/sing/		/mei/	
Mandarin pronunciation	/sheng/	/xing/	/wei/	/mei/

- 'sound' 聲音
 - Mandarin: /shengyin/ → /xingyin/ (i.e., nonword 星音)
- 'tail' 尾巴
 - Mandarin: /weiba/ → /meiba/ (i.e., nonword 美巴)

Recognition and Production of Mandarin words by Cantonese and Mandarin speakers (Chu & Taft, 2010)

- Disyllabic word transcription task
 - Recognition of mispronounced Mandarin words with Cantonese-accented characteristics (e.g., *xingyin* 'sound' 聲音)
 - Cantonese listeners > Mandarin listeners
 - Interlanguage speech interlanguage benefit for the listener (Hayes-Harb et al., 2008)
- With increasing L2 Mandarin phonological proficiency, Cantonese learners' ability to recognize words from
 - the correctly Mandarin pronunciation **improved**.
 - the mispronounced version **did not deteriorate**. 

Mandarin-Cantonese pronunciation correspondences

(Zhang & Gao, 2000)

Mandarin onset /m/ (163 words)

Cantonese onset	Number of words	Percentage	Example	Mandarin / Cantonese pronunciation
m	160	98%	美 'beauty'	<i>mei3</i> / <i>mei5</i>
others	3	2%		

Mandarin onset /w/ (129 words)

Cantonese onset	Number of words	Percentage	Example	Mandarin / Cantonese pronunciation
w	63	49%	烏 'black'	<i>wu1</i> / <i>wu1</i>
m	33	26%	尾 'tail'	<i>wei3</i> / <i>mei5</i>
others	33	26%		

Mandarin rime /ei/ (73 words)

Cantonese rime	Number of words	Percentage	Example	Mandarin / Cantonese pronunciation
ui	25	34%	杯 'cup'	<i>bei1</i> / <i>bui1</i>
ei	22	30%	美 'beauty'	<i>mei3</i> / <i>mei5</i>
others	26	34%		

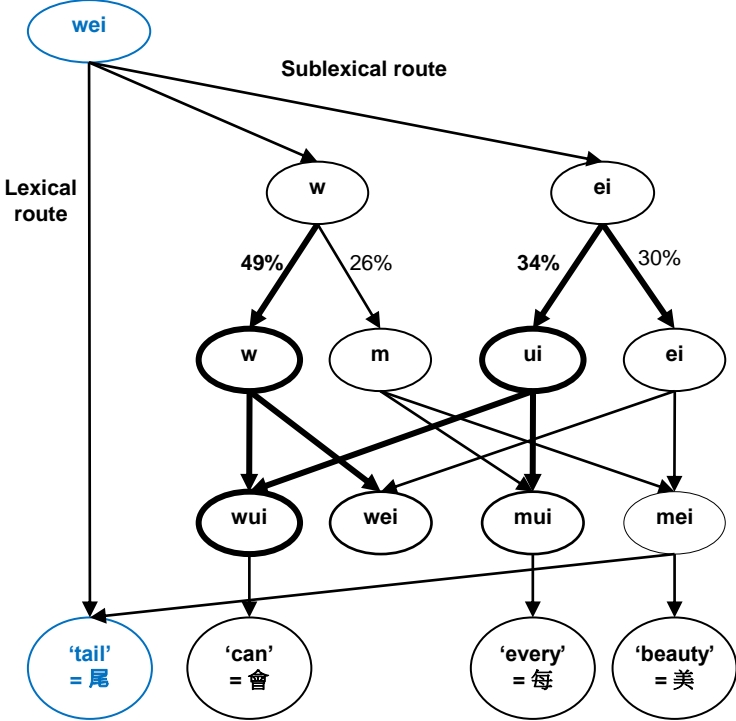
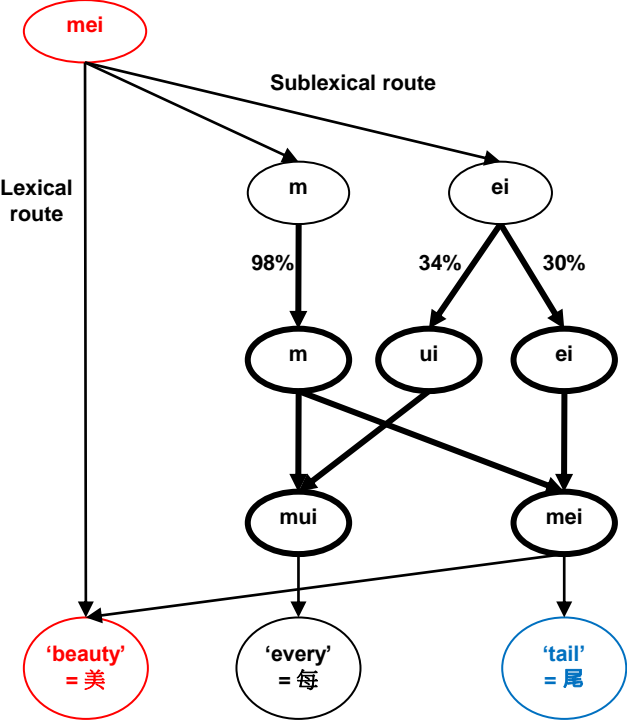
Dual route L2 Mandarin word recognition model

