Phonological Patterning for English as a Lingua Franca in Asia: Implications for Norms and Practice in Multilingual Asia

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Abstract With the rapid economic development and the increasing activities in trade, education, cultural events, and tourism in Asia, more and more people are using English as a lingua franca (ELF). The Asian Corpus of English (ACE) project has, as one of its defining goals, the collection of a million-word corpus of naturally occurring speech in order to analyse and describe the distinctive linguistic features of Asian ELF and to identify shared features if any. However, little research has been done hitherto on the features of ELF in the Asian context. This paper, therefore, presents a description of the phonological patterns found in ELF. Specifically, the paper focuses, inter alia, on the monophthong vowels and rhythmic patterning in the spoken interactions of ELF speakers from the data as well as the implications for policy and practice of ELF in multilingual Asia. The study is based on the Asian Corpus of English (ACE) data collected in Singapore by the National Institute of Education (NIE) team. Participants in the study include speakers from China, Singapore, the Philippines, Indonesia and India. The paper aims to deepen the boundaries of thinking about shared pronunciation patternings of ELF speakers in Asia and considers the implications of such shared patternings and norms on practice in multilingual Asia.

Keywords Outer Circle, Expanding Circle, ACE corpus, vowel, rhythm

1. Introduction

According to the Kachruvian circles model (1982, 1992) meant to capture primarily the sociolinguistic profile of its speakers (see Low 2010a), English in Asia broadly falls into two different circles, mainly the Outer Circle and Expanding Circle varieties. More specifically, Kachru's circles 'represent the types of spread, patterns and the functional allocation of English in diverse cultural contexts' (Kachru 1992: 356). Additionally, he suggests four perspectives for the study of world Englishes, namely: acquisitional, sociocultural, motivational and functional (Kachru 1992: 54). The acquisitional perspective looks at whether English is acquired as a first (or native), a second or a foreign language and accordingly, the labels English as a native language (ENL), English as a second language (ESL) and English as a foreign language (EFL) have been used to describe Inner Circle speakers who are mainly ENL speakers, Outer Circle

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speakers, the ESL speakers and the Expanding Circle with EFL speakers. The sociocultural context in which Englishes function determine their roles and functions. The motivational perspective looks at why speakers are motivated to learn English e.g. for instrumental or integrative purposes. Finally, the functional perspective considers whether English is used as language for intra- or international communication. Embracing Kachru's perspectives in looking at English in Asia, the Outer Circle countries comprise speakers for which English is mainly a second language while the Expanding Circle countries comprise speakers of EFL. This paper has chosen to focus on varieties from both the outer (Singapore, India, the Philippines) and Expanding Circles (China, Indonesia) in Asia. According to Bolton (2008:3), East, South and Southeast Asia have "not only the greatest concentration of 'outer-circle' English-using societies but also a number of the most populous English-learning and English-knowing nations in the world." For this reason, this paper has also chosen to focus on varieties of English spoken in these three regions.

Today, English plays a major role as a lingua franca in multilingual, multicultural Asia. Asia is a geographical region that may further be sub-divided into East, South, Southeast and Asia and the Middle East. It has been described as the largest and most populated continent in the world. Asia may be further divided into East Asia, South Asia, Southeast Asia and the Middle East. Against this vast geographical territory where many different languages are spoken as home languages, English functions as a de facto lingua franca or common language allowing communication to take place. The importance in the role of English in Asia has received recognition in recent years as it has been adopted as the 'sole working and official language' (Kirkpatrick 2010: xi) of the Association of Southeast Asian Nations (ASEAN) in their charter in February 2009. ASEAN is made up of ten member countries, listed alphabetically herewith: Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. The association primarily encourages regional collaboration in the areas of policy, economy and social cooperation. Since its inception in 1967 with the original five member nations of Indonesia, Malaysia, Philippines, Singapore and Thailand, it has grown phenomenally and is thriving economically. ASEAN has a population of about 625 million people, a total gross domestic product (GDP) of about USD$2.4 trillion and has one of the largest economy in the world (Source: http://www.asean-investor.com/, retrieved on 5th June 2016). English is also the working language of ASEAN +3 which comprises China, Japan and

Korea in addition to the 10 member states of ASEAN. The role of English as the official and working language cannot therefore be underestimated in this world regional economic powerhouse especially in the context of ASEAN +3.

It is important to consider the context of English used in Asia. English is used by English-knowing bi- and usually multilinguals for whom English is not their first language. It is used as a common language of communication and hence the term English as a Lingua Franca (ELF) against the backdrop of multilingualism and multiculturalism. Given the immense importance of ELF in Asia, there is still comparative little research that exists in this area though the seminal volume by Kirkpatrick (2010) breaks important new ground in this area and provides a comprehensive, empirical account of the linguistic features found in this region and discusses t implications for policy and pedagogy. It is towards contributing to paucity of research in this region that this paper endeavours to fulfil.

2. Previous Research and Research Questions

Given the importance of ELF in Asia, there exists very few studies focusing on the phonological patterning of varieties of English spoke in Asia as ELF. A few recent studies provide a first breakthrough into this area of study. These are documented in Deterding and Kirkpatrick (2006), Kirkpatrick (2010: 73-85), Deterding (2010) and Deterding (2013: 33-87).

Kirkpatrick (2010: 73) talks about why he does not expect similar phonological features to appear because of the very different circumstances surrounding the development of English in ASEAN. For a start, among the ten member countries, we have those where English first arrived through the process of colonization. Even then, some were colonized by the British (Malaysia, Singapore, Brunei and Myanmar) some by the Americans (the Philippines) others by the French (Cambodia, Laos and Vietnam) and Indonesia by the Dutch. Thailand was never colonised. Dividing up the region according to who the colonial masters were or whether the countries were colonised at all still does not fully paint the picture of how English has developed in these countries. A more powerful categorization can still be found in Kachru's three circles model where the Outer Circle varieties comprise Singapore, Malaysia, Brunei and the Philippines where English is used as a second and increasing a first language while the rest, i.e. Myanmar,

Cambodia, Laos, Vietnam, Indonesia and Thailand reside in the Expanding Circle where English is still a foreign language.

In spite of the differences in the origins and the development in the roles and status of English in the different parts of ASEAN and Asia in particular, Deterding and Kirkpatrick (2006: 395) managed to find some shared pronunciation features which at least four different country speakers produce and these are: initial voiceless dental fricatives as voiceless alveolar plosives, reduced initial aspiration, monophthongisation of some diphthongs e.g. /eɪ/ and /əʊ/, breaking up of triphthongs with an approximant glide in between, stressed function words like pronouns and heavy end syllable/ word stress. They go on to document areas of miscommunication caused by pronunciation differences and find no evidence that any of the shared pronunciation features listed above have led to breakdowns in communication (Deterding and Kirkpatrick 2006: 406). Instead, they have reason to suggest that an additional feature they have observed, i.e. the use of full instead of reduced vowels for unstressed syllables contributes to enhancing intelligibility rather than hinders it.

Kirkpatrick (2010: 74-85) documents the main features of ASEAN ELF. In terms of consonants, he talks about the tendency to reduce final consonant clusters, cites Deterding and Kirkpatrick's (2006) account of the tendency to replace initial dental fricatives with initial alveolar plosives instead. Where vowel features are concerned, he found the lack of phonemic distinction between long and short vowels, the tendency to produce triphthongs with an approximant glide insertion in between, the monophthongisation of diphthongs and the absence of reduced vowels. He also finds the occurrence of stressed pronouns and heavy final syllable/word stress. In studying areas where communication broke down between the speakers of ASEAN ELF, he once again noted like Deterding and Kirkpatrick (2006) that they did not involve the shared pronunciation features and that it was therefore important to establish what these shared features are in order to contribute to the comprehensibility of an ASEAN ELF model.

