

AN ACOUSTIC ANALYSIS OF THE MONOPHTHONGS OF
PENANG MALAY

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FACULTY OF LANGUAGES AND LINGUISTICS
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OF PENANG MALAY**

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ABSTRACT

The study aims to examine acoustically the production of monophthongs of Penang Malay by five (5) selected female participants who are of the Jawi Peranakan community. Two (2) female participants of Standard Malay were also selected as a comparator to Penang Malay. The first research question focuses on the acoustic features of Penang Malay and Standard Malay based on their formant frequencies of F1 and F2, while the second research question examines the similarities and differences between Penang Malay and Standard Malay based on their acoustic properties. The target vowels are: [a], [i], [u], [ɛ], [ɔ], [ə], [e], and [o]. A series of words were used in eliciting data from the participants. The tokens produced by the participants were recorded and analyzed based on the Formant Frequency Model. The findings reveal that the participants of Penang Malay generally did not distinguish between [ɛ] and [e] and conflated them as one vowel. The findings also suggest that Penang Malay and Kedah Malay are not homogenous as claimed by past researchers.

Keywords: Formant Frequency Model, Jawi Peranakan, monophthongs, Penang Malay

ABSTRAK

Kajian ini bertujuan untuk mengkaji secara akustik penghasilan monoftong Dialek Melayu Pulau Pinang oleh lima (5) peserta wanita terpilih yang berketurunan Jawi Peranakan. Dua (2) peserta wanita Bahasa Melayu Standard juga dipilih sebagai pembandingan dengan Dialek Melayu Pulau Pinang. Soalan kajian pertama memfokuskan pada ciri akustik Dialek Melayu Pulau Pinang dan Bahasa Melayu Standard berdasarkan frekuensi formant F1 dan F2, manakala soalan kajian kedua mengkaji persamaan dan perbezaan antara Dialek Melayu Pulau Pinang dan Bahasa Melayu Standard berdasarkan sifat akustiknya. Vokal sasaran adalah: [a], [i], [u], [ɛ], [ɔ], [ə], [e], dan [o]. Satu senarai perkataan digunakan dalam mendapatkan data dari para peserta. Token yang dihasilkan oleh peserta direkodkan dan dianalisis berdasarkan *Formant Frequency Model*. Hasil kajian menunjukkan bahawa peserta Dialek Melayu Pulau Pinang pada umumnya tidak membezakan antara [ɛ] dan [e] dan menyatukannya sebagai satu vokal. Hasil kajian juga menunjukkan bahawa Dialek Melayu Pulau Pinang dan Dialek Melayu Kedah tidak homogen seperti yang didakwa oleh penyelidik-penyelidik lepas.

Kata kunci: Formant Frequency Model, Jawi Peranakan, monoftong, Dialek Melayu Pulau Pinang

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LIST OF SYMBOLS AND ABBREVIATIONS

Ave	: Average
F1	: First formant
F2	: Second formant
Hz	: Hertz
NORF	: non-mobile, old, remote, female
NORM	: non-mobile, old, remote, male
PM	: Penang Malay
SD	: Standard deviation
SM	: Standard Malay
SPM	: Sijil Pelajaran Malaysia
SPVM	: Sijil Pelajaran Vokasional Malaysia
UNESCO	: United Nations Educational, Scientific and Cultural Organization

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CHAPTER 1: INTRODUCTION

1.1 Introduction

This chapter discusses the contextualization of the study and its fundamental concepts. These concepts include the background of the study, statement of the problem, research objectives, research questions, significance of the study, and the organization of the study.

1.2 A brief background of the Malay language

Bahasa Melayu or Malay language has always held high prestige in the Malay Archipelago. According to Ajid Che Kob (1982), the glorious history of Malay dated back to 1,500 years ago. Malay is regarded as a *lingua franca* as many speakers widely speak it in Malaysia, Indonesia, Mindanao (southern Philippines), Singapore, and Brunei (Asmah Haji Omar, 1982). Sociolinguistically, Malay had always held its high prestige in the Malay Archipelago.

The historical development of the Malay language should be viewed from the etymology of the word “Malay”. The origin of this word has not yet been confirmed by historians (Asmah Haji Omar, 1987). What can be done is to examine some of the evidence that may be associated with the word “Malay”. The Chinese records state that a government called *Mo-lo-yeu* presented some natural resources to the Emperor of China circa 644-645 AD. There is also a view that the government of *Mo-lo-yeu* was centered in Jambi, Sumatra, because of a river called Sungai Melayu. A Chinese record also states that a Buddhist monk named I-Tsing used the word when describing two kingdoms he visited around 675 AD. In Ancient Javanese, the word “Mlayu” means to run or wander; this can be associated with the arrival of Indo-Malay who were said to

have come from Yunan to Malaya (Abdul Rashid Melebek & Amat Juhari Moain, 2008).

The word “Malay” can be viewed from two aspects, namely, the narrow and broad aspects (Asmah Haji Omar, 1985). The term refers to the Austronesian people who are on the Malay Peninsula and the traditional area called the islands of the Malay Archipelago. These islands make up Indonesia today.

In 1972, the United Nations Educational, Scientific and Cultural Organization (UNESCO) chose Malay as the term to refer to the Malays who inhabited the Malay Peninsula, the eastern coast, and a few more surrounding areas. The language used by the people in this area is Malay, and it is the national language of Malaysia.

1.3 Penang Malay

Linguistically, native speakers of Malay in Penang speak one of Kedah subdialects (Asmah Haji Omar, 1985, 1993, 2008). Kedah Malay or Kedah Malay dialect is the Malay language that has unique properties, and it is spoken from Perlis up to the north of Perak (Asmah Haji Omar, 2008). Even though Perlis and Penang (both the Island and Seberang Perai) are states that have their own governance in the Constitution of Malaysia, historically, they were part of Kedah. In 1786, Penang was ceded to the British East India Company in exchange for military protection from Burmese and Siamese armies who were threatening Kedah at that time. Seberang Perai received the same fate in 1800.