(Chu & Taft, 2010)

Mispronounced
 尾巴 'tail' *weiba* → *meiba*

Correct
 尾巴 'tail' *weiba*

L2 Mandarin phonological representation
 L2 Mandarin sublexical representation
 L1 Cantonese sublexical representation
 L1 Cantonese phonological representation
 Concepts



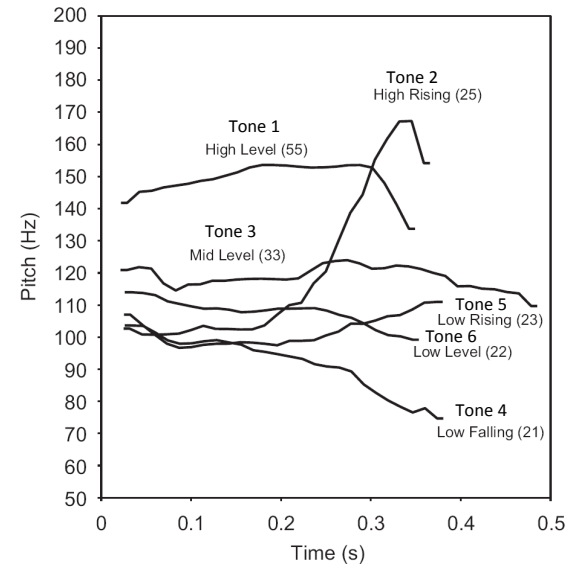
Aim of the study

- Examine whether Cantonese listeners are better than Mandarin listeners in understanding Mandarin tone mispronounced words that show the characteristics of Cantonese accent
- Incorporate the tone component in the L2 Mandarin word recognition model to explain for the findings

Tonal system in Cantonese and Mandarin

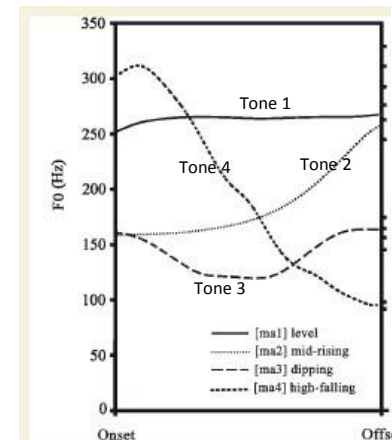
Cantonese tonal system

Cantonese Tones	Pitch	Examples	Meaning
1	high level	詩 /si1/	'poem'
2	high rising	史 /si2/	'history'
3	mid level	試 /si3/	'try'
4	low falling	時 /si4/	'time'
5	low rising	市 /si5/	'city'
6	mid-low level	是 /si6/	'yes'



Mandarin tonal system

Mandarin Tones	Pitch	Examples	Meaning
1	level	媽 /ma1/	'mother'
2	rising	麻 /ma2/	'hemp'
3	dipping	馬 /ma3/	'horse'
4	falling	罵 /ma4/	'blame'



Cantonese-Mandarin tone pronunciation correspondences (Zhang & Gao, 2000)

