

Appendix 1
The subject information of the TM monolinguals

受試者代號 name/ subject	性 別 gen der	年齡 age	出生地 pl/ birth	成長地 ¹ pl/schooling, education	現居地 residence	母語 mother tongue	最常使用的 語言 lang. spoken most frequently	平時國台 語比例 ratio of TM & Tw	父/母出生地 birth place of father/ mother	父親最常用的 語言 lang. frequently spoken:father	母親最常用的 語言 lang. frequently spoken:mother
M_F_Zhu	F	25	Taipei	Taipei	Taipei	TM	TM	10:0	高雄/廣 Kaohsiung/Guangzhou	TM	TM
M_F_Jiang	F	24	Taipei	Taipei	Taipei	TM	TM	9:1	台北/台北 Taipei/ Taipei	TM, Tw	TM
M_F_Cbeta	F	25	Miaoli	Taipei	Taipei	TM	TM	10:0	苗栗/苗栗 Miaoli/ Miaoli	TM	TM
M_F_Chua	F	25	Taoyuan	Jungli, Taipei	Taipei	TM	TM	9:1	桃園/苗栗 Taoyuan/ Miaoli	TM	TM
M_F_naho	F	25	Kaohsiung	Kaohsiung, TPE	Taipei	TM	TM	9:1	高雄/澎湖 Kaohsiung/ Penghu	TM	TM
M_F_Ji	F	23	U.S.A	Taipei	Taipei	TM	TM	10:0	重慶/山東 Chongqing/Shandong	TM	TM
M_M_Sky	M	25	Taipei	Taipei	Taipei	TM	TM	9:1	大陸/台北 Mainland/ Taipei	TM	TM
M_M_Peng	M	25	Taipei	Taipei	Taipei	TM	TM	10:0	花蓮/台中 Hualien/ Taichung	TM	TM
M_M_Justin	M	26	Taipei	Taipei	Taipei	TM	TM	9:1	江蘇/花蓮 Jiangsu/ Hualien	TM	TM
M_M_Gao	M	22	Taipei	Taipei	Taipei	TM	TM	9.5:0.5	高雄/新竹 Kaohsiung/ Hsinchu	TM	TM
M_M_Tong	M	25	Taipei	Taipei	Taipei	TM	TM	10:0	台北/台北 Taipei/ Taipei	TM	TM
M_M_Zhang	M	27	Tainan	south:22,north: 5	Taipei	TM	TM	9:1	高雄/新竹 Kaohsiung/Hsinchu	TM	TM

¹ The places of schooling and education were interviewed by the researcher but not listed in the questionnaire because the subjects have various situations which make a unified questionnaire hard to design.

Appendix 2
The subject information of the Tw-TM bilinguals

受試者代號 name/ subject	性別 gender	年齡 age	出生地 pl/ birth	成長地 pl/ schooling, education	現居地 residence	母語 mother tongue	最常使用的 語言 lang. spoken most frequently	平時國台 語比例 ratio of TM & Tw	父/母出生地 birth place of father/ mother	父親最常用的 語言 lang. frequently spoken:father	母親最常用的 語言 lang. frequently spoken:mother
B_F_Wanting	F	24	Taipei	Taipei	Taipei	Tw	TM, Tw	5:5	台北/台北 Taipei/Taipei	Tw	Tw
B_F_Jian	F	25	Taipei	Taipei	Taipei	Tw	TM	9:1	嘉義/台北 Chiayi/Taipei	Tw	Tw
B_F_Liwan	F	21	Taichung	Taichung	Taichung	Tw	Tw	2:8	雲林/台中 Yunlin/Taichung	TM	Tw
B_F_Landy	F	17	Taipei	Taichung	Taichung	TM	TM	8:2	台北/嘉義 Taipei /Chiayi	Tw	Tw
B_F_Circle	F	21	Chiayi	Chiayi, Taichung	Taichung	Tw	TM, Tw	5:5	嘉義/高雄 Chiayi/Kaohsiung	Tw	Tw
B_F_Lin	F	20	Kaohsiung	Kaohsiung, Taipei	Taipei	Tw	TM, Tw	5:5	高雄/高雄 Kaohsiung/ Kaohsiung	Tw	Tw
B_M_Wenyi	M	24	Chiayi	Taipei	Taipei	Tw	TM	6:4	嘉義/雲林 Chiayi/ Yunlin	Tw	Tw
B_M_Zeming	M	24	Taipei	Taipei	Taipei	TM, Tw	TM, Tw	5:5	宜蘭/宜蘭 Yilan/ Yilan	Tw	Tw
B_M_Chang	M	25	Taichung	Taichung	Taichung	Tw	TM	5:5	台中/台 Taichung/Taichung	Tw	Tw
B_M_Xie	M	25	Taichung	Taichung	Taichung	TM	TM	7:3	台中/台 Taichung/Taichung	TM, Tw	TM, Tw
B_M_Ade	M	24	Kaohsiung	Kaohsiung, Taichung	Taichung	Tw	TM	9:1	高雄/南投 Kaohsiung/ Nantou	Tw	Tw
B_M_Feng	M	24	Pingtung	Kaohsiung, Taichung	Taichung	Tw	TM	7:3	屏東/屏東 Pingtung/ Pingtung	Tw	Tw

