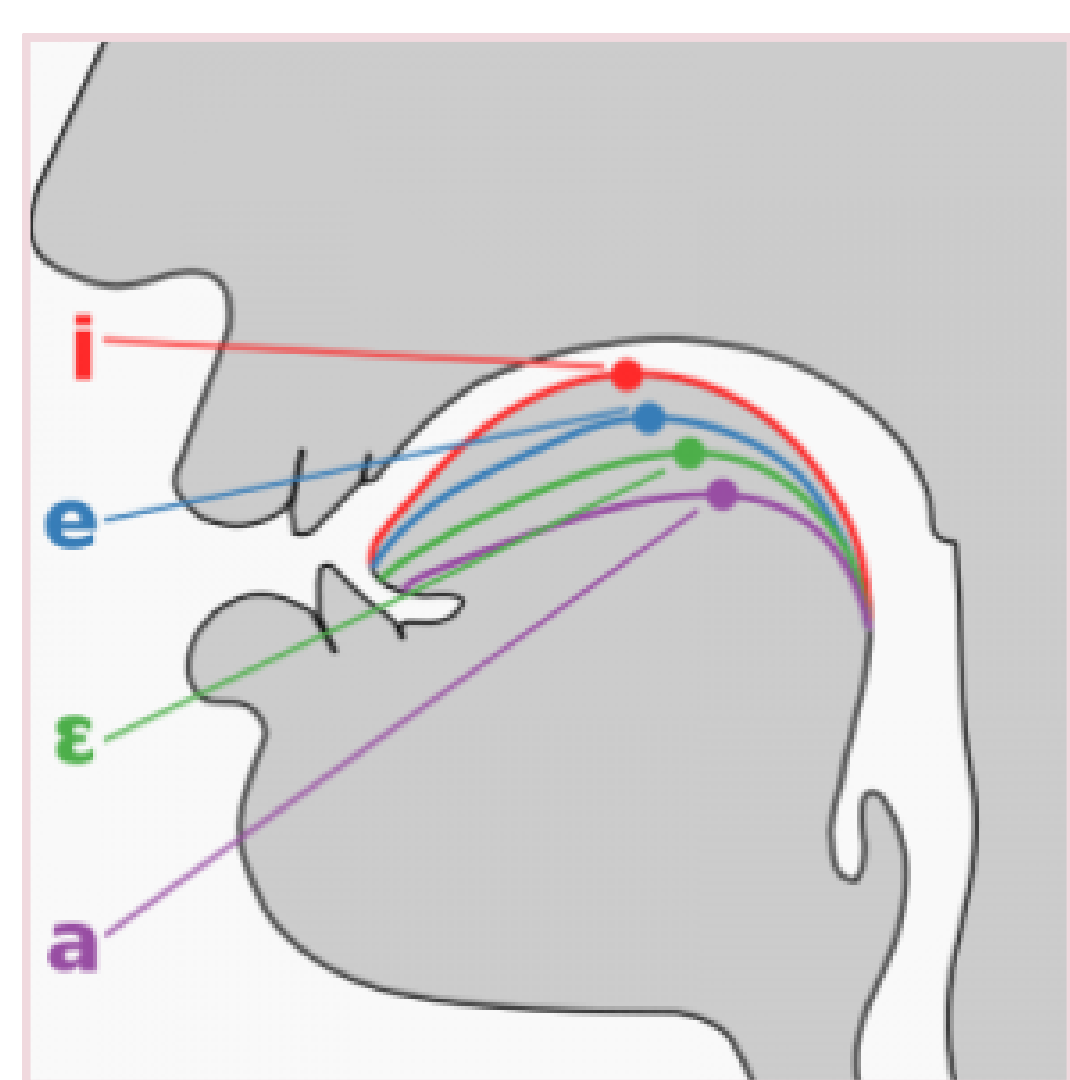