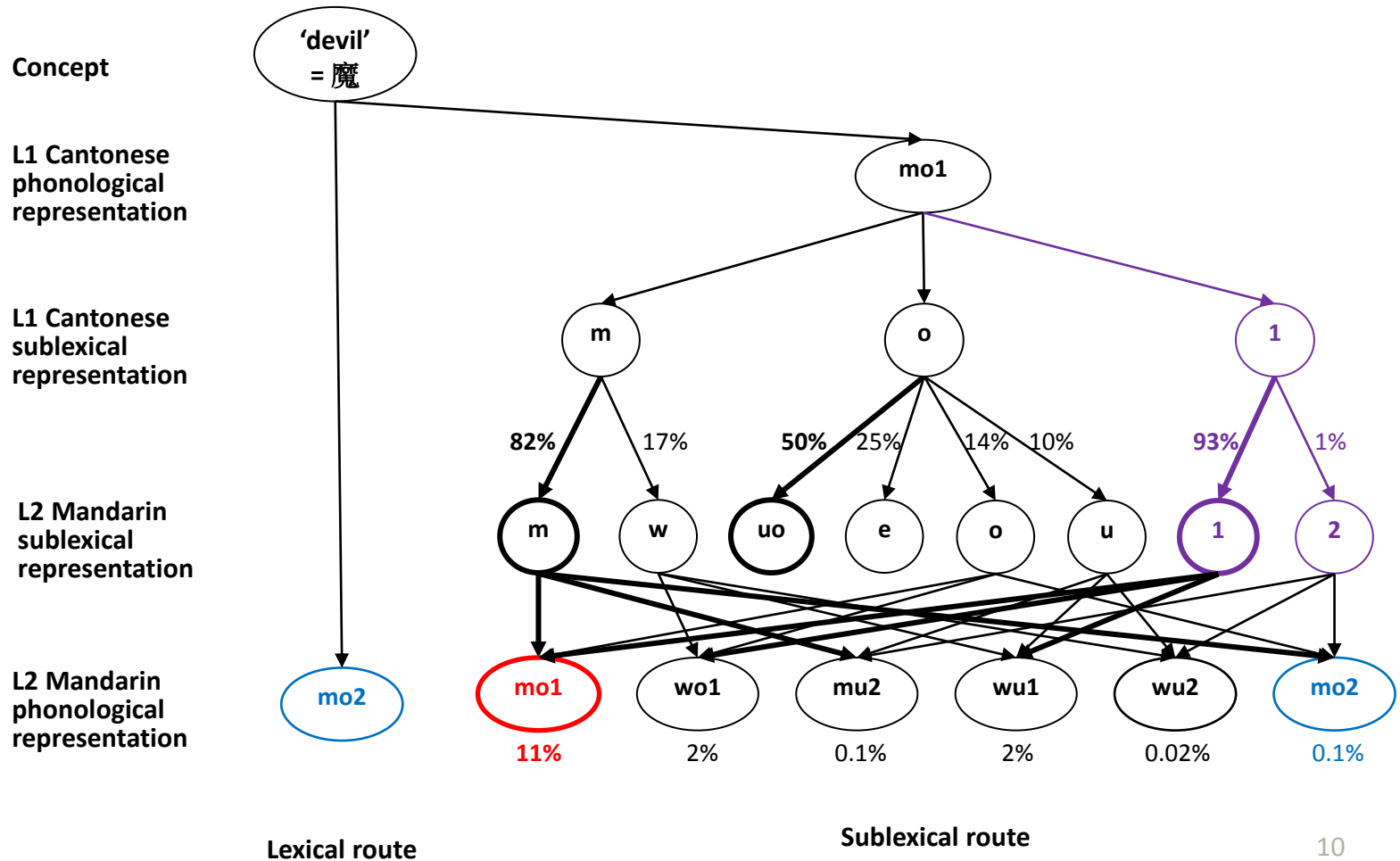
Cantonese tone 1 (1012 words)

Mandarin tone	Number of words	Percentage	Example	Cantonese / Mandarin pronunciation
1	787	93%	邀 'invite'	<i>jiu1 / yao1</i>
2	23	3%	魔 'devil'	<i>mo1 / mo2</i>
4	21	2%	框 'frame'	<i>kwaang1 / kuang4</i>
3	11	2%	禧 'happiness'	<i>hei1 / xi3</i>
neutral	4	1%	麼 'interrogative final particle'	<i>biu2 / mo2</i>

魔 'devil' Cantonese: *mo1* Mandarin: *mo2* → *mo1*

Dual Route L2 Mandarin word production model

魔 'devil' Cantonese: *mo1* Mandarin: *mo2* → *mo1*



Mandarin-Cantonese tone pronunciation correspondences

(Zhang & Gao, 2000)

Mandarin **tone 1** (1012 words)

