

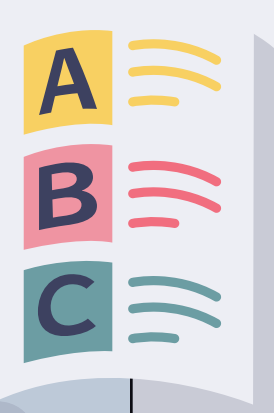
Influence of First Language in Learning English as a Second Language (ESL)



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Host unit of research: Speech Science Laboratory, Faculty of Education, HKU Supervisor: Dr NG, Manwa Lawrence

Introduction



In the field of ESL learning, it is common to find that the mother tongue affects second language acquisition due to differences in the sound system and spelling symbols between L1 and L2.

Eg. Mandarin vowel sounds ([i]衣, [ɿ]鹅, [y]鱼, [u]房, [ə]儿, [a]妈) vs English vowel sounds (/ɪ/, /e/, /æ/, /ʌ/, /ɒ/, /ʊ/, /i:/, /ɔ:/, /u:/, /ɑ:/, /aɪ/, /eɪ/, /ɔɪ/, /aʊ/, /əʊ/, /ɪə/, /ʊə/, /oə/, /ɜ:/, /ə/)

Current bilingual ESL learners concerns:

--> A challenging task to have accurate English pronunciation like native speakers

Prospects of ESL learning:

--> develop ESL learning strategies using **scientific approaches on linguistics** and eliminate the pronunciation errors of ESL learners.

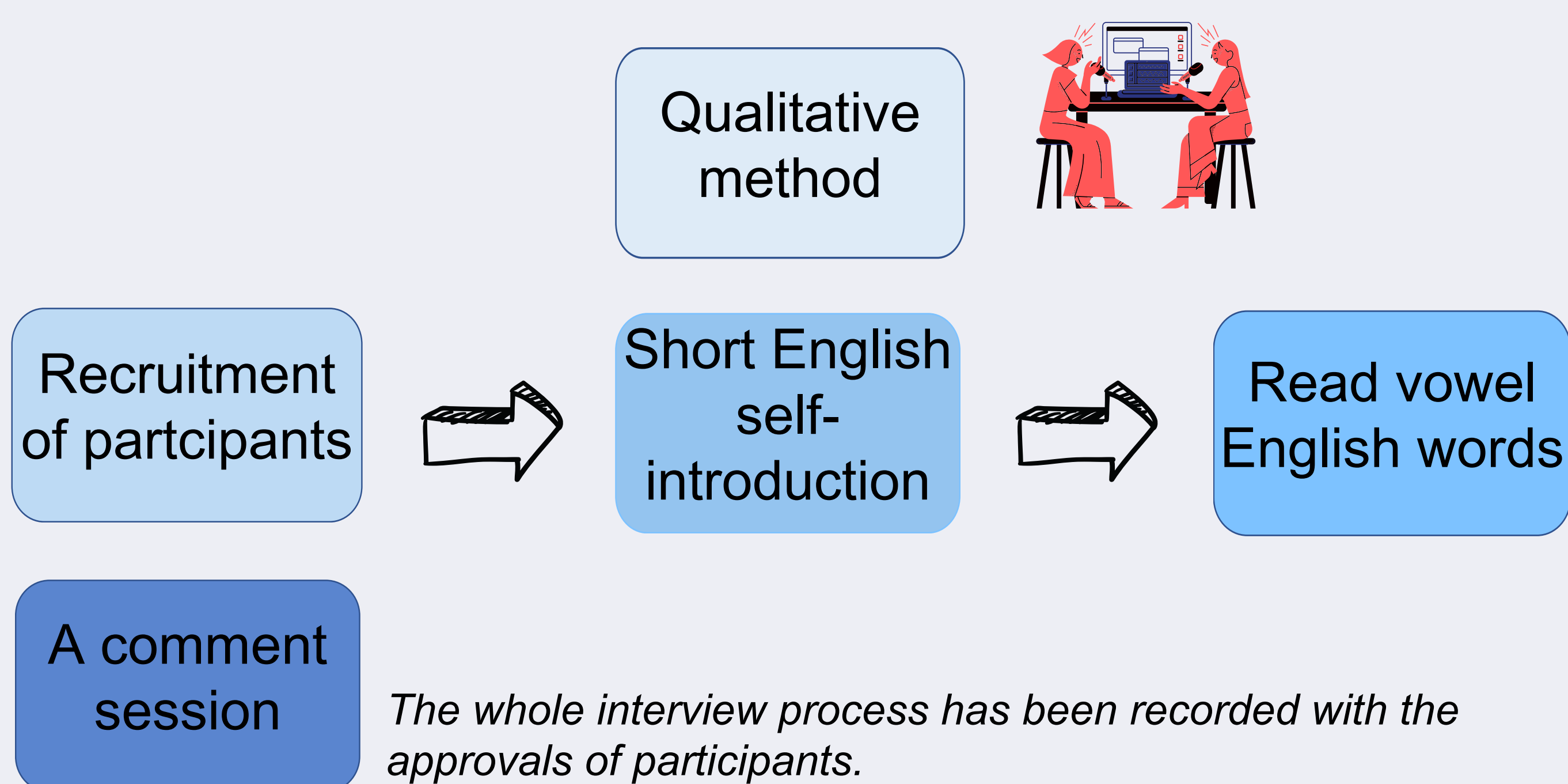
Acoustic analysis --> analyzes one's sound patterns of speech to identify areas where improvement is needed.