Deterding (2013: 33-87) approaches the description of the pronunciation features of ASEAN ELF from the perspective of observing misunderstandings or breakdowns in communication between ASEAN ELF speakers, of which, he noted 86% resulted from pronunciation. He categorises the main pronunciation features resulting in the misunderstandings between the ASEAN ELF speakers (Deterding 2013: 89-90). For consonants, the main features

are replacing approximants or nasals, replacement of consonants with another consonant, consonant deletions or insertions, initial and/or final consonant cluster deletions. For features involving vowels, the different ways in which the vowels in NURSE and TRAP are realized, lack of vowel length distinction and vowel reduction were some of the main features causing misunderstandings between speakers of ASEAN ELF. Finally, a difference in word stress and utterance stress patternings, speaking rates, missing or extra syllables were also found to be responsible for causing other instances of misunderstandings.

In reviewing the previous studies on the pronunciation or ELF in Asia, it is clear that the main focus has tended to be on English in Southeast Asia (ASEAN ELF). Additionally, there are also no existing acoustic studies done to validate the phonological features observed in the earlier studies. This paper attempts to fulfil these research gaps by broadening the focus to include samples from other parts of Asia like India. It is noted that Chinese data does feature in the work of Deterding (2013). Secondly, this is also the first attempt, according to the best knowledge of the author, to provide an acoustic analysis of phonological features found in ELF spoken in Asia. Given the paucity of research in the area of studying the phonetic features and phonological patterning of varieties of English spoken in Asia from an ELF perspective, especially in terms of providing acoustic descriptions, the present study has two main aims:

(i) To provide an acoustic investigation of the vowel inventory and rhythmic patterning in the English spoken by speakers of ELF in Asia to each other, specifically from Singapore, India, Philippines, China and Indonesia

(ii) From the findings in (i), to explore some implications for norms and practice in multilingual Asia.

Specific research questions that stem from the aims of the research are as follows:

- What are the vowel inventories of Asian speakers of English?
- What are the rhythmic patternings of these speakers?
- What are the implications for norms and practice in multilingual Asia?

3. Methodology

3.1 Data and subjects

Data for this paper arises from the contributions of the Singapore team who are part of the larger multi-country project team known as the Asian Corpus of English (ACE) headed by Professor Andy Kirkpatrick who was based at the Hong Kong Institute of Education at the inception of the project and for part of the project's duration and who subsequently led the research from Griffith University.

The ACE project has as its primary goal the building of a corpus of spoken ELF in Asia. The secondary aim of building such a corpus is to provide a better understanding of how English is used in multilingual Asia and to attempt a linguistic description of its features and the collective communicative strategies of ELF in Asia speakers. The corpus collected is made up of natural speech in spoken, interactive encounters and it is envisaged that the collation of such a corpus will help in allowing researchers to describe and analyse distinctive linguistic features of Asian ELF, to identify shared linguistic features, analyse the type and causes of misunderstandings (or breakdowns in communication) and to describe the collective communicative strategies of Asian ELF speakers.

Additionally, the ACE project also collaborates with Professor Barbara Seidlhofer and her team from the University of Vienna who have collected the Vienna-Oxford International Corpus of English (VOICE) which is considered to be the European ELF corpus. This collaboration is important in order to conduct a comparative study of Asian ELF with European ELF features. ACE has a multi-country network of partners from different countries in Asia with lead researchers from different institutes of higher learning from China, Japan, Russia, Singapore, Malaysia, Vietnam, Philippines and Brunei.

Data for the present study is collected by the ACE-Singapore team based at the National Institute of Education, Nanyang Technological University, Singapore where the author is the lead investigator. Ethical guidelines stipulated by the Institutional Review Board (IRB) of Nanyang Technological University were strictly adhered to. These include: voluntary participation, informed consent and guaranteed confidentiality and anonymity and were strictly administered during the data collection process. Ethics clearance was sought and approved by the board and given the approval code IRB 11/02/20.

As mentioned in earlier sections, data for this paper represents speakers from two different Kachruvian circles of English. The Outer Circle speakers are from Singapore, India and the Philippines and the Expanding Circle from China and Indonesia. The Outer Circle speakers are all females while the Expanding Circle speakers are males. The age range of all the speakers span between 27-36 years. Each subject has at least a Bachelor's degree with some either possessing or pursuing a postgraduate degree. See Table 1 for details of the subjects used for this study.

Table 1: Participants' Details

Subject	**Gender**	**Nationality**	**Education**	**Occupation**	**1st language(s)**	**Other language(s)**
Singaporean	F	Singaporean	BA	Researcher	Mandarin/Cantonese	English
Indian	F	Indian	Master's	Researcher	Tamil	English
Philippine	F	Filipino	BA	Researcher	Sinama/Tausog	Filipino, English
Chinese	M	Chinese	PhD student	Researcher	Mandarin	English
Indonesian	M	Indonesian	PhD student	Student	Bahasa Indonesian	English

Sound quality is of extremely important for close acoustic analysis. In the case of this paper, this was particularly challenging as data was not the usual type collected for close acoustic analysis viz. citation forms, read sentences or a read passage. Instead, it was important to collect natural speech data of participants interacting with each other during informal conversations. To meet the high quality of recordings required for acoustic analysis of the speech data collected, participants were recorded in quiet though not soundproofed rooms. These quiet locations included air-conditioned tutorial rooms and meeting rooms at various university campuses where doors were closed to minimize any unwarranted noise interference. Recording was done via a high quality ZOOM H4n PCM portable digital recorder with an in-built microphone and placed a few inches away from each participant's mouths when they were in conversation. This digital recorder captures data in .wav format which makes it convenient for transfer to a computer for further acoustic analysis. A sampling rate of 22, 500 Hz was used as this is the minimum baseline requirement required for close acoustic analysis of speech as suggested by Hayward (2000).

3.2 Acoustic analysis of data

The speech samples were analysed using a freely available software, Praat (Version 5.2.33) for the acoustic analysis of speech developed by Boersma and Weenink (2011) of the Institute of Phonetic Sciences based ta the University of Amsterdam. The present study limits its focus on the monophthongs (henceforth referred to as 'vowels') of the five varieties of English in Asia. In selecting sample words for measurement, the present study adhered to the three guidelines from Deterding (2006), namely (1) each instance of monophthong used for measurement is clear and occurs in a stressed position; (2) monophthongs preceded or followed by /r/, /w/ and /j/ were avoided; and (3) monophthongs followed by /l/ and /ŋ/ were also avoided. For each monophthong, I measured the F1 and F2 formant frequencies which roughly correspond to vowel frontness and height according to Lehiste and Peterson (1961) and are widely used in acoustic studies involving vowels. The F1 and F2 measures were taken at the mid-point of the steady state of monophthongs, as is a commonly used method for such purpose.

To obtain the vowel quadrilaterals of each of the five speakers from the different countries, each speaker's average F1 and F2 values were taken and transformed using a Bark scale, a method widely used and accepted by phoneticians (Hayward 2000: 142). The Bark scale transforms the values obtained for F1 and F2 into a perceptual space which then helps to create a visual representation of the perceived vowel space of a speaker (see Hayward 2000: 140-142 for more details). The Bark scale ensures that the distance between the plotted vowel formant values are similar to the perceived acoustic distance between the vowels. The Bark scale conversion formula is the used in a previous study by Ao & Low (2016) which is the one proposed by Zwicker and Terhardt (1980) and also adopted by Deterding (2003). The formula is recapitulated herewith:

$$Z = 13 \arctan(0.76f/1000) + 3.5 \arctan(f/7500)^2$$

where F is the frequency in Hz and Z is the frequency in Bark

F2 is plotted against F1 to get the acoustic vowel space of the speakers. In order to plot the formant values of female together with those of male speakers, the Lobanov (1971) normalization was conducted using the method introduced by Thomas and Kendall (2015). Normalization of formant values is necessary in such case due to the difference existing between

the size and dimension of the vocal tract of female and male speakers. Additionally, to check whether the vowel space of each speaker are significantly different from each other, one measure is to calculate the distance of individual vowels from the central point (centroid) in the speaker's acoustic vowel space known as the Euclidean distance. Following Deterding (1997), the Euclidean distance (except for the central vowel /ɜː/) was calculated as the average value of F1 and F2 in Bark. As the data was from naturally occurring speech, great effort was taken to hunt for at least three instances of the occurrence of each monophthong from the speech samples of each speaker. However, in the case of Indian English and Indonesian English, only two instances of the short vowel /ʊ/ were selected because there were only two clear instances of this vowel for both varieties.