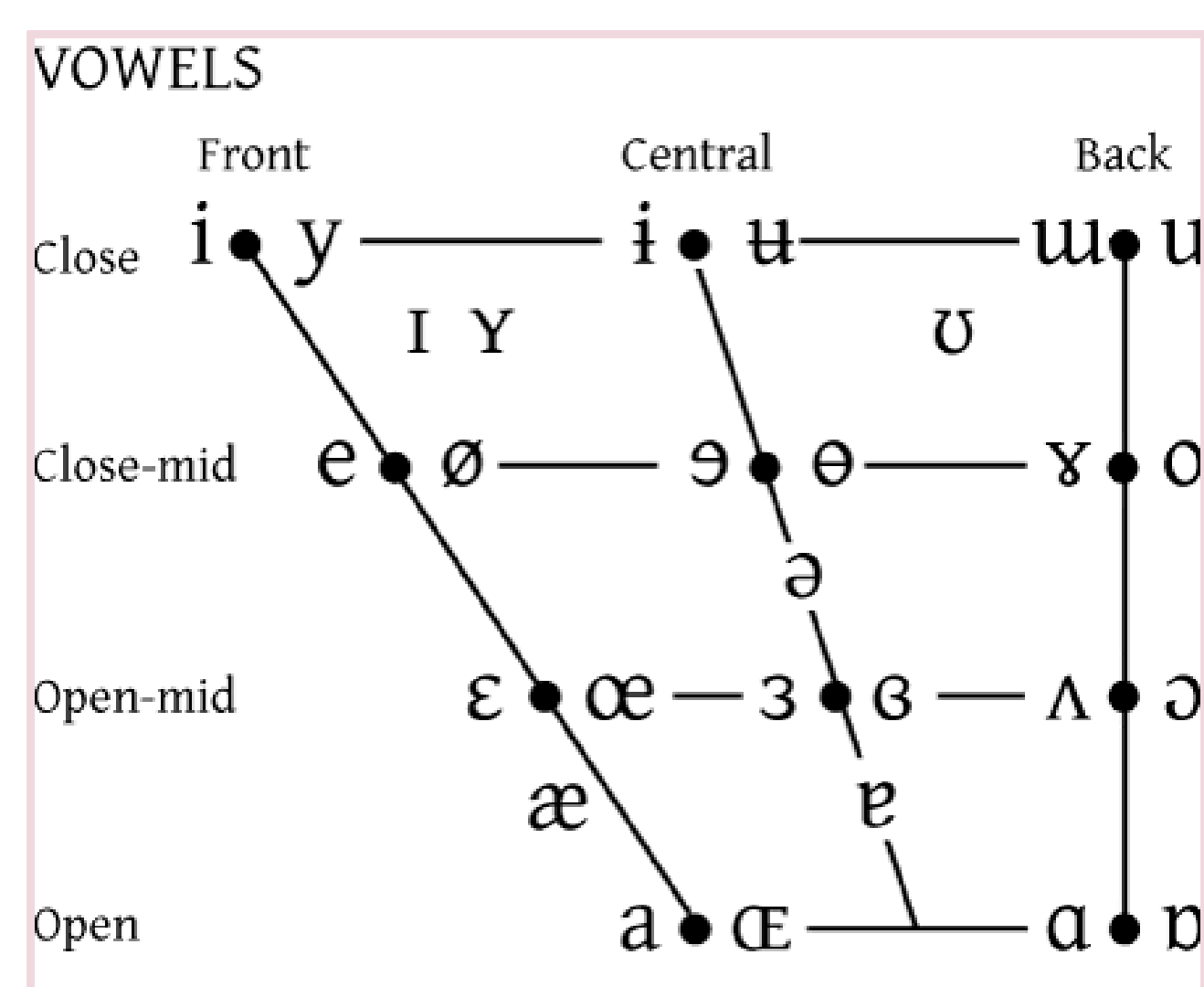


