

Taiwanese

Ellis Cain, Ling-L 306

1 Introduction

This project presents an overview of formant measures for the vowels of English and Taiwanese. VOT measures for the stop consonants of both languages is presented as well.

2 Overview of English and Taiwanese

English contains 10 monophthongs and 6 oral stop consonants, as discussed repeatedly in Ling-L 306 with Professor Berkson.

Taiwanese contains 6 monophthongs, with seven tones, and 8 oral stop consonants (Cheng 2008, p1-2).

3 Speaker information

The English speaker whose data are reported here is a 19-year-old male talker who was born and raised in Northern Ohio for 8 years before moving to Central Indiana. He has lived in the Midwest his whole life. English was the only language spoken in his childhood home. He studied Mandarin Chinese for nine years and has studied abroad there twice. He only has very basic knowledge of Spanish. The only one that may potentially influence the data here is Mandarin.

Data for Taiwanese are provided by a female speaker in her mid-20s who was born and raised in the northern part of Taiwan. She considers herself a native Mandarin Chinese speaker, as she was exposed to it in family and other daily interactions. She also speaks Taiwanese, Hakka, and Japanese with older family members. She has studied English for 23 years in a formal classroom setting and lived in America for 9 years. The languages that could influence the data are Mandarin and Hakka.

4 Vowel Stimuli and Measurements

4.1 English

Table (1) presents the stimuli used to elicit the monophthongs of English.

Table (1) English Vowel Stimuli

IPA	Stimulus	Gloss	IPA	Stimulus	Gloss
[i]	[hid]	<i>heed</i>	[ʌ]	[kʌt]	<i>cut</i>
[ɪ]	[hɪd]	<i>hid</i>	[u]	[hud]	<i>who'd</i>
[ɛ]	[hɛd]	<i>head</i>	[ʊ]	[hod]	<i>hood</i>
[æ]	[hæd]	<i>had</i>	[ɔ]	[kɔt]	<i>caught</i>
[ɜ]	[hɜːd]	<i>heard</i>	[ɑ]	[kat]	<i>cot</i>

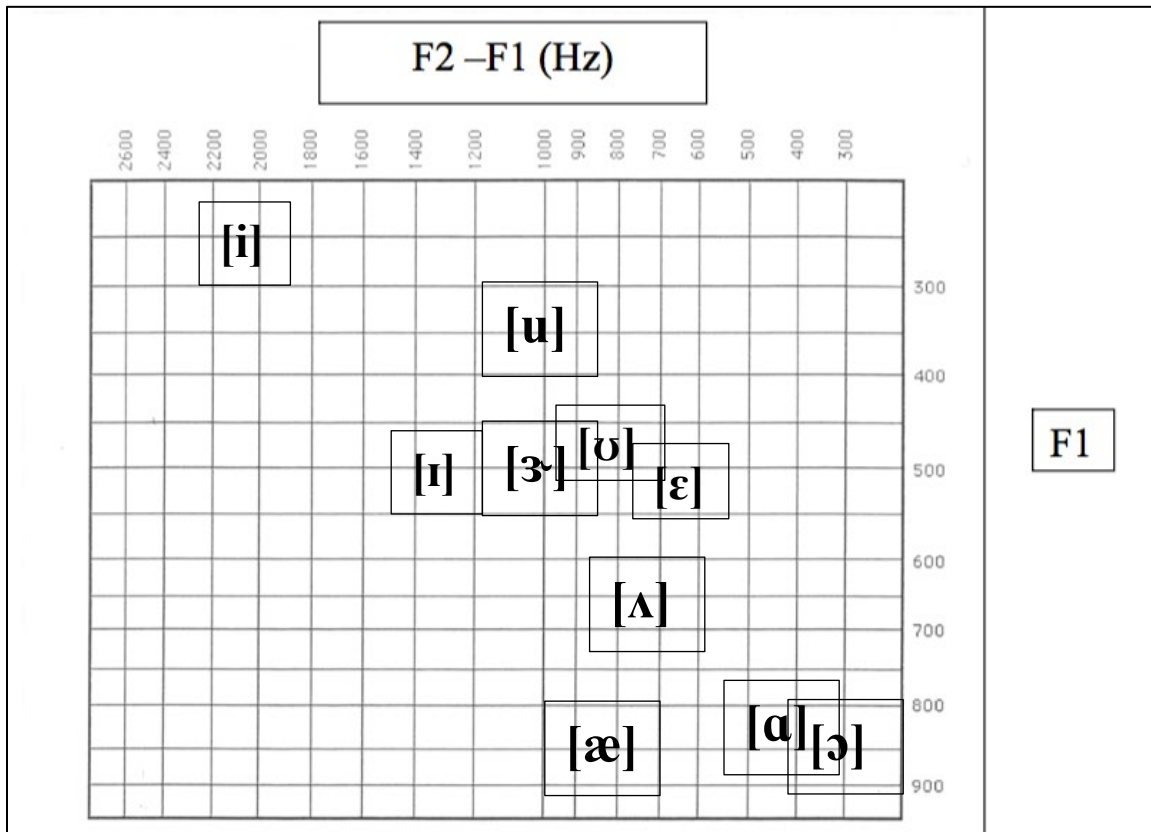
Measurements taken herein include F0, F1, F2, and F3 for each vowel. Results appear in Table (2).