Asmah Haji Omar (2008) argues that Penang subdialect is closely described as the subdialect that is found and spoken on the island. The subdialect that is spoken in Seberang Perai is considered to be part of Kedah Persisiran subdialect. On the notion of Penang Malay, if it is analyzed carefully, it is further divided into two other subdialects:

Balik Pulau subdialect and Tanjung subdialect (Asmah Haji Omar, 2008). These two subdialects are relatively similar to each other and not significantly different from Kedah Persisiran subdialect (Asmah Haji Omar, 2008). In the present discussion on dialectology, Hajar Abdul Rahim (2015) has also characterized Penang Malay as Bahasa Tanjong (Tanjong language). The emergence of Bahasa Tanjong happened as a result of the language contact between two cultures, Malay and the South Indian Muslims. Consequently, intermarriages between these two communities have produced an Indo-Malay community known as Jawi Peranakans, who are the native speakers of Penang Malay (Hajar Abdul Rahim, 2015).

1.4 Statement of the problem

Research on the acoustic properties of Penang Malay is limited since Penang Malay is a subdialect of Kedah Malay. This phenomenon has caused researchers to generalize Penang Malay and Kedah Malay as synonymous. However, Ong, Nur Syahida Adilah Suri, and Rahim Aman (2016) have refuted the claims over the total homogeneity between Penang Malay and Kedah Malay. They found the distribution of consonants in Penang Malay to be completely different from the standard variant of Kedah Malay. These findings are further discussed in Chapter 2. On the other hand, intercomprehension between Standard Malay and Penang Malay could potentially pose problems to the speakers of these two varieties from understanding each other. For example, the word '*depa*' is a homograph that has different meanings and pronunciations in both Standard Malay and Penang Malay. In Standard Malay, [dəpa] is a unit of length, whereas [depa] in Penang Malay refers to two or more people or things previously mentioned.

1.5 Research objectives

Given the research on Penang Malay from the acoustic perspective is scarce, hence the study aims to do the following:

1. To analyze the acoustic features of the monophthongs of Penang Malay and Standard Malay based on the F1 and F2 formant frequencies.
2. To look at the similarities and differences between the monophthongs of Penang Malay and Standard Malay based on the acoustic properties.

1.6 Research questions

This study intends to answer the following research questions:

1. What are the acoustic features of the monophthongs of Penang Malay and Standard Malay based on the F1 and F2 formant frequencies?
2. What are the similarities and differences between the monophthongs of Penang Malay and Standard Malay based on the acoustic properties?

1.7 Significance of the study

Many researchers have studied the Northern Malay Dialects because of the linguistic uniqueness (Ida Ahmad, 1969; Collins, 1989; Asmah Haji Omar, 1993). Studies in dialectology have concentrated primarily on dialects of Northern Malay (including Penang Malay and Kedah Malay); however, in the past, other researchers focused on syntactic and socio-linguistic aspects (Ong, Nur Syahida Adilah Suri, & Rahim Aman, 2016). It can be deduced that although there are studies done on Penang Malay, not many researchers have analyzed the acoustic properties of this particular subdialect of Kedah.

This study will not only examine the features of the monophthongs of Penang Malay based on the F1 and F2 formant frequencies, it will also be extended to determine the similarities and differences between Penang Malay and Standard Malay in terms of their acoustic properties. In addition, as far as acoustic analyses of the Malay language are concerned, those performed on Penang Malay are scarce, as many studies are based only on Standard Malay (see Shahidi A. Hamid & Rahim Aman, 2010; Shahidi A. Hamid, Rahim Aman, & Zulkifley Hamid, 2012). Ong, Nur Syahida Adilah Suri, and Rahim Aman (2016) have done a study on Penang subdialects from a phonological point of view; however, their study does not explicitly cover the acoustic properties of Penang subdialects.

In relation to the points mentioned earlier, it is of significance to conduct this study as it will better describe the acoustic properties of monophthongs of Penang Malay because previous studies have fundamentally focused on the acoustic analysis of Standard Malay and analyzed Penang Malay from impressionistic and phonological aspects.

1.8 Limitations of the study

The focus of this study is to investigate and analyze the monophthongs of Penang Malay only. The five speakers who participated in this study were all female speakers who are Jawi Peranakans by origin and heritage. Penang is divided into two parts, specifically Penang Island and Seberang Perai (known as Province Wellesley previously). In this study, only speakers from Penang Island were selected as it was hypothesized that they would be speaking in the same variety of dialect. This study also selected two female speakers of Standard Malay from Johor Bahru, Johor to draw a comparison between the monophthongs of Penang Malay and Standard Malay. Asmah

Haji Omar (1987) concurs that the Johor-Riau dialect is considered as Standard Malay. At this point in time, it is not possible to compare the findings of Penang Malay in this study to Kedah Malay as the research data is very limited. This study, however, will draw the acoustic data from the Standard Malay participants as a comparator to that of Penang Malay. Afiqah Jazmin Azli (2017) used Standard Malay as a comparator in her acoustic analysis of the monophthongs of Kedah Malay due to the lack of data on Penang Malay.

Only speakers who are in the range of 40 to 60 years old were selected because people in that particular age group speak the dialect more consistently on a daily basis, they are not influenced by the rapid urbanization, and code-switching or code-mixing of Malay and English. Therefore, the findings of this study could not be generalized as a total representation of the monophthongs of Penang Malay or Standard Malay because this study did not include any male speakers or speakers from other age groups.

The quality of the recordings might not be excellent because they took place in Masjid Jamek Lebuh Acheh, George Town, Penang, and not in a recording studio or a speech laboratory. However, precautionary measures were taken to ensure the quality of the recordings was not greatly jeopardized. The recordings were done in a carpeted area to reduce echoes, and the fans were switched off to reduce any ambient noise. The low cut and high cut filters on Marantz PMD661MKII handheld solid-state recorder were activated to reduce the sound of the wind and high-frequency noise from the ambient environment during the recordings.

1.9 Organization of the dissertation

This study consists of five chapters. Chapter 1 presents the introduction to the study. Chapter 2 discusses further the literature review of this study, where it looks at past

studies on the acoustic analysis of Penang Malay, other varieties of Malay dialects, Standard Malay, and other related studies on vowels. Chapter 3 explains the methodology and methods used in this study. The data collection and data analysis are also presented in that chapter as well. The findings of the study are presented and discussed in Chapter 4. Lastly, Chapter 5 summarizes and concludes the study.