Cantonese tone	Number of words	Percentage	Example	Mandarin / Cantonese pronunciation
1	787	78%	媽 'mother'	<i>ma₁ / maa₁</i>
8	69	7%	插 'insert'	<i>cha₁ / caap₈</i>
7	58	6%	黑 'black'	<i>hei₁ / hak₇</i>
others	98	9%		

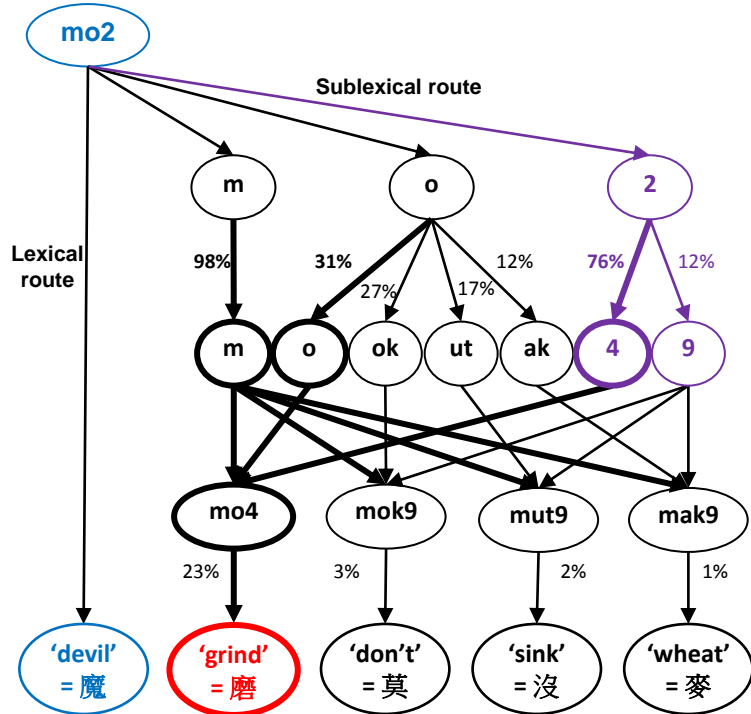
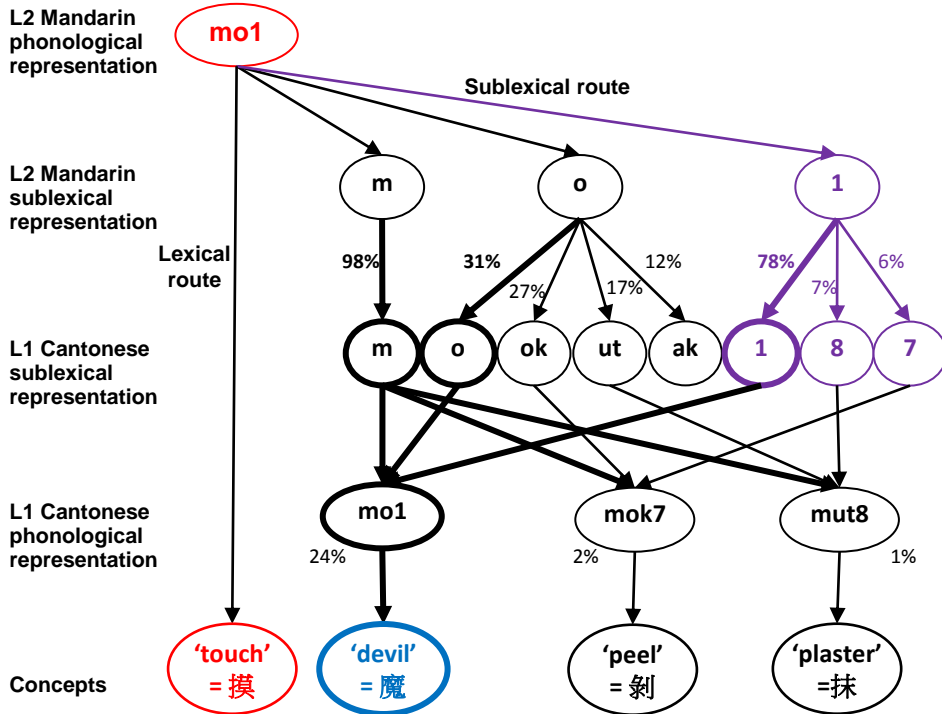
Mandarin **tone 2** (965 words)