Table (2) English Vowel Measurements

Vowel	F0	F1	F2	F3
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[i]	130 Hz	259 Hz	2284 Hz	3112 Hz
[ɪ]	117 Hz	503 Hz	1893 Hz	2877 Hz
[ɛ]	113 Hz	527 Hz	1170 Hz	2967 Hz
[æ]	112 Hz	857 Hz	1739 Hz	2872 Hz
[ɜ]	125 Hz	542 Hz	1613 Hz	3596 Hz
[ʌ]	120 Hz	684 Hz	1424 Hz	2841 Hz
[u]	125 Hz	353 Hz	1361 Hz	2368 Hz
[ʊ]	107 Hz	479 Hz	1361 Hz	2715 Hz
[ɔ]	111 Hz	857 Hz	1172 Hz	2368 Hz
[ɑ]	115 Hz	841 Hz	1251 Hz	2384 Hz

These measurements were used to create a vowel chart as well, which plots each vowel using F1 and F2-F1 values.



4.2 Taiwanese

Table (3) presents the stimuli used to elicit the monophthongs of Taiwanese. This stimuli list was constructed with reference to 台湾闽南语常用词辞典 from 中华民国 教育部.

Table (3) Taiwanese Vowel Stimuli <expand or collapse table as needed>

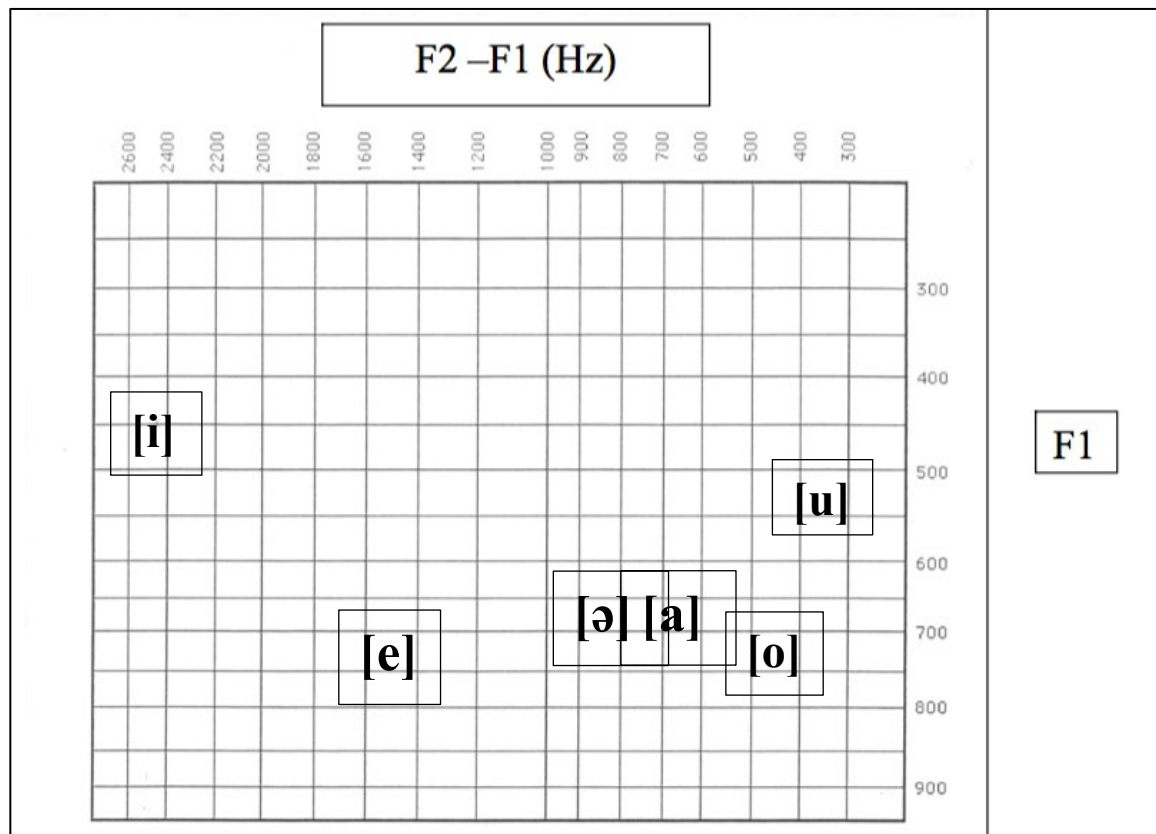
IPA	Stimulus	Gloss	IPA	Stimulus	Gloss
[ki]	忌 kī	<i>Envy</i>	[ho]	予 hōo	<i>Give</i>
[ha]	夏 hā	<i>Summer</i>	[he]	系 hē	<i>System</i>
[hə]	號 hō	<i>Name</i>	[hu]	父 hū	<i>Father</i>

Measurements taken herein include F0, F1, F2, and F3 for each vowel. Results appear in Table (4).