Appendix 3

Examples of the materials on the PowerPoint

This is an example of the PowerPoint materials from Experiment 3. The first page of the PowerPoint is an Introductory to the experiment. The second page is a reminding page. Then come the three practice items and fillers, test items. Every 6 to 7 pages will have a short break reminding by the dog's pictures.

00:05 1	00:05 2	00:05 3	00:05 4	00:05 5	00:05 6
00:05 8	00:05 9	00:05 10	00:05 11	00:05 12	00:05 13
00:05 15	00:05 16	00:05 17	00:05 18	00:05 19	00:05 20
00:05 22	00:05 23	00:05 24	00:05 25	00:05 26	00:05 27

Appendix 4

The materials (T2 in isolated words) used in Experiment 1

Test Items		Fillers
IPA	Mandarin Character (T2)	Mandarin Characters
1. tu	毒 <i>du2</i> , 獨 <i>du2</i> , 讀 <i>du2</i>	督 <i>du1</i> , 賭 <i>du3</i> , 肚 <i>du4</i>
2. t ^h u	圖 <i>tu2</i> , 途 <i>tu2</i> , 徒 <i>tu2</i>	禿 <i>tu1</i> , 土 <i>tu3</i> , 兔 <i>tu4</i>
3. tɕi	級 <i>ji2</i> , 擊 <i>ji2</i> , 極 <i>ji2</i>	雞 <i>ji1</i> , 擠 <i>ji3</i> , 記 <i>ji4</i>
4. t ^h i	堤 <i>ti2</i> , 題 <i>ti2</i> , 提 <i>ti2</i>	踢 <i>ti1</i> , 體 <i>ti3</i> , 替 <i>ti4</i>
5. ta	達 <i>da2</i> , 答 <i>da2</i> , 達 <i>da2</i>	搭 <i>da1</i> , 打 <i>da3</i> , 大 <i>da4</i>
6. tɕ ^h a	查 <i>cha2</i> , 茶 <i>cha2</i> , 察 <i>cha2</i>	差 <i>cha1</i> 叉 <i>cha4</i>

Appendix 5

The materials (final T2 in disyllabic expressions) used in Experiment 2

Test Items							
T1T2	English Gloss	T2T2	English Gloss	T3T2	English Gloss	T4T2	English Gloss
班級 <i>ban1ji2</i>	class	河堤 <i>he2ti2</i>	riverbank	打擊 <i>da3ji2</i>	strike	問題 <i>wen4ti2</i>	question
專題 <i>zhan1ti2</i>	project	拳擊 <i>quan2ji2</i>	boxing	等級 <i>deng3ji2</i>	rank	話題 <i>huan4ti2</i>	topic
插圖 <i>cha1tu2</i>	illustration	年級 <i>nian2ji2</i>	grade	考題 <i>kao3ti2</i>	examination questions	目擊 <i>mu4ji2</i>	witness
師徒 <i>shi1tu2</i>	master and apprentice	前途 <i>qian2tu2,</i>	future	掃毒 <i>sao2du2</i>	anti-virus	病毒 <i>bing4du2</i>	virus
中途 <i>zhong1tu2</i>	halfway	沿途 <i>yan2tu2</i>	along the way	反毒 <i>fan3du2</i>	anti-drugs	地圖 <i>di4tu2</i>	map
孤獨 <i>gu1du2</i>	solitary	長途 <i>chang2tu2</i>	long-dista nce	警察 <i>jing3cha2</i>	police	問答 <i>wen4da2</i>	questions and answers
發達 <i>fa1da2</i>	prosper	回答 <i>hui2da2</i>	answer	奶茶 <i>nai3cha2</i>	milk tea	調查 <i>diao4cha2</i>	investigation
觀察 <i>guan1cha2</i>	observation	紅茶 <i>hong2cha2</i>	black tea	解答 <i>jie3da2</i>	solution	綠茶 <i>lu4cha2</i>	green tea

Appendix 5
(continued)