For the measurement of rhythm, 10 utterances with no less than seven syllables with no pause in between each were isolated for the measurement making a total of 50 utterances for measurement. The measurement of rhythm with the invention and advent of rhythm indexes or metrics as they are sometimes called has dominated the world of rhythmic research arguably since the seminal work of Low & Grabe (1995), Low, Grabe & Nolan (2000) and Grabe & Low (2002) and the Pairwise Variability Index (PVI) which first appeared in the doctoral dissertation of Low (1998). Low (2015: 102-109) provides a detailed account of the development of rhythm indices/ metrics and studies that have been based on the use of the metrics. In spite of the advent of new indices, this paper has chosen to use the PVI for the measurement of rhythmic patterning across the five speakers based on the findings by Ong, Deterding and Low (2005) which compared the three rhythm indices developed by Ramus, Nespor and Mehler (1999), Low, Grabe and Nolan (2000) and Deterding (2001). The bases for each of these rhythmic indices are based on the concept of durational measurements of units of speech. In the case of Ramus et al. (1999), they measured vocalic and consonantal durations in an attempt to classify languages according to a typology that ranged from stress-based timing (where the intervals between stresses are supposed to be more nearly equal or isochronous) to syllable-based timing (where the intervals between syllables are supposed to be isochronous). Low et al. (2000) were able to provide empirical evidence to show that varieties of English previously classified as syllable-timed had a significantly lower PVI than those classified as stress-timed. This may be explained by the significantly less vowel –to-vowel durational variability in syllable-timed languages compared to stress-timed ones because they have fewer reduced vowels in unstressed syllables compared to

previously classified stress-timed languages. Deterding (2001) developed the Variability Index (VI) which aimed to capture syllable-to-syllable variability and postulated that syllable structure and weight played important roles in capturing the rhythmic typology of languages. Findings by Ong et al.'s (2005) study showed that the PVI yielded the highest correlation with the perception of rhythmic patterning of languages. For this reason, the present study will adopt Low et al.'s (2000) PVI as the basis for measuring the rhythmic patterning found in the different speech samples.

The version of the PVI used is the one found in Low et al. 2000 which has been normalized for variations in speaking rate is expressed in formulaically as:

$$nPVI = 100 \times \left[\sum_{k=1}^{m-1} \left| \frac{d_k - d_{k+1}}{(d_k + d_{k+1})/2} \right| / (m-1) \right]$$

where m= number of vowels in an utterance and
d= duration of the kth vowel.

As mentioned earlier, the PVI measures the degree of durational variability between vowels, normalizes for speech rate variation and is expressed as an index. The multiplication by 100 is to convert fractional values to whole numbers. A high PVI indicates greater variability in duration between successive vowels in an utterance compared to one which has a low PVI and hence, less variability in duration between successive vowels. A high PVI has been found in languages previously classified as stress-timed while a low PVI has been found for languages hitherto classified as syllable-timed (Low et al. 2000; Grabe and Low 2002; Low 2010). The version of the PVI used here also takes into account the small modifications made by Deterding (2006) where the minimum vowel duration is set at 30 milliseconds to avoid situations where vowels are extremely reduced and the vowels not measurable.

For the purpose of measuring the vowel formants and vowel durations, vowel segmentation was done according to the principles outlined in Low (1998: 36). Specifically, searching for a steady state in the formant structures before a change occurs, listening to verify segmentation positions and being consistent about applying the same principles throughout the measurement process. For a sample vowel segmentation, please see Figure 1.

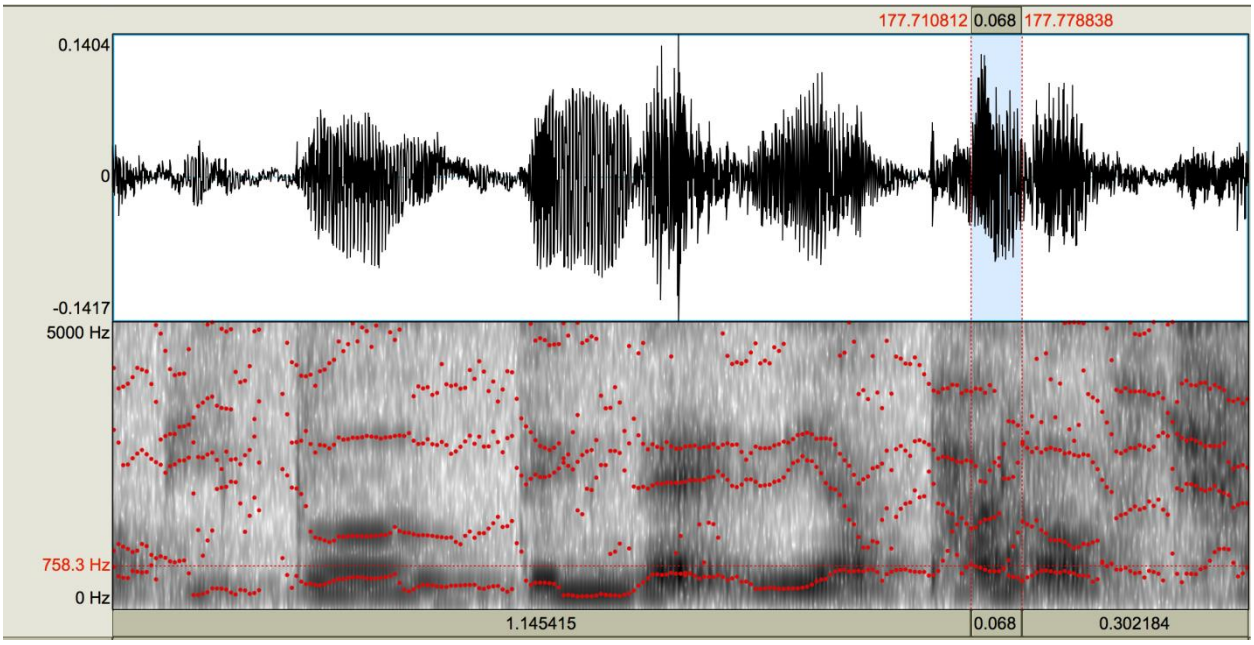

Figure 1: Sample vowel segmentation (the shaded part shows the segmentation of the long vowel /ɑː/ in the word 'part' produced by the Singapore English speaker in the present data)

The present study adopts British English (henceforth BrE) as the reference variety. It must be noted that BrE here refers to "Standard Southern British English" (or SSBE) (see Deterding 1997; Low and Brown 2005: 13). By using BrE as the reference variety, however, I do not assume that it is a standard Inner Circle variety of English that the Outer and Expanding Circle varieties should aspire to. It is only adopted as a convenient reference variety with which the phonological features of the varieties of English can be compared.

4. Results

Figures 2-6 show the individual average vowel formant plots for the five different speakers. Figure 2 shows the average vowel formant plot for the Singapore English (SgE) speaker.