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CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter discusses the different variations and characteristics of vowels in Penang Malay and Standard Malay. In addition, Formant Frequency Model is explained as it is the analytical model adopted in this study.

2.2 Penang Malay

Asmah Haji Omar (2008) states that there are eight vowels in Kedah Persisiran, which is the standard subdialect of Kedah. The vowels are /a/, /i/, /u/, /ɛ/, /ɔ/, /ə/, /e/, and /o/. Penang Malay uses the same set of vowels as Penang Malay is part of Kedah Malay. Asmah Haji Omar (2008) has divided Kedah Malay dialect into a few subdialects particularly Perlis-Pulau Langkawi, Kedah Persisiran, Kedah Utara, and Penang. Asmah Haji Omar (1993) has also divided Kedah Malay dialect into five subregions:

1. Perlis
2. Langkawi Island
3. Lembah Kedah-Seberang Perai, covering from Kubang Pasu to Bandar Baharu, and the northern part from the west coast to Baling
4. The border of Padang Besar to the east and south which covers Padang Terap and Sik
5. Penang (the island itself)

Shuib Ismail (1971) has also divided Kedah Malay into three main divisions. According to him, in the northern area, nearing the border of Malaysia-Thailand, Kedah Malay is influenced by Thai, especially on the pronunciation aspect and this dialect is best known as Kedah Malay dialect with a Siamese twist. In the eastern part, there is a variation of Kedah Malay that is comparable to that of Kelantanese Malay, and it is

known as Kedah Malay dialect with a Pattani twist. Meanwhile, on the coastline which covers the lowland (including Penang Island), Kedah Malay is less influenced by Thai or Pattani dialect. Speakers of Malay in this area are considered to be speaking more neutrally as compared to speakers of other Malay varieties in other districts, and the Malay dialect spoken in this particular area is known as “Kedah language” (Shuib Ismail, 1971, p. 6). Ismail Hussein (1973) affirms that Kedah Malay stretches the whole north-western coast of the Peninsula from down south of Perlis to Dinding in Perak, including Penang Island. Collins (1989), on the other hand, argues that the classification of Kedah Malay includes the coasts and islands of three countries: Malaysia, Indonesia, and Thailand.

Even though Penang Malay is classified to be part of Kedah Malay, the features and properties of Penang Malay are not always similar to Kedah Malay. This phenomenon is acknowledged by Asmah Haji Omar (1979):

A dialect area need not necessarily be uniform throughout. It is impossible to expect a space covering several thousand square miles to show a uniformity at any single level of the language system. There are bounds to be differences at a lower level of the system, particularly at the level of phonology, between the speech of one district and that of another. (p. 5)

Asmah Haji Omar (2008) argues that Penang subdialect is closely described as the subdialect that is found and spoken on the island. The subdialect that is spoken in Seberang Perai is considered to be part of Kedah Persisiran subdialect. On the notion of Penang Malay, if it is analyzed carefully, it is further divided into two other subdialects: Balik Pulau and Tanjung. These two subdialects are relatively similar to each other and not significantly different than Kedah Persisiran subdialect (Asmah Haji Omar, 2008). In the present discussion on dialectology, Hajar Abdul Rahim (2015) has also characterized Penang Malay as Bahasa Tanjong (Tanjong language). The emergence of Bahasa Tanjong happened as a result of the language contact between two cultures, Malay and the South Indian Muslims. Consequently, intermarriages between these two

communities have produced an Indo-Malay community known as Jawi Peranakans, who are the native speakers of Penang Malay (Hajar Abdul Rahim, 2015).

Although many scholars have categorized Penang Malay as a subdialect of Kedah Malay, it cannot be dismissed that the uniqueness of Penang Malay has placed it in its own class. Hamilton (1922) posited Penang Malay as a deviation of the Northern Malay dialects. He further argued that the influence of Indian heritage particularly Tamil in Penang Malay had set it apart from other Northern Malay dialects. These linguistic and cultural markers have helped build the identity of the Jawi Peranakans. George Town was a booming British Straits Settlement that catered to different ethnicities, beliefs, cultures, economies, and geographies. Old Penang or George Town at that time was a multicultural place. It is evident in the archival materials (as cited in Mills, 1960):

The greater part of this community are but sojourners for a time, so that the population of the island is continually shifting as to the individual members of whom it is composed; this population includes British subjects, foreigners, both Europeans and Americans, people of colour originally descended from European fathers and Asiatic mothers, Armenians, Parsees, Arabs, Chooliars (Indians), Malays from the Malay Peninsula, Sumatra, and the Eastern Islands, Buggeses from Borneo, Celebes and other islands in the China Seas, Burmans from Pegu, Siamese, Javanese, Chinese, with Mussulmen and Hindoos from the Company's territories in India. (pp. 53-54)

2.2.1 Characteristics of Penang Malay

According to Asmah Haji Omar (2008), the first significant difference between Balik Pulau subdialect and Tanjung subdialect lies in the production of prevocalic /r/ and intervocalic /r/. In Balik Pulau subdialect, the production of /r/ is uvular fricative [R], which is similar to that of Kedah Persisiran. The production of /r/ in Tanjung subdialect is velar fricative [r̄] as found in the Southern dialects. However, there could be two variations of /r/ among Tanjung speakers, some may use the velar fricative [r̄], and some may use the alveolar trill [r]. Asmah Haji Omar (2008) has provided the following examples:

Tanjung	Balik Pulau/Kedah Persisiran	Standard Malay
buṛoq/buroq	buRoq	buruk
ṛibot/rebut	Ribot	ribut
maṛah/marah	maRah	marah

The second difference between these two subdialects can be seen from the word-final vowel of /a/. In this instance, Tanjung subdialect shows a similarity in the production of the sound as that of Kedah Persisiran, which is low-mid vowel and lips are stretched. In Balik Pulau subdialect, however, the produced vowel is a back vowel and the lips are a bit rounded. Here are some examples:

Tanjung	Balik Pulau/Kedah Persisiran
apa	apa<
jala	jala<

According to Noriah Mohamed (2010), another unique feature of Penang Malay as compared to Standard Malay lies in its phonemes. The production of phoneme /s/ remains as /s/ if the phoneme is in the initial position of open syllable words. However, /s/ is not produced as /s/ if it is at the end of a closed syllable word. In word-final position of closed syllable words, /s/ becomes /h/ if it is preceded by vowel /i/ but changes to /jh/ (glide) if the preceding vowels are /u/ or /a/. Please refer to Table 2.1 for further examples.