Influence of Indonesian as a First Language on the Acquisition of English as a Second Language

BACKGROUND

Learning to speak a second language (L2) such as English has been seen to be difficult, especially by adult speakers. Second language proficiency has been correlated with the amount of “error” or accent perceived in their L2 sounds, which is a result of articulatory deviation strongly related to the mother tongue (L1) spoken by the speakers.

Each resonating frequency of the vocal tract is known as a “**formant**”, with F1 and F2 representing the first and second formants. The tongue, lips, jaw, soft palate, etc. are known as **articulators**. Any articulatory movement results in changes of vocal tract configuration and the frequencies at which it resonates, and thus change in formants. When each vowel is placed on a graph, where the horizontal dimension represents the decreasing frequency of F1 and the vertical dimension represents the decreasing frequency of F2, it produces the mirror image of a **vowel chart**, which indicates position of the articulators.



International Phonetic Alphabet (IPA) Chart¹ Tongue positions for the vowels [i], [e], [ɛ], [a]²

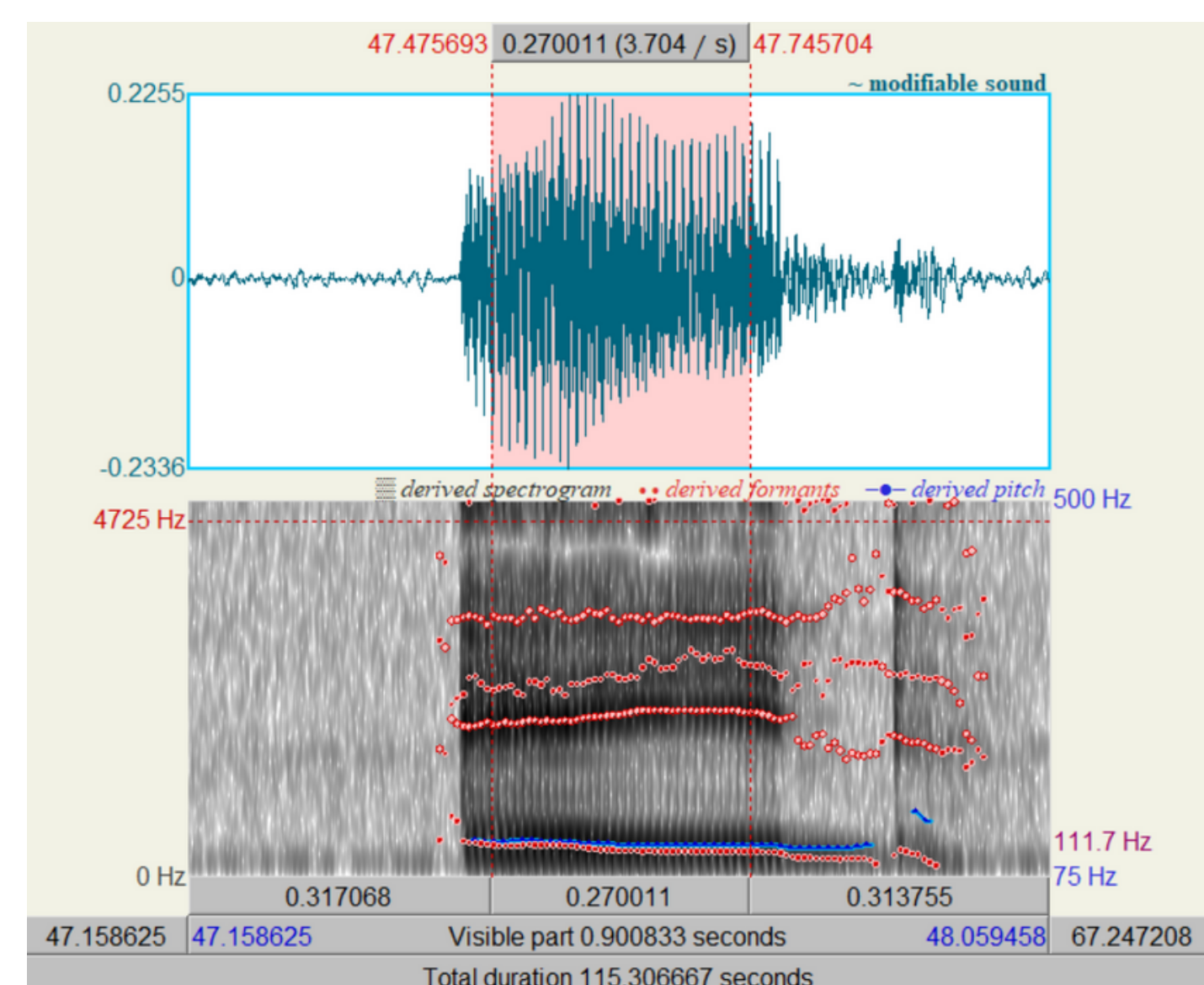
OBJECTIVE

Examine how Indonesian as one’s first language (L1) affects production of English as a second language (L2) through the documentation of formant frequencies, review of the vowel charts of [i], [ɪ], [e], [ɛ], [æ], [ɑ], [o], [ʊ], [u], [ʌ] and relational analysis to sounds present in the Indonesian language.