Cantonese tone	Number of words	Percentage	Example	Mandarin / Cantonese pronunciation
4	736	76%	磨 'grind'	<i>mo₂ / mo₄</i>
9	115	12%	習 'learn'	<i>xi₂ / zaap₉</i>
others	114	12%		

Dual Route L2 Mandarin word recognition model

Mispronounced
 魔鬼 'devil' *mo2gui3* → *mo1gui3*

Correct
 魔鬼 'devil' *mo2gui3*



Experiment

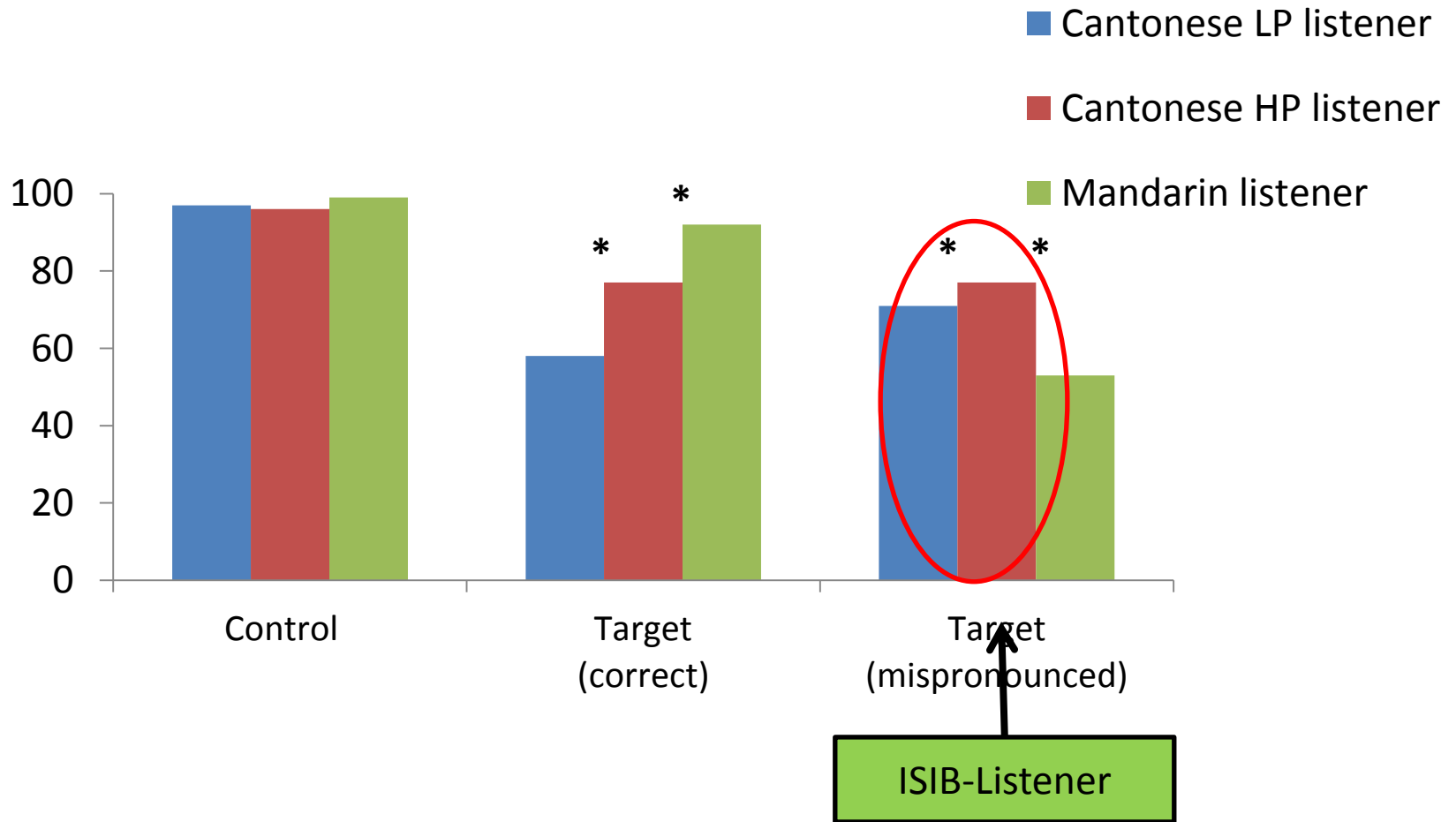
- Task
 - Disyllabic word transcription task
- Materials