Table 2. 1: Phoneme /s/ in Penang Malay

SM	PM	SM	PM	SM	PM
preceded by /i/		preceded by /u/		preceded by /a/	
habis	/habeh/	bagus	/bagujh/	beras	/bəRajh/
keris	/kəreh/	terus	/təRujh/	rampas	/Rampajh/
garis	/gareh/	tikus	/tikujh/	atas	/atajh/
manis	/maneh/	terjerumus	/tədʒəRumujh/	jelabas	/dʒəlabajh/

SM = Standard Malay, PM = Penang Malay

Phoneme /l/ in Penang Malay is pronounced as /l/ if it is in the word-initial position in open or closed syllable words. However, this phoneme does not exist in word-final position of closed syllable words. Phoneme /l/ in Penang Malay is dropped if the preceding vowel is /i/; it changes to /oj/ or /j/ (glide) if the preceding vowels are /u/ or /a/. Please refer to Table 2.2 for more examples.

Table 2. 2: Phoneme /l/ in Penang Malay

SM	PM	SM	PM	SM	PM
preceded by /i/		preceded by /u/		preceded by /a/	
batil	/bate/	bakul	/bakoj/	ajal	/adʒaj/
cungkil	/tʃuŋke/	sanggul	/saŋgoj/	akal	/akaj/
panggil	/paŋge/	jambul	/dʒamboj/	awal	/awaj/
sambil	/sambe/	gomol	/gomoj/	asal	/asaj/

SM = Standard Malay, PM = Penang Malay

Phoneme /r/ in Penang Malay dialect is produced as uvular fricative [R] if it is the initial phoneme of an open syllable word and the last phoneme in the first syllable of a closed syllable word. Generally, the latter requires a schwa /ə/ to be incorporated after uvular fricative /R/. Please refer to Table 2.3 for further examples.

Table 2. 3: Phoneme /r/ in Penang Malay (I)

SM	PM	SM	PM
at the beginning of open syllable words		at the end of closed syllable words	
raja	[Radʒa]	terbit	[təRəbit]
rakyat	[Raʔjat]	terkam	[təRəkam]
rumah	[Rumāh]	berkas	[bəRəkajh]

SM = Standard Malay, PM = Penang Malay

On the other hand, /r/ at the end of the first syllable in three-syllable words is dropped. The first syllable may also be a prefix. Please refer to Table 2.4 for more examples.

Table 2. 4: Phoneme /r/ in Penang Malay (II)

SM	PM
at the end of the first syllable	
gergasi	/gəgasi/
merpati	/məpati/
permatang	/pəmatanŋ/
bercakap	/bəcakap/
bersilat	/bəsilat/
termakan	/təmakan/
tersilap	/təsilap/
perjalanan	/pədʒalanan/

SM = Standard Malay, PM = Penang Malay

In addition, /r/ at the end of a word becomes pharyngeal voiced fricative [ʕ] (Noriah Mohamed, 2010). Generally, the vowel that precedes [ʕ] is nasalized (Noriah Mohamed, 2010). Please refer to Table 2.5 for further examples.

Table 2. 5: Phoneme /r/ in Penang Malay (III)

SM	PM		
	At the end of a word		
		Phonemic transcription	Pronunciation
Spelling	Spelling		
air	ayak	/ajaq/	[ayãʕ]
pasir	pasiak	/pasijaq/	[pasiãʕ]
fikir	pikiak	/pikijaq/	[pikiãʕ]
besar	besak	/bəsaq/	[bəsäʕ]
hingar	hingak	/hiŋaq/	[hiŋãʕ]
setar	setak	/setaq/	[sətãʕ]
tidur	tidok	/tidoq/	[tidõʕ]
nyiur	nyiok	/nijoq/	[niõʕ]
pancur	pancok	/pancoq/	[paŋčõʕ]

SM = Standard Malay, PM = Penang Malay

Noriah Mohamed (2010) also argues that elision does happen to vowel clusters, especially to the ones with hiatus. In prosody, hiatus means one of the vowels in the vowel clusters are dropped and the remaining vowels experience a difference in pronunciation (Noriah Mohamed, 2010). Please refer to Table 2.6 for more instances.

Table 2. 6: Elisions in Penang Malay

SM		PM	
Spelling	Phonetic transcription	Spelling	Phonetic transcription
kuala	[ku ^w ala]	kola	[kola]
kuasa	[ku ^w asa]	kosa	[kosa]
biawak	[bi ⁱ awaʔ]	bewak	[bewaʔ]
siapa	[si ⁱ apa]	sapa	[sapa]
biasa	[bi ⁱ asa]	besa	[besa]
aniaya	[an ⁱ āyā]	naya	[nāyā]
tiarap	[ti ⁱ arap]	terap	[teRap]

SM = Standard Malay, PM = Penang Malay

Noriah Mohamed's (2010) findings on the elisions in Penang Malay are in accordance with Logan's (1851) results. According to his study in 1851, elision happens to proper nouns as well. "Words are much compressed, the syllables being pronounced in a short, abrupt manner, and the same habit appears in the contraction of polysyllabic Mahomedan names, Ma for Mahamed, Mot for Mahmud, Sme' for Ismail & c'" (Logan, 1851, p. 60).