Objectives



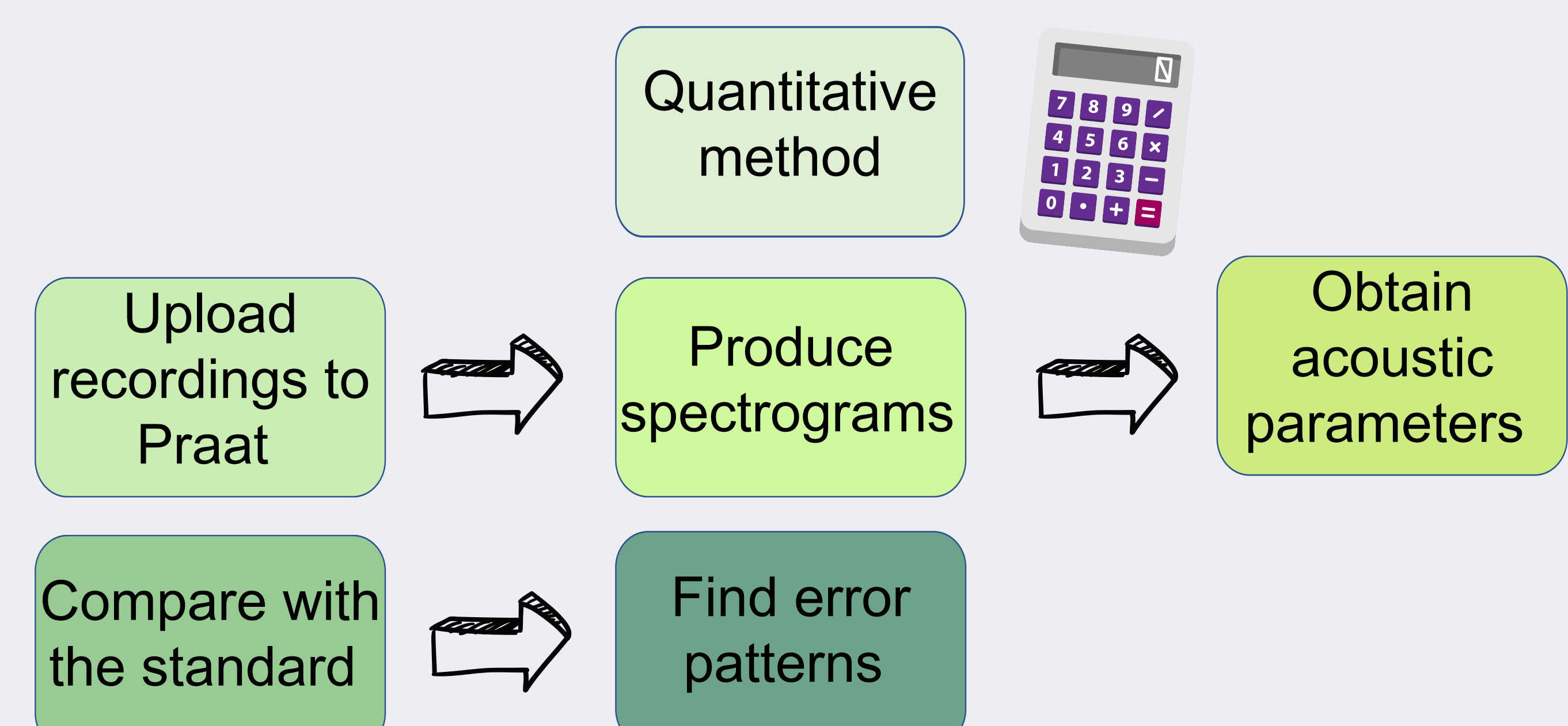
- To identify **if and how** one's mother tongue affects production of L2 English sounds
- To determine the **error patterns** associated with L2 English sounds related to L1 sounds produced by Mandarin-English bilingual speakers