Fillers			
Tonal combination	Mandarin Characters	Pinyin	English Gloss
T1T1	新鮮 天空	<i>xin1xian1</i> <i>tian1kong1</i>	fresh sky
T1T3	優點 缺點	<i>you1dian3</i> <i>que1dian3</i>	strong point shortcomings
T1T4	軍隊 需要	<i>jun1dun4</i> <i>xu1yao4</i>	troops need
T3T1	餅乾 點心	<i>bing3gan1</i> <i>dian3xin1</i>	biscuit snack
T3T4	打算 表現	<i>da3suan4</i> <i>biao3xian4</i>	intend performance
T4T1	地區 信心	<i>di4qu1</i> <i>xin4xin1</i>	area confidence
T4T3	辦法 自己	<i>ban4fa3</i> <i>zi4ji3</i>	method oneself
T4T4	動作 注意	<i>dong4zuo4</i> <i>zhu4yi4</i>	motion notice

Appendix 6

Materials used in Experiment 3:

Final T2 of disyllabic expressions in sentence-medial & final position

I. Carrier sentences for test items:

(1) Sentence-medial: _____ 就是這樣。 ___jiu4 shi4 zhe4 yang4. “__ is like this.”

(2) Sentence-final: 這就是 _____。 Zhe4 jiu4 shi4 _____. “This is ___.”

Test Items							
T1T2	English Gloss	T2T2	English Gloss	T3T2	English Gloss	T4T2	English Gloss
班級 <i>ban1ji2</i>	class	河堤 <i>he2ti2</i>	riverbank	打擊 <i>da3ji2</i>	strike	問題 <i>wen4ti2</i>	question
專題 <i>zhan1ti2</i>	project	拳擊 <i>quan2ji2</i>	boxing	等級 <i>deng3ji2</i>	rank	話題 <i>hua4ti2</i>	topic
插圖 <i>cha1tu2</i>	illustration	年級 <i>nian2ji2</i>	grade	考題 <i>kao3ti2</i>	examination questions	目擊 <i>mu4ji2</i>	witness
師徒 <i>shi1tu2</i>	master and apprentice	前途 <i>qian2tu2</i>	future	掃毒 <i>sao2du2</i>	anti-virus	病毒 <i>bing4du2</i>	virus
中途 <i>zhong1tu2</i>	halfway	沿途 <i>yan2tu2</i>	along the way	反毒 <i>fan3du2</i>	anti-drugs	地圖 <i>di4tu2</i>	map
孤獨 <i>gu1du2</i>	solitary	長途 <i>chang2tu2</i>	long-distance	警察 <i>jing3cha2</i>	police	問答 <i>wen4da2</i>	questions and answers
發達 <i>fa1da2</i>	prosper	回答 <i>hwei2da2</i>	answer	奶茶 <i>nai3cha2</i>	milk tea	調查 <i>diao4cha2</i>	investigation
觀察 <i>guan1cha2</i>	observation	紅茶 <i>hong2cha2</i>	black tea	解答 <i>jie3da2</i>	solution	綠茶 <i>lu4cha2</i>	green tea

E.g. (1) 「班級」就是這樣。 “Ban1ji2”jiu4 shi4 zhe4 yang4. “The class is like this.”

Appendix 6
(continued)

「辦法」就是這樣。 “ban4fa3” jiu4 shi4 zhe4 yang4. “The method is like this.”

(2) 這就是「考題」。 Zhe4 jiu4 shi4 “kao3ti2.” “ This is the examination questions.”

這就是「綠茶」。 Zhe4 jiu4 shi4 “lu4cha2.” “This is Green tea.”

II. Carrier sentences for fillers:

(1) ___就是這個意思。 ___ jiu shi zhe ge yi si. “ ___ is what this means.”

(2) ___就是這個。 ___ jiu shi zhe ge. “ ___ is this one.”

(3) ___就是那樣。 ___ jiu shi na yang. “ ___ is like that.”

Fillers			
Tonal combination	Mandarin Characters	Pinyin	English Gloss
T1T1	新鮮 天空	<i>xin1xian1</i> <i>tian1kong1</i>	fresh sky
T1T3	優點 缺點	<i>you1dian3</i> <i>que1dian3</i>	strong point shortcomings
T1T4	軍隊 需要	<i>jun1due4</i> <i>xu1yao4</i>	troops need
T3T1	餅乾 點心	<i>bing3gan1</i> <i>dian3xin1</i>	biscuit snack
T3T4	打算 表現	<i>da3suan4</i> <i>biao3xian4</i>	intend performance
T4T1	地區 信心	<i>di4qu1</i> <i>xin4xin1</i>	area confidence
T4T3	辦法 自己	<i>ban4fa3</i> <i>zi4ji3</i>	method oneself
T4T4	動作 注意	<i>dong4zuo4</i> <i>zhu4yi4</i>	motion notice

Appendix 6
(continued)

E.g. (1) 「動作」就是這個意思。 “dong4zuo4” jiu4 shi4 zhe4 ge yi4si. “The motion is what this means.”