Ong, Nur Syahida Adilah Suri, and Rahim Aman (2016), on the other hand, have conducted a study on the phonology of Penang Malay sub-dialects. Based on their acoustic analysis of Balik Pulau participants, it is found that this sub-dialect has a difference as compared to the standard Kedah Malay dialect. This distinction is very clear in phonological aspects. For example, these differences include the vowel deletion and the process of nasal-obstruent assimilation. The process of vowel deletion occurs in

Penang Malay. Based on the findings of their study, the tendency for Balik Pulau participants to perform vowel deletion is not as significantly high as the process of nasal-obstruent assimilation. Ong, Nur Syahida Adilah Suri, and Rahim Aman (2016) have provided the following examples to illustrate the vowel deletion in Penang Malay:

Standard Malay	Penang Malay
lain	len
main	men
daun	don
jauh	dʒoh

This process refers to the nasal and obstructive consonants that are homogenized in terms of places of articulation, such as “m-p” and “m-b” (kampuŋ, lampu, sembaŋ, dʒampi). Speakers of Penang Malay have acoustically highlighted some significant and unique differences with Kedah Malay. Ong, Nur Syahida Adilah Suri, and Rahim Aman (2016) have laid out the following examples to further illustrate the process of nasal-obstruent assimilation in Penang Malay:

Standard Malay	Kedah Malay	Penang Malay
mandi	mandi	mandi
tunggu	tun̄gu	tun̄gu
cangkul	tʃaŋkoj	tʃaŋkoj
lembu	ləmmũ / ləmũ	lembu
kambing	kambin	kambin
tinggi	tiŋgi / tiŋi	tiŋgi / tiŋi

According to Noriah Mohamed (2010), there are words that are exclusive to Penang Malay and Kedah Malay that might not be available in other Malay dialects. Table 2.7 shows the exclusive words in Penang Malay and Kedah Malay.

Table 2. 7: Exclusive words in Penang Malay and Kedah Malay

(reproduced from Noriah Mohamed, 2010, pp. 47-48)

Word	Example	Translation
Awat – to ask why	Awat hang kena buang kerja? Awat kereta api ni lambat? Awat tak buat?	Why were you fired from your job? Why is this train late? Why did you not do it?
Dok – it is another way of saying sit down or place of residence	Hang dok tang mana? Mailah dok tang ni. Saya dok makan masa dia mai. Pi mai pi mai dok tang tu jugak.	Where do you live? Come and sit here. I was eating when he/she came. Going back and forth
Dan – make it in time or have time	Saya tak dan nak balik hari ni kot. Kalau ikut hati dan-dan tu jugak aku nak balik.	I do not think I can go back today. If it was up to me, I wanted to go back at that time.
La – right now	Kalau boleh saya mau benda tu la ni jugak.	I want it right now if it is possible.
Sat – wait awhile	Tunggu sat no. Sat-sat dia mai. Dia baru pi sat-sat ni.	Please wait for a while. He/she comes here every now and then He/she left just now.
Kot – maybe / probably	Dia jatuh sat ni kot . Manalah tau kot-kot ada orang suka kat cek.	He probably fell down just now. Who knows there is someone who actually likes me.
Lagu – like this	Hang buat lagu ni. Lagu ni tak syoklah.	You do it like this. It is not fun like this.

The previous examples of words are representative of the dialect spoken daily among the Jawi Peranakan community. Since the Jawi Peranakan are those who are of mixed heritage, there is, of course, some form of influence from their mother tongue, which is Tamil in their spoken Malay (Noriah Mohamed, 2010). This influence may be rather

apparent for the early generations of Jawi Peranakan, but the influence of Tamil on Penang Malay dialect is rather subtle for later generations. According to Noriah Mohamed (2010), one of the main causes for the influence of Tamil on Penang Malay is due to the direct interference between the two languages.

Foreign elements can influence a language through different processes of clash, and clashes can occur in the following situations: war, colonialism, business and commerce, neighborhood and friendship, education, and the spread of religion (Abdullah Hassan & Aion Mohd, 1994). For example, wars and colonialism had brought in words from Portuguese and English into the Malay language. In addition, business, commerce, education, and the spread of religion had brought in words from Sanskrit and Arabic; while neighborhoods and friendships had brought in words from Chinese, Tamil, and Indonesian. Through the process of neighborhood and friendship, the borrowing of Tamil into Penang Malay was apparent, especially in daily conversations (Abdullah Hassan & Aion Mohd, 1994).

2.3 Standard Malay

Malay is the native language in Peninsula Malaysia and surrounding areas, including Singapore and southern Thailand, the central and eastern Sumatra, Riau Islands to the west coast of the island of Borneo (Asmah Haji Omar, 2005). Outside this core area - from Sumatra to West Papua - the area called the Nusantara or the Malay Archipelago - Malay was the lingua franca among communities that have their own native language. Malay also serves as a trade language and the language of communication between governments. This is due to the influence of the Malay kingdoms in the past, beginning with Srivijaya from the 7th century in Palembang, Sumatra, and later the 15th century Sultanate of Malacca (Collins, 1996). The fall of the Malacca Sultanate to the

Portuguese in 1511, followed by the rise of other sultanates in the region, including the original Johor-Riau Malay Sultanate (17th to 19th century). The Johor-Riau dialect became the local dialect of the Johor-Riau sultanate. This dialect covers counties in eastern Sumatra including Riau Islands, Singapore, Johor, Pahang, and Selangor. This dialect also has many similarities with the dialect, which spread to Ipoh in Perak (Asmah Haji Omar, 1992a).

The Malay world was divided politically for the first time in its history in 1824 by the British-Dutch Treaty. Under the agreement, Britain controlled Singapore and the Malay Peninsula and a third of Borneo (now Malaysia), while Dutch controlled the remaining area (now Indonesia). In areas controlled by the Dutch, native speakers of Malay formed a minority group alongside hundreds of native speakers of other languages including Javanese language, which was very influential. Consequently, different variations of Malay emerged as a result of influences from Dutch, Javanese and other languages in the Dutch-controlled territory in Java. This variation was different from the Malay language spoken in the Malay heartland, particularly the Malay Peninsula and Singapore (Asmah Haji Omar, 1993; Collins, 1989). Prior to Indonesia's independence, the variation was declared as the national language of Indonesia, and it was called Bahasa Indonesia.