Methodology

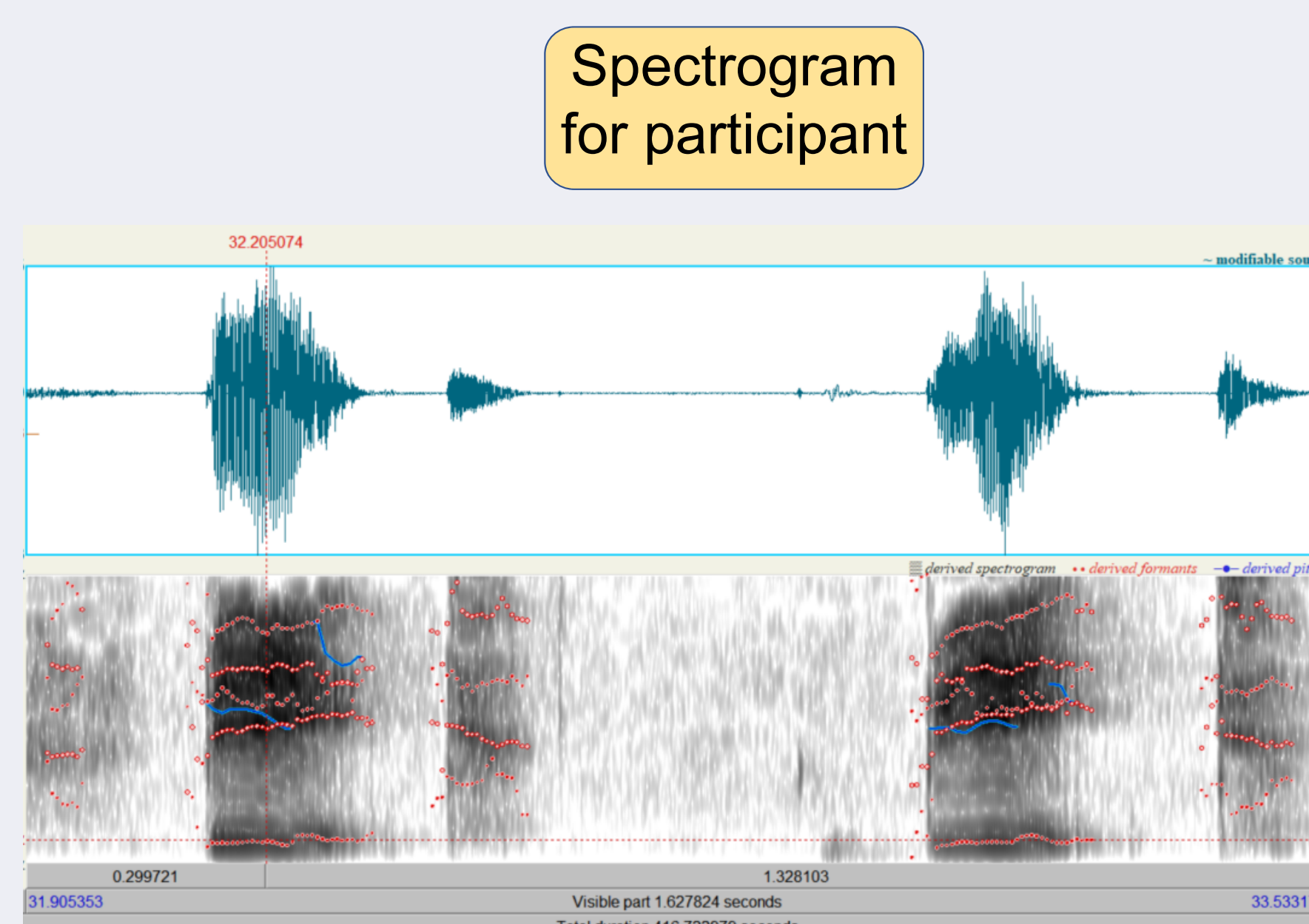
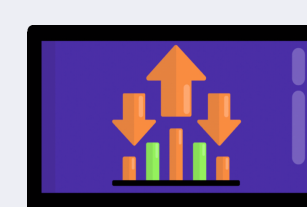


Beat	Bit	Bait	Bet	Bat	Pot	But	Bought
Boat	Put	Boot	Bert	Bite	Bout	Voice	
Heed	Hid	Aid	Head	Had	Odd	Hud	Awed
Owed	Hood	Who'd	Heard	Hide	How'd	Hoyd	
Be	Sick	Day	Get	Fat	Stop	Up	Talk
No	Good	New	Her	I	Now	Boy	

Figure 1: Speech Stimuli Word List (Vowel contrasts)