(2) 「餅乾」就是這個。 “bing3gan1” jiu4 shi4 zhe4ge. “The biscuit is this one.”

(3) 「天空」就是那樣。 “tian1kong1” jiu4 shi4 na4 yang4. “The sky is like that.”

Appendix 7a

Sample for subject background sheet (Chinese)

全部實驗已結束。

感謝你的參與，請留下基本資料，以供實驗樣本採集。

個人基本資料

編號:____

性別: 男 女 出生年:_____ 出生地:_____ 現居地:_____

母語(第一個學會的): 國語 台語 其他_____

平常最常使用的語言: 國語 台語 其他_____

國台語使用比例: 國語: 台語= ____ : ____

其他語言能力(寫出學習順序 1234,並註明流利/精通 or 中等 or 尚可 or

略懂): 客家話____ 原住民語____ 英語____ 日語____

法語____ 其他_____

遷徙經驗: (請擇一打勾)

從未搬過家。

有。(____歲時,從_____搬到_____(縣市/鄉鎮))

家庭基本資料

1. 父親出生地:_____ 母親出生地:_____

2. 你的父親最常使用哪種語言? (請勾選) 國語 台語 其他

3. 你的母親最常使用哪種語言? (請勾選) 國語 台語 其他

4. 你的父親會哪幾種語言? (請勾選) 國語 台語 其他_____

5. 你的母親會哪幾種語言? (請勾選) 國語 台語 其他_____

Appendix 7b

Sample for subject background sheet (English Translation)

The experiments are complete. Thank you for your participating. Please leave your basic information for our subject sampling.

Personal Information

Number: _____

Sex: M F Year of Birth: _____ Place of Birth: _____ Residence: _____

- ◆ Mother tongue (Your first language): (Please choose one)
 - Gouyu (Taiwan Mandarin) Taiwanese the other

- ◆ The language you speak most frequently: (Please choose one)
 - Gouyu (Taiwan Mandarin) Taiwanese The other

- ◆ Other languages you have learned (Number the learning order 1234 and describe your degree. For example, fluent/mastered, moderate, acceptable or understand.)
 - Hakka aboriginal languages English Japanese French Others

- ◆ The experience of migration: (Please choose the suitable description)
 - I have never moved.
 - Yes. (When I was _____ years old, I moved from _____ to _____ (county or city/ village or town))

Family Information

1. Birth place of Father: _____; Birth place of Mother: _____

2. The language your father speaks most frequently. (Please choose one)
 - Gouyu (Taiwan Mandarin) Taiwanese Other _____

3. The language your mother speaks most frequently. (Please choose one)
 - Gouyu (Taiwan Mandarin) Taiwanese Other _____

4. How many languages does your father speak? (Please choose one)
 - Gouyu (Taiwan Mandarin) Taiwanese Other _____

Appendix 7b**(continued)**

5. How many languages does your mother speak? (Please choose one)

Gouyu (Taiwan Mandarin) Taiwanese Other _____

Appendix 8

The row tokens of each variable in Experiment 1

Vowels	Lg. Back- ground	Gender	Tonal Type			Total
			Normal	Variation		
			NR	LR	Level	
i	Mono.	M.	29	4	3	36
		Fm.	19	2	15	36
	Bi.	M.	22	9	5	36
		Fm.	26	4	6	36
a	Mono.	M.	24	4	8	36
		Fm.	18	10	8	36
	Bi.	M.	14	7	15	36
		Fm.	15	11	10	36
u	Mono.	M.	31	0	5	36
		Fm.	24	4	8	36
	Bi.	M.	23	7	6	36
		Fm.	22	8	6	36
		Total	267	70	95	432

Appendix 9

The row tokens of each variable in Experiment 2

Preceding Tone	Lg. bg.	gender	Tonal Type			
			Normal	Variation		
			NR	LR	Level	Total
H-ending	Mono.	M.	24	25	47	96
		Fm.	38	29	29	96
	Bi.	M.	15	35	46	96
		Fm.	24	33	39	96
	total			101	122	161
L-ending	Mono.	M.	36	20	40	96
		Fm.	44	26	26	96
	Bi.	M.	30	21	45	96
		Fm.	43	18	35	96
	total			153	85	146
Total			254	207	307	768

Appendix 10

The row tokens of each variable in Experiment 3

Position	Group	Gen.	Tonal Type			Total
			NR	LR	Level	
S-initial	Mono.	M.	37	15	140	192
		Fm.	59	29	104	192
	Bi.	M.	33	42	117	192
		Fm.	35	58	99	192
	Total			164	144	460
S-final	Mono.	M.	40	43	109	192
		Fm.	64	55	73	192
	Bi.	M.	18	60	114	192
		Fm.	23	64	105	192
	Total			145	222	401
Total			309	366	861	1536