The Malay language in Malaysia and Singapore was jointly developed for quite some time as both countries share the same colonial history. Besides, the state of Johor and Singapore is in the same region of the Malay dialects, namely the Johor-Riau dialect (Asmah Haji Omar, 1988). According to the language scholars (Asmah Haji Omar, 1988; Asraf, 1984), Johor-Riau dialect is the basis of Standard Malay used in both countries, although there are a few other Malay dialects in the Malay Peninsula. Singapore, which used the Johor-Riau dialect was the center of cultural, political and socio-economic development of the Malay community during the British colonization

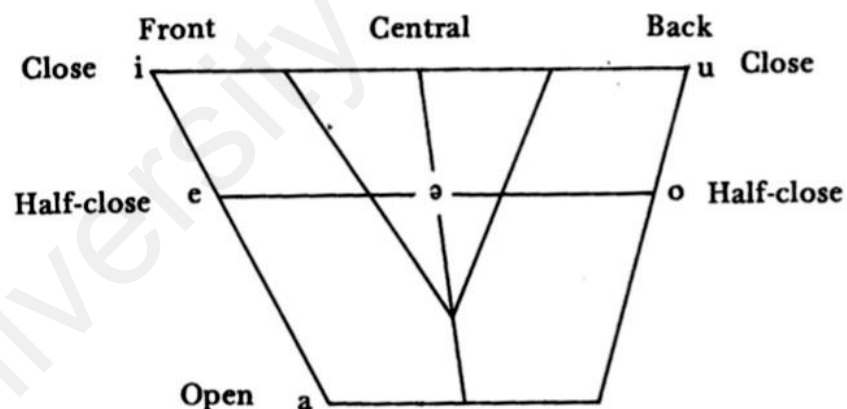
(Heng, 2011). Malay newspapers in Malaya began in Singapore in the late 19th century. With the advent of the printing press, the Johor-Riau dialect and vocabulary were 'borrowed' for printing. The norms developed for written language were pioneered by intellectuals, who initially used Javanese scripts (Hashim Musa, 2006), which eventually spread to schools, colleges and government offices throughout Malaya and Singapore. The development of Malay was prominent until it formed a variation that was supralocal, which means the variation was not confined to just one place. This variation is known as Standard Malay (Asmah Haji Omar, 1988).

Radio service began in 1946 with the establishment of Radio Malaya in Singapore. If the Johor-Riau dialect became the model for the printed language (Asraf, 1984), the pronunciation of the Johor-Riau dialect became the norm for newsreaders working at radio stations (Asmah Haji Omar, 1988, 1992a). As it is the case with the grammar and vocabulary of Johor-Riau dialect, the pronunciation of the dialect had also expanded to meet its broader function while accommodating the pronunciation of new words borrowed from other languages. This style of speaking was brought to Kuala Lumpur when Radio Malaya moved there and the north of Malaya when Penang opened its radio stations, as well as in Sabah and Sarawak (Asmah Haji Omar, 1992a). Hence, the standard pronunciation of Malay following Johor-Riau dialect became supralocal. Asmah Haji Omar (1992a) refers to it as /ə/ or schwa variation. It should also be noted that there are two main variations of Standard Malay – the /ə/ or /a/ variations (Asmah Haji Omar, 1992b). The /a/ variation is spoken in the northern part of Peninsula Malaysia, Sabah and Sarawak. Much has been written about the /a/ variety of Standard Malay, including Asmah Haji Omar (1992b), Asraf (1984), Awang Sariyan (2000), Mohamed Pitchay Gani (2004), and Suratman Markasan (1989). All these scholars gave their full support to the /a/ variety policy of Standard Malay but Asmah Haji Omar (1992b).

2.3.1 Characteristics of vowels in Standard Malay

Previous studies, as done by Yunus Maris (1980), Farid (1980), Raja Mukhtaruddin Raja Mohd Dain (1985), Nik Safiah (1989), Teoh (1994) and others, describe the nature of the vowel sounds of Standard Malay (i.e., [i, e, a, o, u, ə]) through the impressionistic approach. Indirawati Zahid and Mardian Shah Omar (2012) have proposed the same set of vowels with the addition of three vowels: [ɛ], [ɔ] and [ɒ]. These studies described the vowel sounds without distinguishing the production of vowel sounds by gender, and they have led researchers to have varying opinions on the vowel sounds of Malay. Figure 2.1 shows a traditional diagram developed by Yunus Maris (1980) to illustrate the approximate tongue positions during the production of the vowels.

Figure 2. 1: Diagram of pure vowels (Yunus Maris, 1980, p. 2)



2.3.1.1 Malay vowels by Yunus Maris (1980)

In what can be called the standard pronunciation of Malay, there are six pure vowels, i.e. [i, e, a, o, u, ə]. Yunus Maris (1980) uses the following terms in defining them: front, back and central, depending on which part of the tongue is

raised in the mouth; close, half-close and open, depending on the distance between the related parts of the raised tongue and the palate; rounded and unrounded, depending on the location of the lips, i.e. the presence or absence of lip-rounding during the production of the vowel sounds. The front and central vowels in Malay are always unrounded while the vowels in the back are always rounded (Yunus Maris, 1980).

There are three front vowels: close, half-close, and open. All are produced with no lip-rounding. Table 2.8 shows the characteristics of front vowels in Malay.

Table 2. 8: Front vowels in Malay

Tongue position (front)	Lip position	Symbol in phonetic transcription	Symbol in official orthography
Close	Unrounded	[i]	i
Half-close	Unrounded	[e]	e (also i)
Open	Unrounded	[a]	a

The front of the tongue will be elevated closer to the hard palate in the production of the close front vowel [i] while the tip of the tongue will be kept close to the lower teeth-ridge. Yunus Maris (1980) has provided the following examples:

Word	Phonetic	Gloss
ikan	[ikan]	(fish)
biru	[biru]	(blue)
duri	[duri]	(thorn)

In producing the half-close front vowel [e], the front of the tongue is placed to a position slightly away from or lower than the position for [i]; the tip of the tongue is as for [i] and the lips are unrounded; the space between the jaws is small. Yunus Maris (1980) has laid out the following examples:

Word	Phonetic	Gloss
elok	[eloʔ]	(good)
besok	[besoʔ]	(tomorrow)
boleh	[boleh]	(possible, able)

The open front vowel [a] is produced by placing the tip of the tongue, constituting the front part of the tongue, low down in the mouth so that the highest part of the tongue raised will be the 'rear' part of the front. The tongue-tip is as for [i] and [e], and the lip position is unrounded. The opening between the jaws is slightly wider than medium. Yunus Maris (1980) has provided the following examples:

Word	Phonetic	Gloss
api	[api]	(fire)
tahu	[tahu]	(to know)
tidak	[tidaʔ]	(no, not)

According to Yunus Maris (1980), there are two back vowels in Malay: close and half-close. Table 2.9 shows the characteristics of back vowels in Malay.