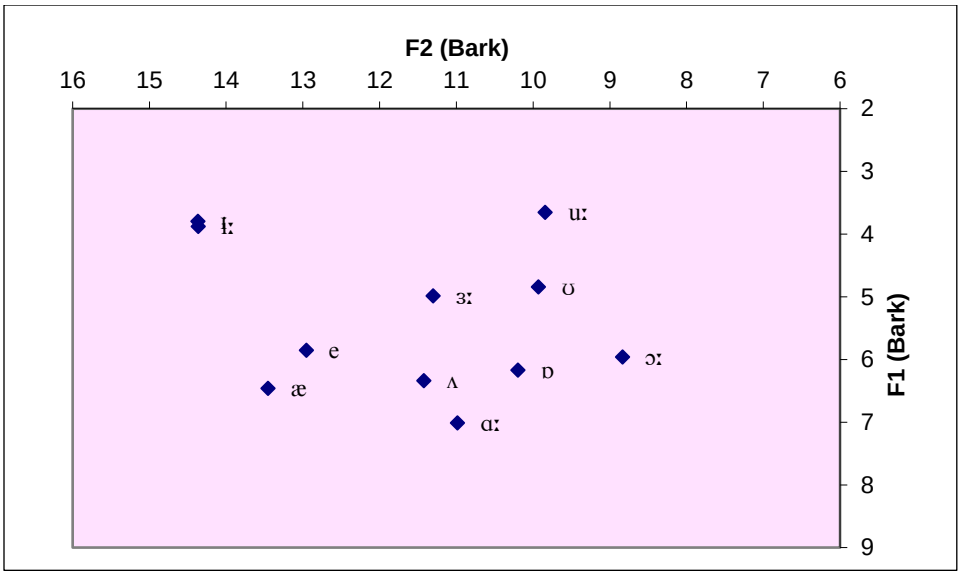

Figure 2: Average vowel formant plot for Singapore English speaker

From Figure 2 above, it is clear that there is an overlap in the vowel formant values for the long and short vowels /iː/ and /ɪ/. All other vowel qualities appear to be distinct from the plot. The quality obtained for /æ/ is more fronted than would be expected for British English (BrE). The long and short vowel pairs /uː/ and /ʊ/ also appear to be more centralized than what would be expected for BrE.

Figure 3 shows the average vowel formant plot for the Indian English speaker.

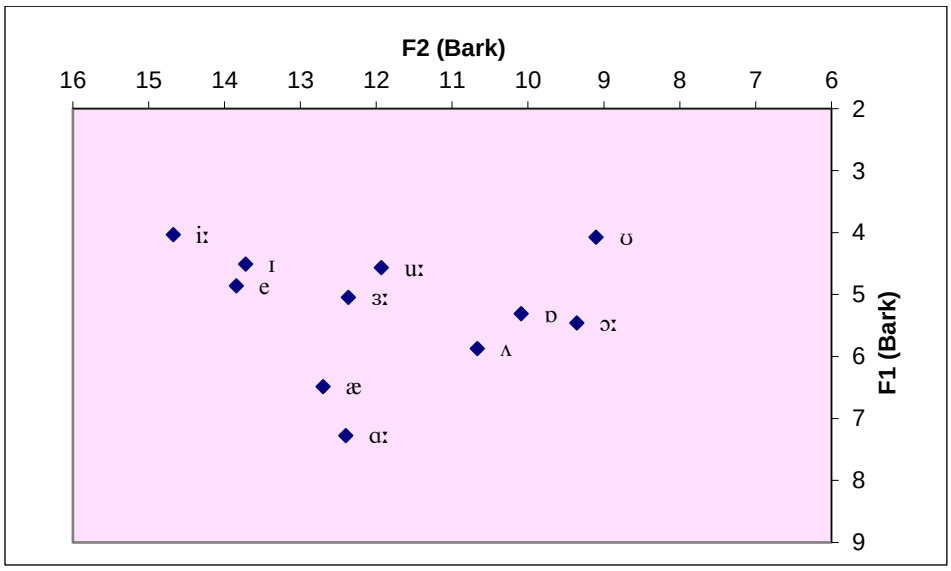

Figure 3: Average vowel formant plot for Indian English speaker

The vowels appear to be distinct in that there is no instance of overlap between any vowels. It should be noted, however, that this observation is based on the mean formant values. One should not neglect the fact that the variability does exist behind the mean values. This is worthy of close investigation in future studies involving more speakers. Some unique features that stand out are that the long back vowel /u:/ appears to be very centralized and the rounded back vowel /ɒ/ also appears to be rather centralized.

Figure 4 shows the average vowel plot for the Philippine English speaker.

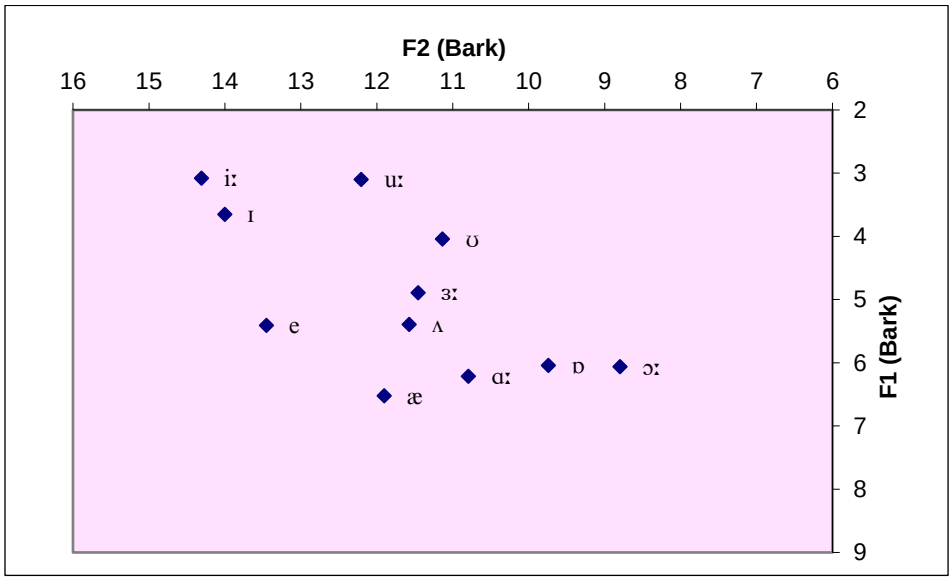

Figure 4: Average vowel formant plot for the Philippine English speaker

Again, from the average vowel formant plot alone, it appears that the Philippine English (PhilE) speaker does distinguish all vowels. The back vowel pairs /u:/ and /ʊ/ are realized with a more centralized quality such clustering itself with the other central vowels like /ɜ:/ and /ʌ/ for example. The open front vowel /æ/ is also more centralized in quality than fronted.

Figure 5 shows the average vowel formant plot for the Chinese English speaker.

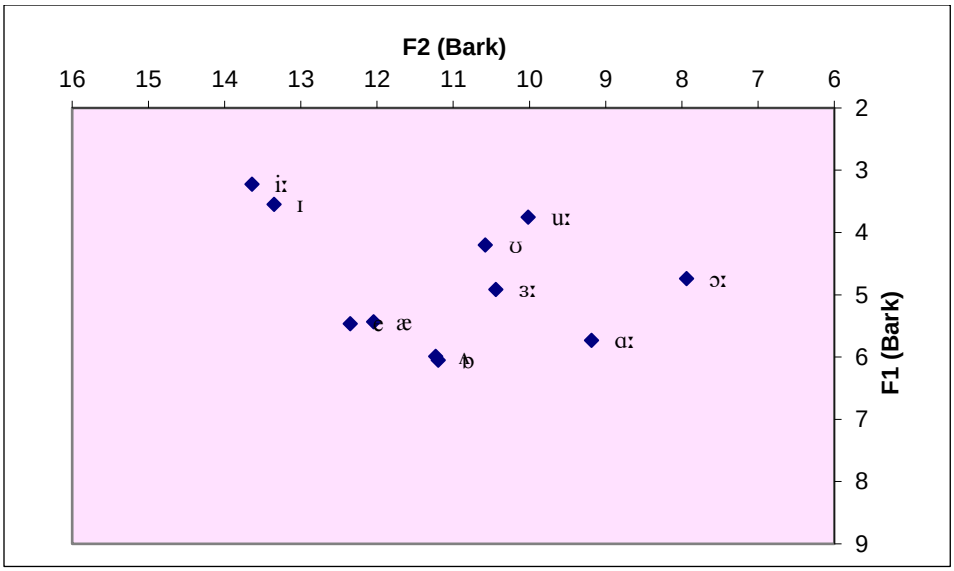

Figure 5: Average vowel formant plot for the Chinese English speaker

From figure 5, there appears to be an overlap of the vowels /ɒ/ and ʌ/. The vowels /e/ and /æ/ the same level of openness and /æ/ appears more mid than open. The back vowel pairs /u:/ and /ʊ/ are also more centralized than one would expect for a BrE speaker.