Word type	Examples	Cantonese pronunciations	Mandarin pronunciations
Control	邀請 'invite'	<i>jiu1cing2</i>	<i>yao1qing3</i>
Target (correct)	魔鬼 'devil'	<i>mo1gwai2</i>	<i>mo2gui3</i>
Target (mispronounced)	摸鬼 (nonword)	<i>mo1gwai2</i>	<i>mo1gui3</i>

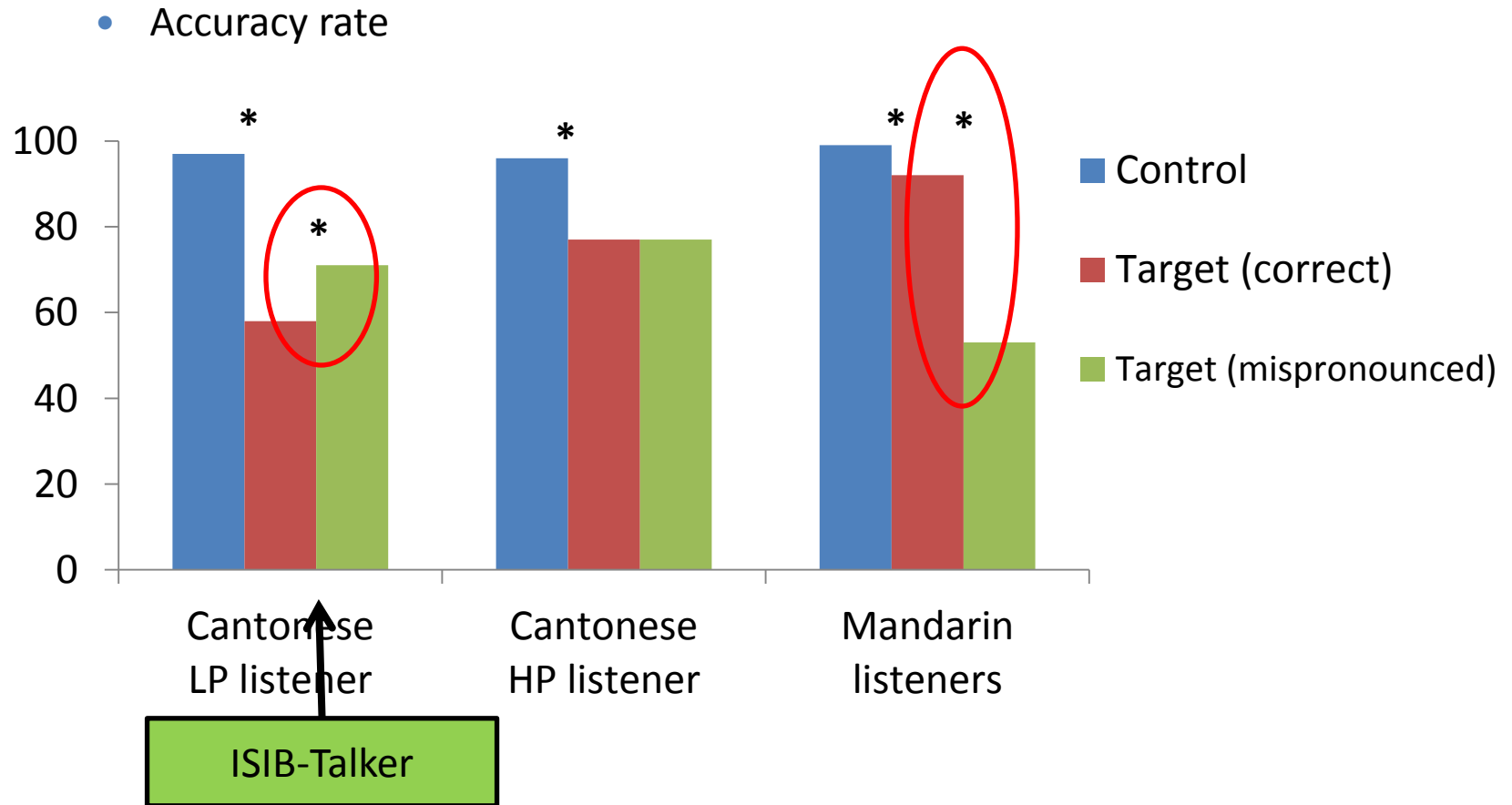
- Dependent variables
 - Accuracy rate
- Participants
 - 30 Cantonese speakers and 20 Mandarin speakers