Table 2. 9: Back vowels in Malay

Tongue position (back)	Lip position	Symbol in phonetic transcription	Symbol in the official orthography
Close	Rounded	[u]	u
Half-close	Rounded	[o]	o

The close back vowel [u] is produced by placing the front part of the back of the tongue close to but not touching the soft palate, and the blade of the tongue is retracted slightly from the lower front teeth. The lips are not too closely rounded, and the opening of the jaws is between medium and narrow. Yunus Maris (1980) has provided the following examples:

Word	Phonetic	Gloss
upah	[u pah]	(wage, reward for services rendered)
buluh	[u loh]	(bamboo)
baru	[u ru]	(new)

The half-close back vowel [o] is produced by placing the back of the tongue slightly lower than the [u] position, and holding the tongue-tip similar to [u]. The lips are not as rounded as [u], and the space between the jaws is slightly wider than medium. Yunus Maris (1980) has laid out the following examples:

Word	Phonetic	Gloss
oleh	[o leh]	(by)
boleh	[o leh]	(possible, able)
parut	[o rut]	(scar; grater, to grate)

The last type of vowel in Malay is the central vowel, [ə]. Table 2.10 shows the characteristics of the central vowel in Malay.

Table 2. 10: Central vowel in Malay

Tongue position (center)	Lip position	Symbol in phonetic transcription	Symbol in official orthography
Varying from half-open to close	Unrounded	[ə]	e initial and medial

			positions a for final position
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Placing the central part of the tongue in a position slightly away from the mouth's roof and holding the tongue-tip and back well down in the mouth produces the central vowel [ə]. The lips are unrounded, and the opening between the jaws is medium. For certain speakers, the height to which the central part of the tongue is raised ranges from as low as, or lower than, the position of a half-open vowel to or higher than that of a half-close vowel. The typical speaker makes use of a midway variety between these positions. It should also be noted that this central vowel does not occur in a closed final syllable. Yunus Maris (1980) has provided the following examples:

Word	Phonetic	Gloss
enam	[ənam]	(six)
beras	[bəras]	(rice)
bapa	[bapə]	(father)

On nasalization of vowels in Malay, Yunus Maris (1980) has acknowledged that:

Malay vowels are either oral, i.e. produced with the soft palate raised to block the nasal cavity and air from the lungs passes through the mouth only, or nasalized, i.e. produced with the soft palate lowered thus facilitating the passage of air simultaneously through the nose and the mouth during their production. (p. 7).

According to Yunus Maris (1980), generally, all vowels are pronounced with more or less comparable length, with one exception. Only some or all the vowels in a word will be given extra length as one of the stressing modes. Vowel length has no semantic bearing in Malay, apart from its use for emphasis as stated above (and, generally, for style). The only exception mentioned above is the central

vowel [ə], which is much shorter than the other vowels; indeed, some speakers do not pronounce it at all in an initial or medial inter-consonantal position (Yunus Maris, 1980). Yunus Maris (1980) has laid out the following examples:

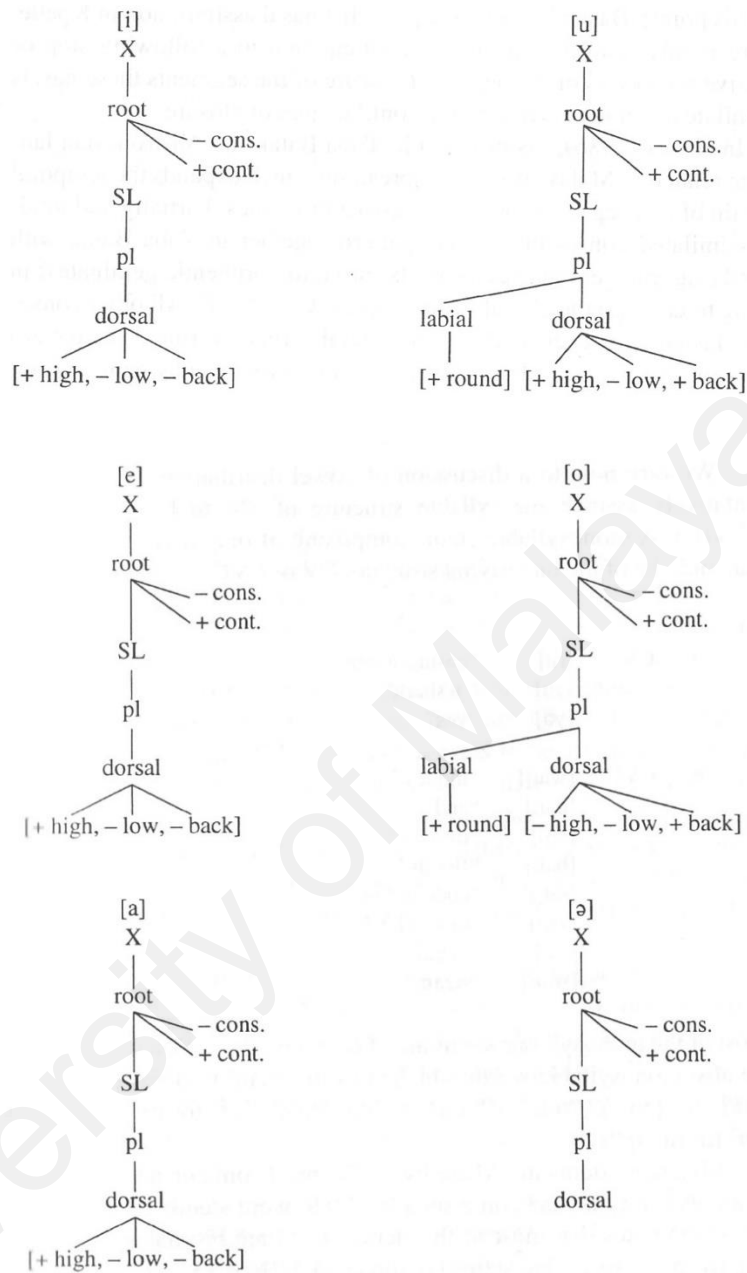
Word	Common pronunciation	Gloss
empat	[əmpat]	(four)
beras	[bəras]	(rice)
kera	[kəra]	(a type of monkey)

This phenomenon is evident in the acoustic analysis of the vowel [ə] among Penang Malay and Standard Malay speakers; it is discussed at length in Chapter 4.