Results



Spectrogram for participant

- Formants:** frequencies of concentrations of energy (resonances) associated with the sound signal
- F1&F2:** lowest and second lowest frequency resonance of the vocal tract (the **bottom two red lines**).
- x-axis:** time & **y-axis:** frequency (Hz)
- Waveform:** energy changes with time & **Frequency patterns**

Figure 2: Spectrogram for word "beat" by one participant

Formants comparisons with native speakers

		/ɪ/	/i:/	/e/	/ɛ/	/æ/	/aɪ/	/ɔ/	/o/	/ɒ/	/ʊ/	/ʌ/	/ɜ/
F1	M	342	427	476	580	588	768	652	497	469	378	623	474
	F	437	483	536	731	669	936	781	555	519	459	753	523
F2	M	2322	2034	2089	1799	1952	1333	997	910	1122	997	1200	1379
	F	2761	2365	2530	2058	2349	1551	1136	1035	1225	1105	1426	1588

Figure 3: Standard formants form for native speakers

L1 Mandarin bilingual speakers' average F1 & F2 are **higher** than the native speakers formants.

Formants comparisons within genders

		Women		Men	
Words		F1	F2	F1	F2
Beat		410	2456	258.8	2121
Bit		393	2624	258.8	2104
Bait		896.2	1800	661.4	1735
Bet		460.1	2750	661.4	1668
Bat		830	2070	594.3	1617
Pot		560.7	1350	460.1	879.4
But		812	1500	795.6	1450
Bought		630	1200	460.1	929.8
Boat		644.6	1300	426.6	812.3
Put		443.3	1400	426.6	1014
Boot		678.2	1165	393	913
Bert		661.4	1550	527.2	1701
Bite		527.2	2691	527.2	1634
Bout		845.9	1450	493.6	913

Figure 4: F1 & F2 within genders

The results of participants align with the standard: the average formant frequencies of females are **higher** than the males.

Discussion & Conclusion



It is obvious that L1 Mandarin influences L2 English pronunciation significantly and sound errors are undeniable.

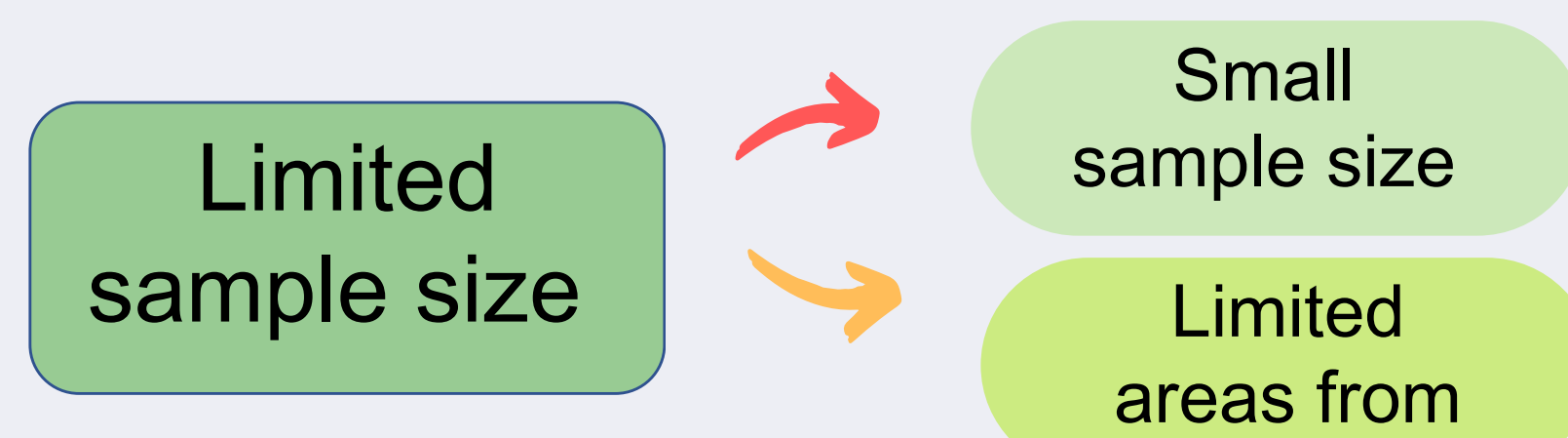
Reasons:

- Mandarin has a **smaller** vowel inventory compared to English
- English has a distinction between **tense and lax vowels**, eg. the vowel pairs /i:/ and /ɪ/
- Differences in **articulatory techniques** between Mandarin and English.
- Mandarin has relatively **high** and relatively **level tongue positions** for most of Chinese vowels

--> Error patterns:

- vowel formant shifting
- vowel merger
- Formant transition

Limitations



Future direction

- English consonant quality
- Sentence intonation

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