METHODS

30 adult Indonesian-English bilingual speakers were recruited and instructed to produce a list of standard English words excerpted from a protocol used by speech therapists for English accent reduction therapy. The recordings were analyzed using PRAAT 6.2.23, which draws the waveform and spectrogram display and has a feature to trace F1 and F2 from the formant frequencies.

beat, heed	[i]
bit, hid	[ɪ]
bait, aid	[e]
bet, head	[ɛ]
bat, had	[æ]
bought, awed	[ɑ]
boat, owed	[o]
put, hood	[ʊ]
boot, who'd	[u]
but, hud	[ʌ]

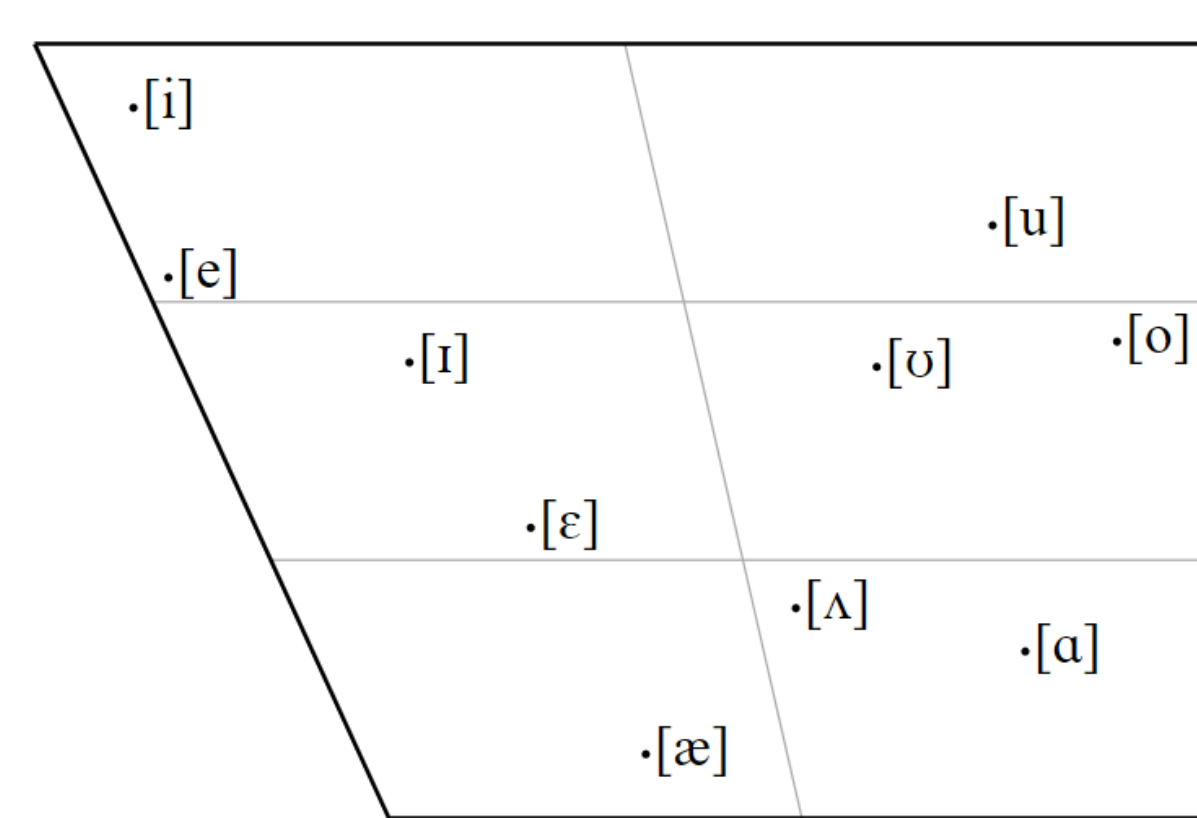


The F1 and F2 values are tabled into Microsoft Excel and inputted into Adam Baker’s Formant Plotter³ to create the vowel chart. Results are compared to those obtained from native English speakers. Error patterns in English pronunciation are studied and related to sounds present in Indonesian.