Result (comparing different listeners)

- Accuracy rate

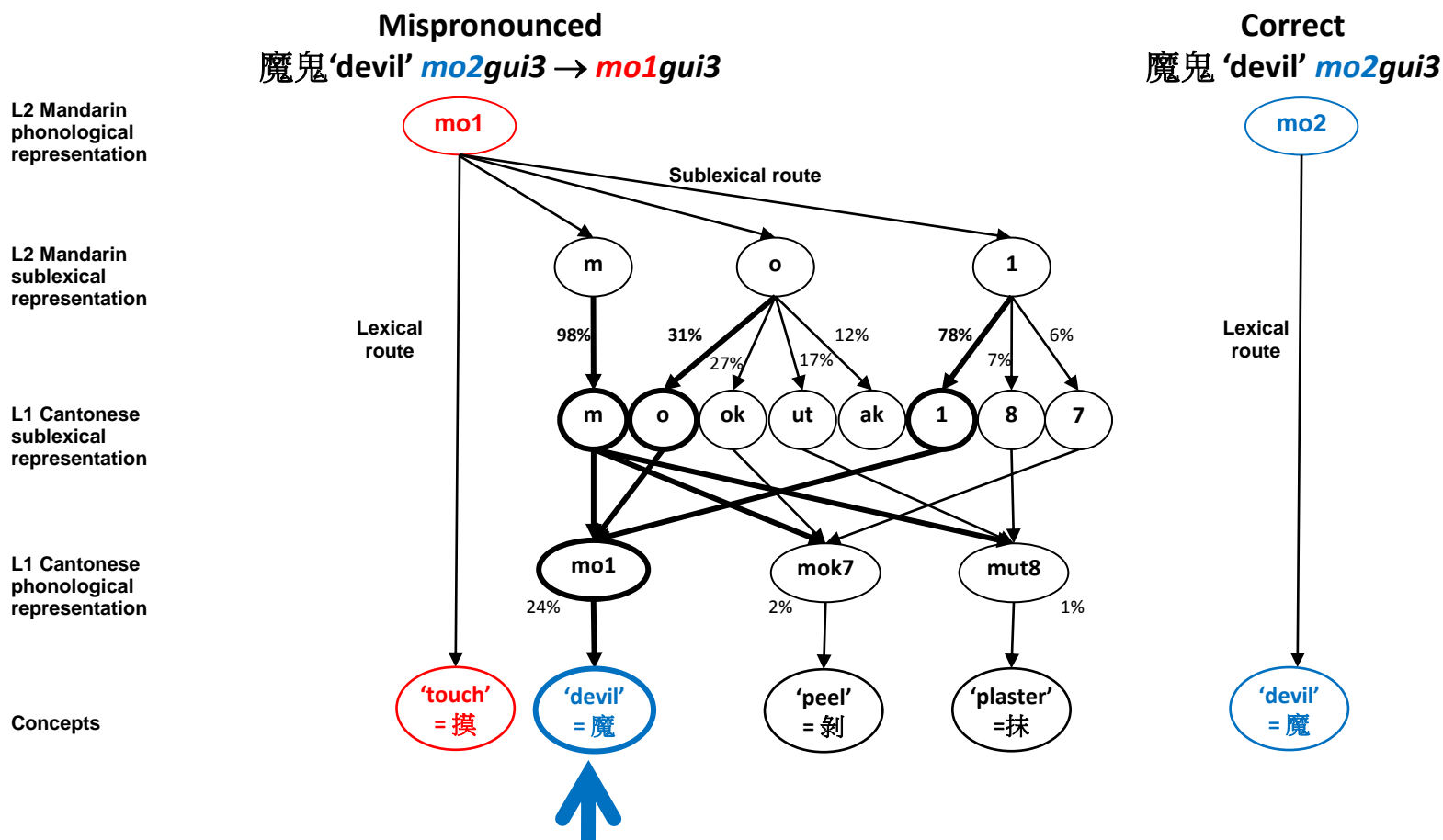


Result (comparing different word types)