Figure 6 shows the average vowel formant plot for the Indonesian English speaker.

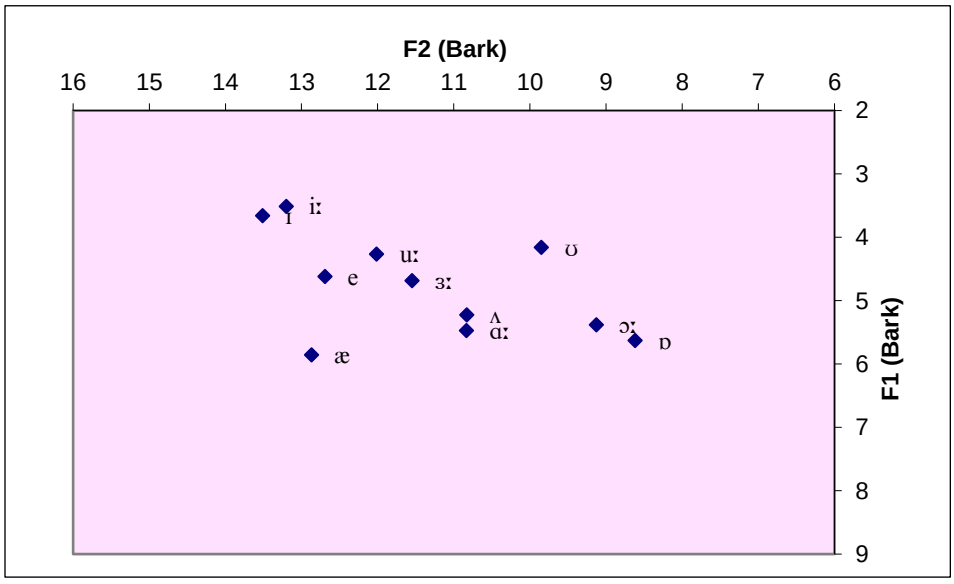

Figure 6: Average vowel formant plot for the Indonesian English speaker

Again, from the vowel formant plot alone, the vowels appear to be distinct. The back vowel /u:/ is centralized but other than that, the vowel formant plot appears to be rather similar to what one would find for BrE speakers.

Figure 7 shows the average vowel formant plots for all five speakers plotted together and the values have been normalized for male-female differences suggested by Thomas and Kendall (2015).

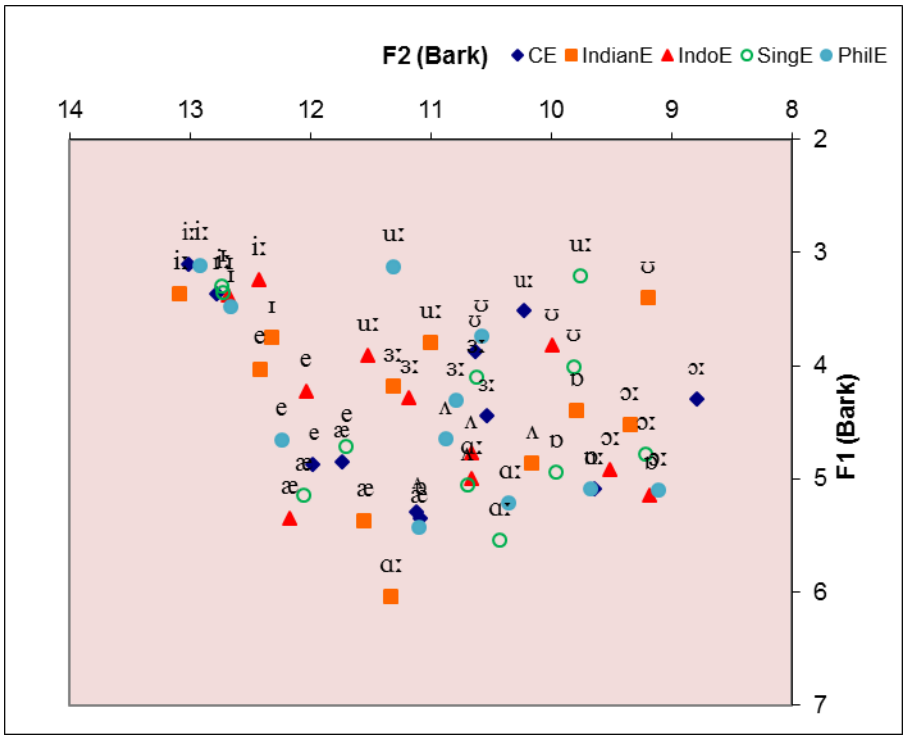

Figure 7: Vowel formant plot for all five varieties of English (Lobanov normalized)

A visual inspection of the scatter plots overlaid with the average vowel formant plots of all five varieties of English shows a clustering of the long and short vowel pairs, /i:/ and /ɪ/, /u:/ and /ʊ/, /ɑ:/ and /ʌ/ and /e/ and /æ/.

Figure 8 shows the average vowel formant plots for the Outer Circle varieties while Figure 9 shows the average vowel formant plots for the Expanding Circle varieties in this study.