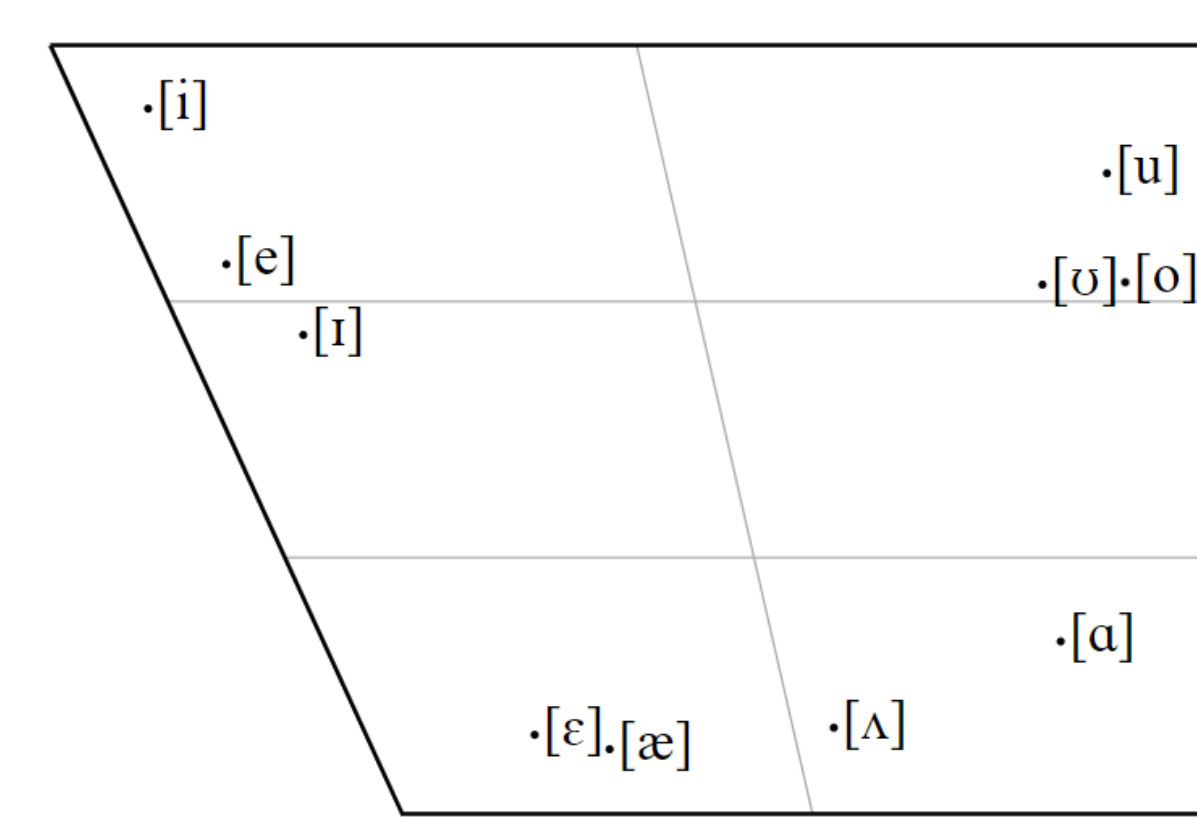
RESULTS & DISCUSSION

Words	Vowels	Female Native		Female Indonesian		Male Native		Male Indonesian	
		F1	F2	F1	F2	F1	F2	F1	F2
beat, heed	[i]	437	2761	323	2561	342	2322	263	2151
bit, hid	[ɪ]	483	2365	512	2323	427	2034	434	1796
bait, aid	[e]	536	2530	453	2441	476	2089	377	2106
bet, head	[ɛ]	731	2058	846	1968	580	1799	545	1640
bat, had	[æ]	669	2349	858	1853	588	1952	697	1492
bought, awed	[ɑ]	936	1551	768	1161	768	1333	628	1004
boat, owed	[o]	555	1035	468	1062	497	910	420	886
put, hood	[ʊ]	519	1225	470	1189	469	1122	437	1195
boot, who'd	[u]	459	1105	377	1090	378	997	342	1046
but, hud	[ʌ]	753	1426	840	1509	623	1200	599	1299

Average F1 and F2 values for the vowels produced by Male and Female Natives and Indonesians. Natives’ formants data taken from Hillenbrand et al.⁴