Dual Route L2 Mandarin word recognition model

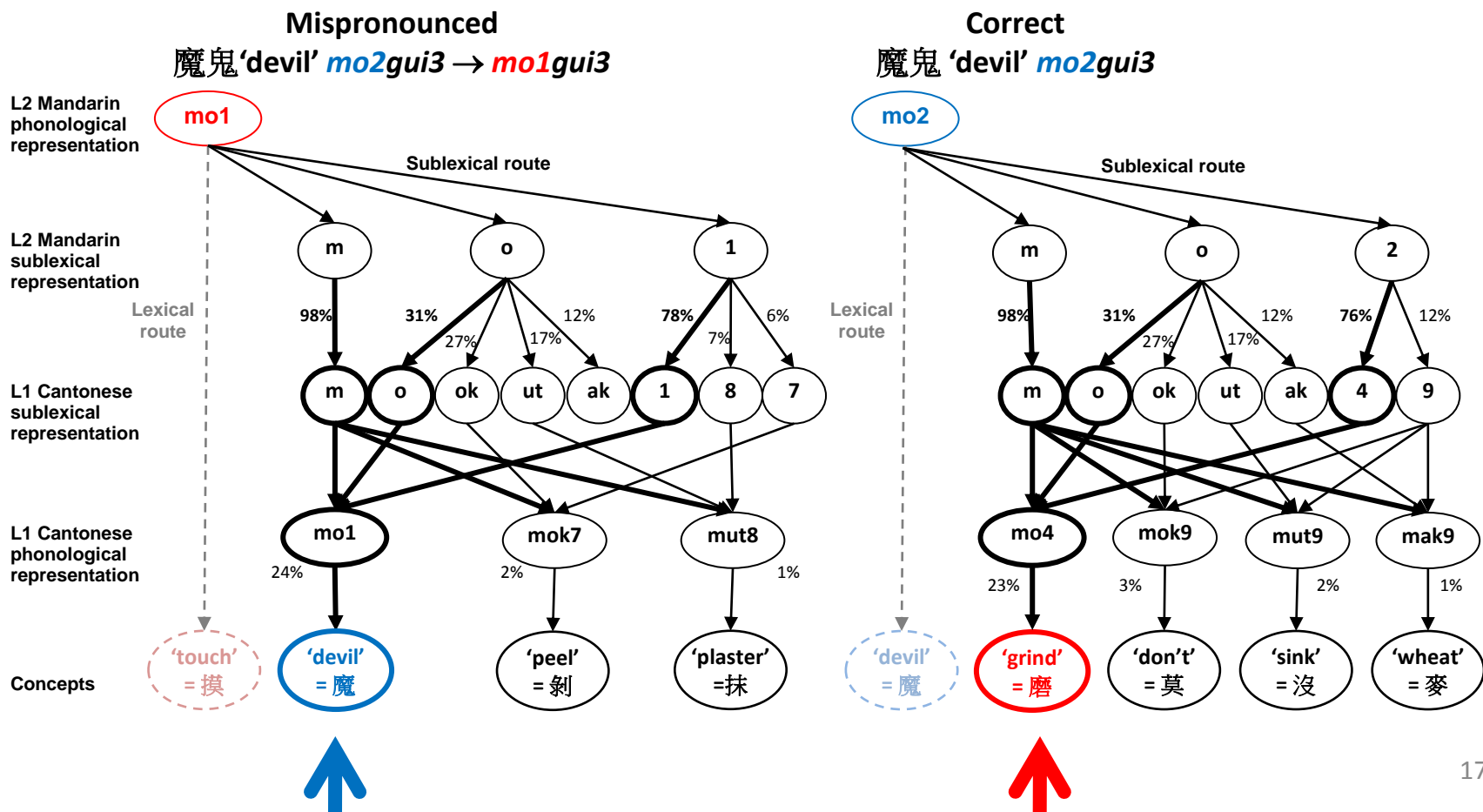
- Cantonese listeners (both HP and LP) understood Mandarin tone mispronounced words (with Cantonese characteristics) better than Mandarin listeners
 - Evidence for ISIB-Listener at the prosodic level (i.e., tone) through L1 lexical transfer



Dual Route L2 Mandarin word recognition model

- Cantonese **Low Proficiency** listeners understood Mandarin **mispronounced** words better than those that are **correctly** pronounced.

→ Evidence for ISIB-Talker effect



Dual Route L2 Mandarin word recognition model

- With increasing L2 Mandarin phonological proficiency, Cantonese learners' ability to recognize words from the correctly Mandarin pronunciation **improved**.
- However, their ability to recognize the mispronounced version **did not deteriorate**.