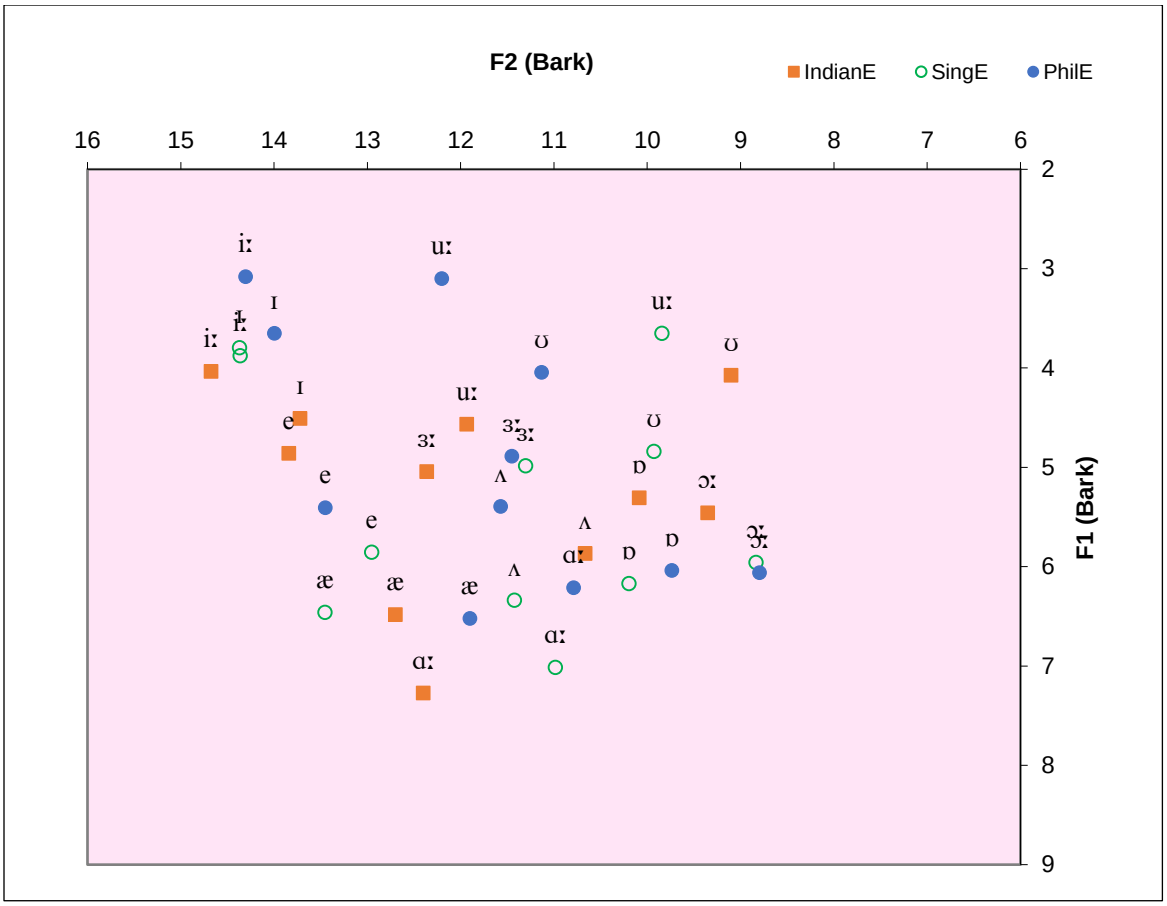

Figure 8: Average vowel formant plots for Outer Circle varieties

A visual inspection of Figure 8 representing the Outer Circle varieties suggests that there is less clustering than one found in the overall plot represented in Figure 7. In this figure, only the long-short vowel pair /i:/ and /ɪ/ appear to be clustered.

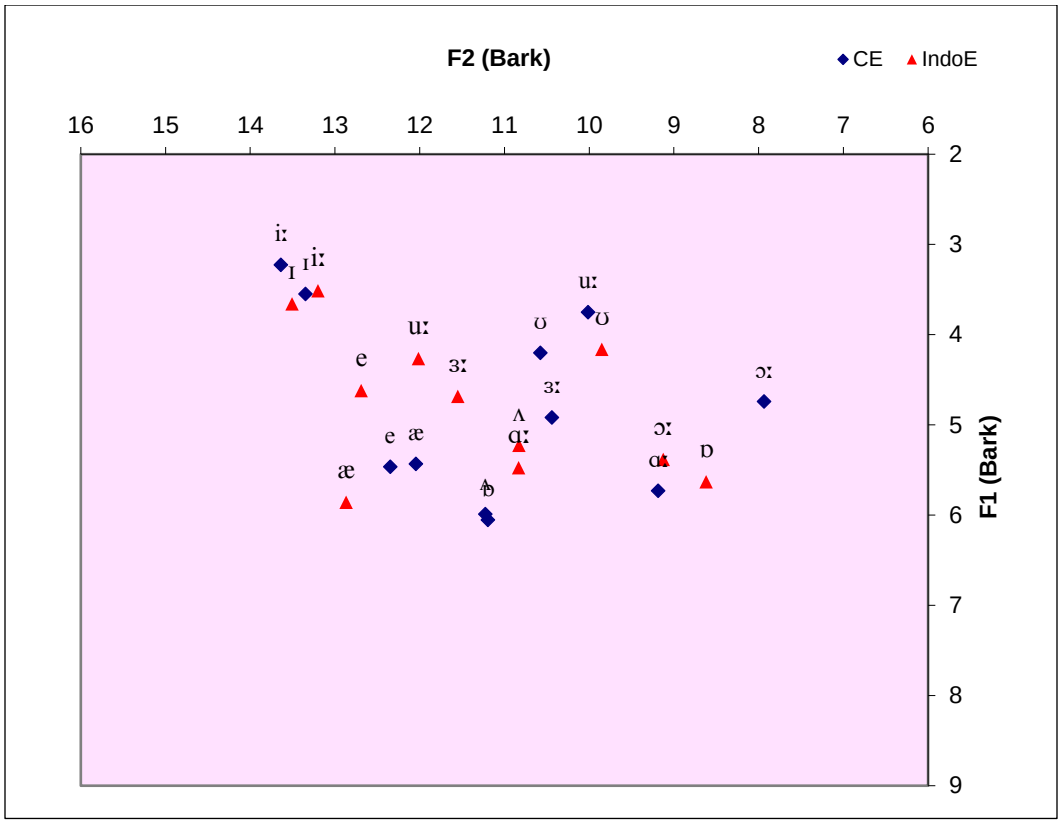

Figure 9: Average vowel formant plots for Expanding Circle varieties

Figure 9 shows a clustering of the long-short vowel pairs /iː/ and /ɪ/ and an overlap between two short monophthongs /ɒ/ and /ʌ/.

It is impossible from mere visual inspection to ascertain whether the values are statistically similar or different. To do so will require further statistical analysis and for this reason, a paired t-test (two-sample assuming unequal variances) was done on all F1 and F2 values for each vowel pair that appears to be clustered. Tables 2 and 4 show the results obtained.

From Table 2 below, it is clear that among the Outer Circle countries, there is evidence of conflation of all long and short vowel pairs except for /ʌ/~/ɑː/. The vowels /e/~/æ/ are also not distinct.

Table 2: T-test for Outer Circle countries (two-tailed, two-sample assuming unequal variances)

Vowel Pairs	F1	F2
/iː/~/ɪ/	Insignificant (t=0.9, df=23, p>0.05)	Insignificant (t=1.1, df=27, p>0.05)
/e/~/æ/	Significant (t=4.1, df=25, p<0.05)	Significant (t=2.5, df=25, p<0.05)
/ʌ/~/ɑː/	Significant (t=2.5, df=26, p<0.05)	Insignificant (t=0.12, df=22, p>0.05)
/ɒ/~/ɔː/	Insignificant (t=0.02, df=25, p>0.05)	Insignificant (t=1.9, df=23, p>0.05)
/ʊ/~/uː/	Insignificant (t=1.5, df=14, p>0.05)	Insignificant (t=1.7, df=19, p>0.05)

Table 3: T-test for Expanding Circle countries (two-tailed, two-sample assuming unequal variances)

Vowel Pairs	F1	F2
/iː/~/ɪ/	Insignificant (t=1.6, df=14, p>0.05)	Insignificant (t=0.07, df=11, p>0.05)
/e/~/æ/	Insignificant (t=1.2, df=12, p>0.05)	Insignificant (t=0.6, df=16, p>0.05)
/ʌ/~/ɑː/	Insignificant (t=0.3, df=12, p>0.05)	Insignificant (t=1.7, df=10, p>0.05)
/ɒ/~/ɔː/	Insignificant (t=1.7, df=13, p>0.05)	Insignificant (t=1.2, df=15, p>0.05)
/ʊ/~/uː/	Insignificant (t=0.6, df=12, p>0.05)	Insignificant (t=0.8, df=8, p>0.05)

From Table 3 above, it is clear that for the Expanding Circle varieties, there is evidence that all long-short vowel pairs and the vowels /e/~/æ/ are conflated and not distinct.

Table 4: T-test for both Outer and Expanding Circle countries (two-tailed, two-sample assuming unequal variances)

Vowel Pairs	F1	F2
/iː/~/ɪ/	Insignificant (t=1.1, df=43, p>0.05)	Insignificant (t=1.3, df=52, p>0.05)
/e/~/æ/	Significant (t=3.6, df=37, p<0.05)	Significant (t=2.2, df=44, p<0.05)
/ʌ/~/ɑː/	Insignificant (t=1.6, df=37, p>0.05)	Insignificant (t=0.8, df=33, p>0.05)
/ɒ/~/ɔː/	Insignificant (t=1.3, df=42, p>0.05)	Significant (t=2.2, df=41, p<0.05)
/ʊ/~/uː/	Insignificant (t=1.7, df=26, p>0.05)	Insignificant (t=1.9, df=30, p>0.05)

From Table 4 above, clumping the F1 and F2 values for the Outer and Expanding Circle varieties together, it is clear that all long-short vowels are conflated except for /ɒ/~/ɔː/ and the front vowels /e/~/æ/ are distinct.