Vowel chart of Male Indonesians

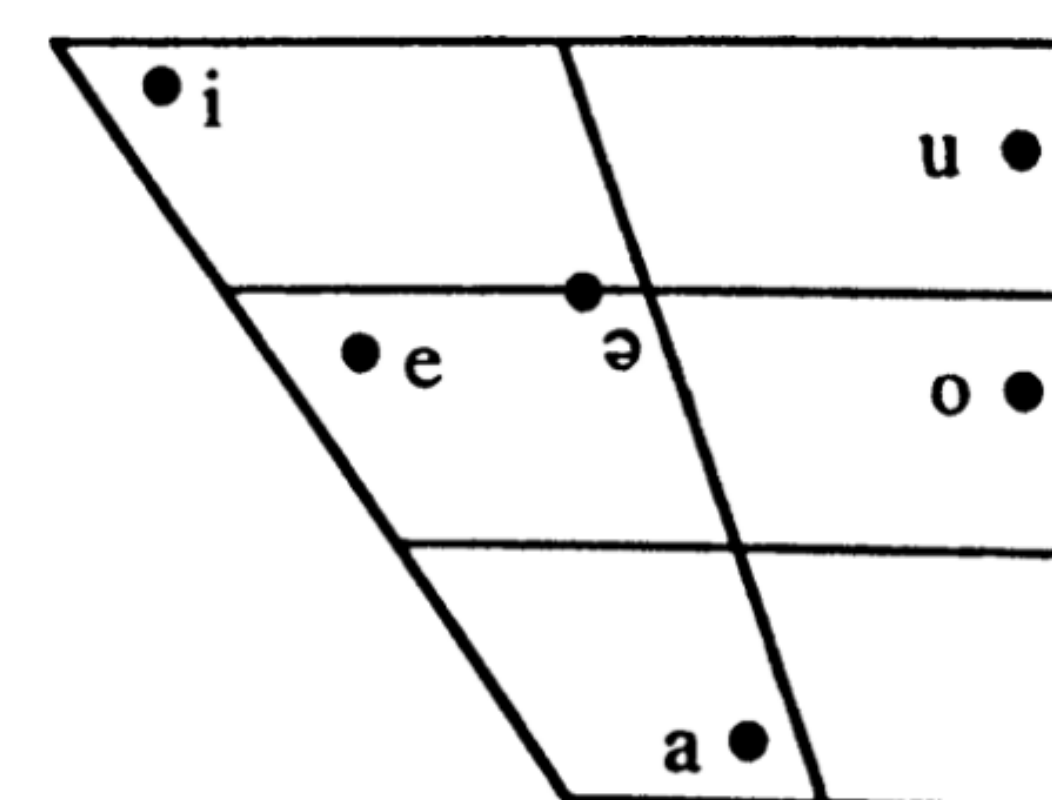


Vowel chart of Female Indonesians

Comparison between the vowel chart of Indonesians, English Natives, and the IPA vowel chart produce the following observations:

- [i], [o], [u], and [e] are pronounced relatively the same
- [ɪ] is produced with a close-mid rather than in between close and close-mid mouth
- [ɛ] is produced central rather than front tongue position
- [æ] is produced with an open rather than open-mid mouth, and central rather than front tongue position
- [ɑ] is produced with an open-mid rather than open mouth
- [ʌ] is produced central rather than back tongue position

The Indonesian language only has six monophthongal phonemes: [i], [u], [e], [ə], [o] and [a].⁵ The Indonesian speakers were able to produce the vowels [i], [u], [o], and [e] with relatively similar formant frequencies and placement on the chart (with some deviations in [u] and [o] closer to the placement of the vowels in Indonesian).



Indonesian vowel chart⁵

For vowels not present in the Indonesian language, the speakers’ formants also tended to **deviate closer to sounds that are more familiar**. For example, [ɪ] is pronounced closely to [e] or [ə], and [ʊ] is pronounced closely to [o]. The vowels [ɑ], [æ], [ʌ] are pronounced by Indonesian speakers in a way that is more similar to the Indonesian vowel [a]: more central and open than their L1 English counterparts. There is strong correlation exhibited between the Indonesian speakers’ production of English vowels and pre-existing vowels in the Indonesian language.

CONCLUSION

This study examined how L1 Indonesian affects L2 English vowel production. Measurements of formant frequencies and vowel charts revealed that vowels shared between the languages, such as [i], [u], [o], [e], were produced accurately. However, vowels absent from Indonesian like [ɪ], [ʊ], [ɑ], [æ], [ʌ] tended to be assimilated to the closest Indonesian counterpart [e], [o], [a]. This reveals influences of the native language on L2 vowel production.

Acknowledgements

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