Table (4) Taiwanese Vowel Measurements

Vowel	F0	F1	F2	F3
[i] (忌 kī)	190 Hz	479 Hz	2951 Hz	3565 Hz
[e] (系 hē)	186 Hz	747 Hz	2321 Hz	3030 Hz
[o] (予 hōo)	181 Hz	747 Hz	1172 Hz	2667 Hz
[u] (父 hū)	173 Hz	537 Hz	904 Hz	3077 Hz
[ə] (號 hō)	190 Hz	684 Hz	1581 Hz	2715 Hz
[a] (夏 hā)	182 Hz	684 Hz	1424 Hz	2841 Hz

These measurements were used to create a vowel chart as well, which plots each vowel using F1 and F2-F1 values.



5 Discussion regarding the vowel charts

An interesting thing that occurred with the English vowels was the relatively heavy fronting of the [u] and [ʊ] vowels, as they were spread more towards the middle of the vowel chart and even were close to the values of [ɪ]. For Taiwanese, the [a] vowel was particularly curious, as it was relatively high, right next to [ə]. This could be due to the recording quality, but it could be because the speaker mixed up the vowels. There isn't an orthography system for Taiwanese, so I had to use simplified Chinese characters and write the intended pronunciation, so the speaker's pronunciation could be influenced by the mandarin pronunciation.

6 VOT

6.1 VOT for English Stop Consonants

English contains 6 stop consonants, as reviewed numerous times in Ling-L 306. Stimuli used to elicit these stops were simple CV syllables. VOT measures were taken for two tokens of each stop consonant, and these appear in Table (5).

Table (5) VOT Measurements for English Stops

Stop	Stimulus	VOT for token 1 (in ms)	VOT for token 1 (in ms)
p	pa	115	99
t	ta	96	120
k	ka	134	114
b	ba	6	9
d	da	19	12
g	ga	30	19

6.2 VOT for Taiwanese Stop Consonants

Taiwanese contains 8 stop consonants, as stated by Cheng in 臺灣閩南語羅馬字拼音方案使用手冊 and found in the online dictionary by the 中华民国教育部. VOT measures were taken for two tokens of each stop consonant, and these appear in Table (6).

Table (6) VOT Measurements for Taiwanese Stops

Stop	Stimulus	Gloss	VOT for token 1 (in ms)	VOT for token 1 (in ms)
[p]	比 pí	<i>To compare</i>	13	15
[p ^h]	疔 phí	<i>Mange</i>	116	121
[b]	米 bí	<i>Rice</i>	-76	-65
[t]	談 tâm	<i>Talk; discuss</i>	12	25
[t ^h]	潭 thâm	<i>Pit; depression</i>	109	106
[k]	馆 kuán	<i>Embassy; consulate</i>	32	49

[k ^h]	款 khuán	<i>Sum of money</i>	104	116
[g]	玩 guán	<i>To play</i>	6	9

The speaker had made the comment that there is a three-way contrast in Taiwanese; voiceless aspirated, voiceless unaspirated, and voiced unaspirated. This is generally consistent with the data found in the recordings, except for the [g]. The [b] was truly voiced and had a relatively large negative VOT, compared with the [b] in English, which had a small positive VOT. The [g] in Taiwanese had a small positive VOT, which is different from the expected negative VOT due to the voicing. I'm not exactly sure to the reason for this, but it does have a smaller VOT than the [g] in English. Overall, the contrasts in English are differentiated with regards to aspiration instead of voicing, with the English consonants reflecting the aspirated consonants in Taiwanese.

7 Discussion/Conclusion

Overall, I would say that the whole process was enjoyable and a good learning experience. It was my first time doing any type of linguistic fieldwork, so I didn't have many expectations coming in to this project. Constructing a stimuli list wasn't too difficult, as the speaker showed me the online Chinese dictionary she's used before. I was able to sort by starting consonant or vowels, which made the process of finding words much quicker than sorting alphabetically. However, as I mentioned in the previous section, Taiwanese doesn't have an official orthography system, which caused some difficulties during the elicitation of the words. The speaker was a linguistics graduate student and was able to attempt to produce the goal word, but there was some difficulty producing it on the first try and had to repeat multiple times. Other than this issue, using praat was a smooth process, as I have used it before to analyze tones in a Chinese class I previously took. The formant tracking was relatively accurate and there wasn't much background noise, so the recordings were generally clear and straightforward.

References

Cheng Jei-cheng (2008). 臺灣閩南語羅馬字拼音方案使用手冊 (2nd ed.). ROC Ministry of Education. ISBN 978-986-01-6637-8.

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