As mentioned earlier, it is important to compare the Euclidean distance (distance from the centroid or central point) for the different varieties of English to ascertain whether their overall vowel qualities are significantly similar or different. Table 5 shows the Euclidean distance for the five varieties of English in this study.

Table 5: Euclidean Distance for five varieties of English

Indian English	Singapore English	Philippine English	Chinese English	Indonesian English
2	2.132	1.962	1.814	1.707

A paired t-test (two sample, two-tailed assuming unequal variances) was conducted to ascertain whether any of the Euclidean distances were significant from each other and the results were negative meaning that the Euclidean distances were insignificant from each other. Table 6 shows the pairwise comparisons and the results.

Table 6: Tests of statistical significance between Euclidean distance obtained between the different varieties of English

Chinese English vs Indian English	Insignificant (t=2.3, df=9, p>0.05)
Chinese English vs Indonesian English	Insignificant (t=2.3, df=9, p>0.05)
Chinese English vs Singapore English	Insignificant (t=2.3, df=9, p>0.05)
Chinese English vs Philippine English	Insignificant (t=2.3, df=9, p>0.05)
Indian English vs Indonesian English	Insignificant (t=2.3, df=9, p>0.05)
Indian English vs Singapore English	Insignificant (t=2.3, df=9, p>0.05)
Indian English vs Philippine English	Insignificant (t=2.3, df=9, p>0.05)
Indonesian English vs Singapore English	Insignificant (t=2.3, df=9, p>0.05)
Indonesian English vs Philippine English	Insignificant (t=2.3, df=9, p>0.05)
Singapore English vs Philippine English	Insignificant (t=2.3, df=9, p>0.05)

Table 7 shows the average PVI values obtained for Indian English, Singapore English, Philippine English, Chinese English and Indonesian English while Figure 10 presents the results graphically.

Table 7: Average PVI values obtained for five varieties of English

Indian English	Singapore English	Philippine English	Chinese English	Indonesian English
44.58	34.74	44.58	37.1	46.18

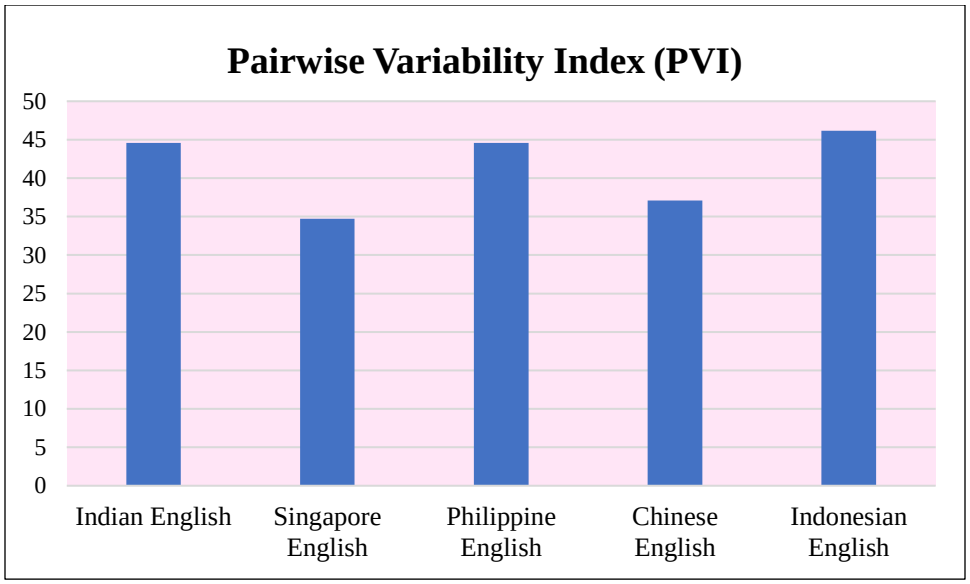

Figure 10: Average PVI values for the five varieties of English

Just looking at the PVI values obtained suggest that the values look similar to each other with SgE being the most syllable-timed (closest to 0) and IndoE being furthest away from 0 at 46.18. All values appear to be consistent with previous studies done on syllable-timed languages which typically return PVI values of in the 30s to the 50s and usually in the 40s range. However, the values need to be subject to tests for statistical significance before one can ascertain whether they are similar or different statistically.

A paired two-sample t-test assuming unequal variances was done between the different varieties of English to test for statistical similarity or difference in the PVI values obtained. A comparison of the PVI values obtained between the Outer Circle varieties was first done. The PVI values obtained for IndE was compared with that obtained for SgE and this was found to be marginally significant ($t=2.1$, $df=18$, $p<0.05$). Upon closer inspection of the raw figures, it is clear that there was huge variation in the PVI values obtained for the IndE speakers which could have contributed to the significant results. A comparison of the PVI values for IndE and PhilE also showed them to be insignificant ($t=2.1$, $df=16$, $p>0.05$). Next, a comparison of the PVI values for PhilE and SgE was compared and also found to be insignificant ($t=2.1$, $df=16$, $p>0.05$). Based on the statistical tests conducted, it can be concluded that the rhythmic patterning as measured by the PVI values for the Outer Circle varieties are statistically similar.

Next, a comparison of the PVI values obtained for the two Expanding Circle varieties, namely ChE and IndoE was compared and the values were found to be insignificant ($t=2.1$, $df=17$, $p>0.05$). This suggests that the rhythmic patterning of the Expanding Circle varieties is statistically similar.

Finally, a t-test was conducted to compare the average PVI values obtained for all the Outer Circle varieties (IndE, SgE, PhilE) against the average PVI values obtained for the Expanding Circle varieties (ChE and IndoE). The statistical comparison between the Outer and Expanding Circle varieties showed was found to be insignificant ($t=0.09$, $df=33$, $p>0.05$) and this suggests that the rhythmic patterning between the Outer and Expanding Circle varieties in this study are similar.

5. Discussion

5.1 Implications for norms

Results from measuring vowels and rhythm show that the five varieties under study are statistically similar in terms of the vowel qualities produced and their overall rhythmic patterning. This finding is not surprising as it concurs with a previous acoustic study by Low (2010a) which measured the rhythmic patterning of the formal spoken English of SgE and ChE speakers. Her results showed that the PVI values obtained for SgE and ChE were statistically similar. Interestingly, while ChE and SgE were statistically similar, ChE also showed similarities with BrE rhythmic patterning. SgE rhythm was found to be statistically different from that of BrE. Low (2010a) then came up with the Venn Diagram of Rhythmic Patterning shown in Figure 11 below.

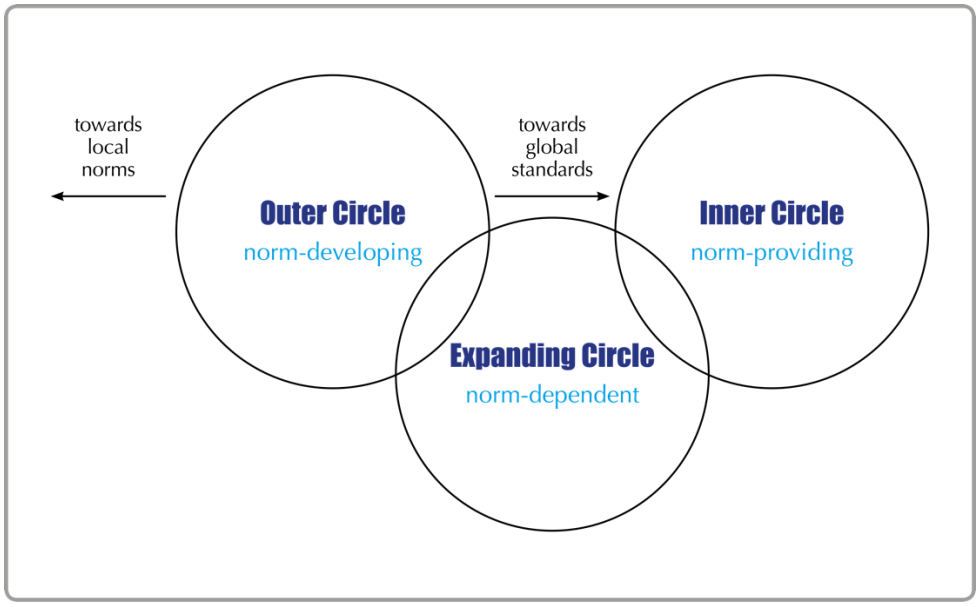

Figure 11: Low's Venn Diagram for rhythmic patterning (revised from Low 2010a and Low 2014)

What is interesting about the Venn Diagram is the fact that the it schematically shows how Expanding Circle varieties exhibit similar features to Outer Circle varieties but also shares similarities with inner circle varieties. This diagram validates the Kachruvian paradigm by showing that there are Expanding Circle varieties are norm-dependent on inner circle varieties and thus share similar properties of speech. However, what is interesting is that the norm-dependent Expanding Circle varieties also show similarities with the norm-developing Outer Circle varieties and how Expanding Circle varieties develop will be interesting to track longitudinally

The data from vowel quality and rhythmic patterning measurements from this study of informal speech of ELF in Asia provide a new dimension for further consideration. The acoustic data and the statistical analysis provide empirical evidence to show that at least in two aspects of phonological patterning i.e. vowel quality and rhythm, both the Outer and Expanding Circle varieties belong, in fact, to the same circle. This was first articulated in a conference presentation by Low & Ao (2011) and first written up herewith. This 'bi-polar' model, shown in Figure 12 below represents a rethink of norms for ELF in Asia in particular. My suggestion is that both the Outer and Expanding Circles belong to the same circle especially during informal interactions. Taking this suggestion a step further, the Expanding Circle varieties are also becoming norm-developing like their Outer Circle counterparts. Explaining this model from the sociolinguistic

realities of ELF in Asia, it suggests that the movement away from the inner circle norms is a result of wanting to exert the local self via the local variety of English. The tension between the global pull towards the inner circle and the local pull may be represented by what is known as the glocal tension in terms of norms when considering ELF in Asia. The fact that the Expanding Circle is becoming more like the Outer Circle varieties especially during informal interactions is indicative that ELF in Asia is itself, setting its own norms.

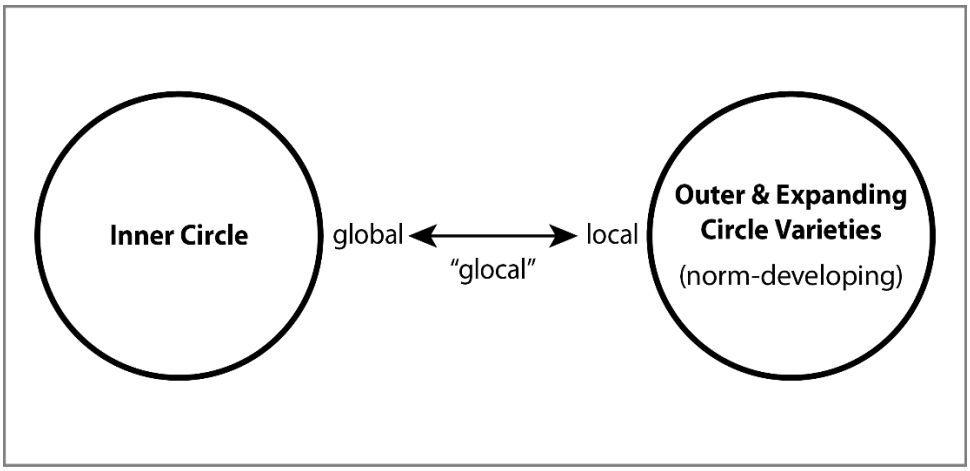

Figure 12: Bi-Polar Model (first presented in Low and Ao 2011)

A clear caveat is needed as no inner circle varieties were examined in this study. Any reference to values expected can only be postulated by previous research done on inner circle varieties (See for example, Low 2010a).

5.2 Implications for practice

Low (2010b: 248) study developed a table suggesting which of the Lingua Franca Core (LFC) pronunciation features suggested might pose a problem for international intelligibility in Singapore English. Referring to Kirkpatrick's (2007) intelligibility-identity continuum cited in Walker (2010: 20), one can reconstruct the LFC syllabus with two additional columns for intelligibility and identity based on previous studies especially that by Deterding (2013) who provides a thorough account of all the pronunciation features that are shared and those that contribute to misunderstandings or breakdowns in communication. However, based on the

findings from the present study, I propose a revision to the LFC core syllabus along the intelligibility-identity continuum suggested by Kirkpatrick (2007). See Table 8 below.

Table 8: What an ELF in Asia Syllabus might look like

Pronunciation Feature	Lingua Franca Core Syllabus	Important for Identity?	Important for Intelligibility?
1. Consonantal Inventory	All except for /θ, ð, l/		
2. Phonetic Realisations	Aspiration after /p, t, k/ Pre-fortis lengthening/ pre-lenis weakening		
3. Consonant Clusters	Preserve word-initially and medially		
4. Vowel Quantity	All long-short vowel contrasts	YES (meaning conflation is a shared feature)	Not if regional qualities are maintained and shared
5. Vowel Quality	Consistent Regional Qualities can be preserved	YES (meaning conflation is a shared feature)	Not if regional qualities are maintained and shared
6. Weak Forms	Not necessary	YES (meaning not to have them is an expression of identity)	Might even add to intelligibility as Deterding (2013) suggests
7. Stress-timed rhythm	Not necessary	YES (a shared norm)	Might even add to intelligibility as Deterding (2013) suggests
8. Word Stress	Hard to teach		
9. Nuclear Tonic Stress	Critical		

It is noted that many of the rows are blank at the moment as the present study only conducted a close acoustic analysis of vowels and rhythmic patterning and while I am able to draw on previous findings by Deterding (2013) and Kirkpatrick (2010), acoustic validation of the observed features is needed.

6. Conclusion

The present study aims to provide an acoustic investigation of the vowel inventory and rhythmic patterning in the English spoken by speakers of ELF in Asia to each other, specifically from Singapore, India, Philippines, China and Indonesia and to explore some implications for norms and practice in multilingual Asia.

Results from the vowel quality and rhythmic measurements show that there are many similarities that exist between the five varieties of English leading me to come up with the bi-polar model for ELF norms in Asia. Essentially, this study has shown that there are several shared pronunciation features among the five varieties of English hitherto classified as two different circles of English (Outer and Expanding Circle). These shared features, in turn, can form the basis for developing ELF pronunciation norms in Asia and consequently, they can guide the construction of an ELF core syllabus in Asia, a sample of which has been developed.

There are clear limitations to the present research, not least the fact that only 1 speaker from each variety has been analysed. Additionally, many more features can be added for close acoustic analysis particularly consonantal and suprasegmental features that have been documented in previous perceptual studies. In spite of its limitations, however, this study is the first that uses acoustic means to explore ELF spoken interactive data and more studies of this nature are urgently needed in the future to validate earlier perceptual observations made.

The author gratefully acknowledges the Asian Corpus of English (ACE) project funded by Research Centre into Language Education and Acquisition in Multilingual Societies, Hong Kong Institute of Education for the permission to use the ACE corpus data for the present study.

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