2.3.1.2 Malay vowels by Teoh (1994)

Studies on Malay vowels by Teoh (1994) are considered to be an extension to the previous works of Yunus Maris (1980). In his book, Teoh (1994) “re-examines the phonological system of Malay within a non-linear framework” (p. xi). Teoh (1994) states that there are six (6) vowels in Standard Malay (i.e., [i, e, a, o, u, ə]) and they are in accordance with (Yunus Maris, 1980; Farid, 1980; Raja Mukhtaruddin Raja Mohd Dain, 1985; Nik Safiah, 1989). Figure 2.2 shows the nonlinear phonological analysis of the vowels in Standard Malay.

Figure 2. 2: Nonlinear phonological analysis of vowels in Standard Malay

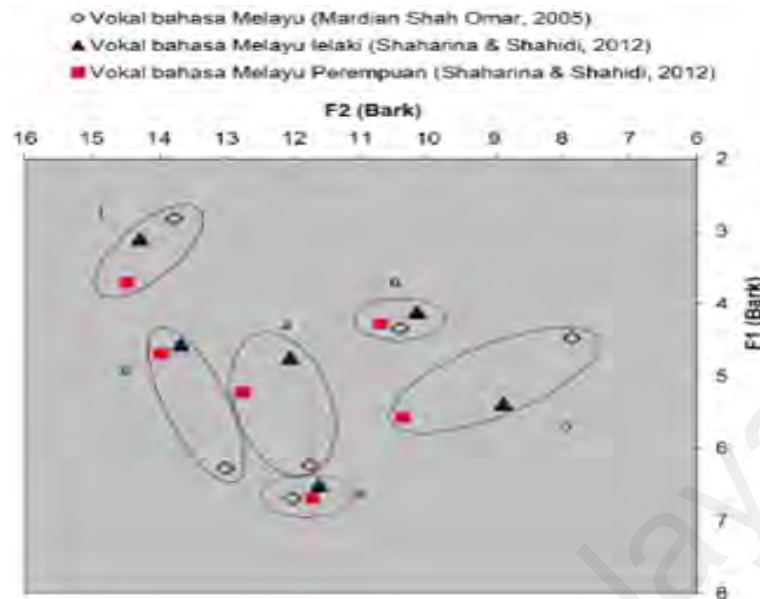


Teoh (1994) assumes that schwa lacks any distinctive height and backness specification, and thus denotes the empty vowel. Only vowels in the language are syllabic whilst all consonants and glides are non-syllabic. Teoh's (1994) findings on schwa are evident in the acoustic analysis of the vowel [ə] among Penang Malay and Standard Malay speakers; it is discussed at length in Chapter 4.

2.4 Other studies on Malay vowels

Studies on Standard Malay are, according to Yusnul'ain (2014), very restricted compared to other languages, such as English. Older studies appeared to be impressionistic in nature but the advent of new researchers such as Adi Yasran Abdul Aziz (2011), Was Aslynn Salwani Wan Ahmad (2005), Shaharina Mokhtar and Shahidi A. Hamid (2012), and Yusnul'ain (2014) have used acoustic analysis to explain Malay sounds. Based on recent research, Yusnul'ain (2014) puts forward a comparison of three vowel plots based on studies by Mardian Shah Omar (2005) and Shaharina Mokhtar and Shahidi A. Hamid (2012) which used acoustic analysis to test Standard Malay vowels and consonants. The latter two studies found that the positions of the certain vowels differed slightly from those identified by previous researchers. Mardian Shah Omar (2005) reports that the /e/ and /ə/ positions are slightly lower and similar to /a/ while Shaharina Mokhtar and Shahidi A. Hamid (2012) say that vowels /e/ and /ə/ are mid and mid-high similar to the descriptions of previous researchers. For the vowel /o/, on the other hand, both studies display scattered distribution in the vowel plot as Mardian Shah Omar (2005) found that /o/ is located far back, followed by Shaharina Mokhtar and Shahidi A. Hamid (2012) who found that their male Malay speakers produced /o/ which is located at the back but not as far as Shahidi A. Hamid's (2005), and the female Malay speakers produced /o/ which is located in the middle and closer to /ə/. Figure 2.3 shows the Standard Malay vowel plots as found in Yusnul'ain's (2014) study.

Figure 2. 3: Standard Malay vowel plots



Mardian Shah Omar (2005) and Shaharina Mokhtar and Shahidi A. Hamid (2012) (as cited in Yusnul'ain, 2014, p. 24)

Table 2.11 shows several examples of minimal pairs for the monophthongs of Standard Malay. These examples are reproduced and translated from Indirawati and Mardian Shah Omar (2006), and they illustrate that the monophthongs of Standard Malay are represented in different phonemes.

Table 2. 11: Examples of minimal pairs for Standard Malay monophthongs

(reproduced from Indirawati & Mardian Shah Omar, 2006, pp. 145-146)

Vowels	Examples
/i/ - /e/	<i>bila</i> [bila] ‘when’ - <i>bela</i> [bela] ‘defend’
/e/ - /a/	<i>bela</i> [bela] ‘defend’ - <i>bala</i> [bala] ‘disaster’
/i/ - /a/	<i>bila</i> [bila] ‘when’ - <i>bala</i> [bala] ‘disaster’
/o/ - /u/	<i>burung</i> [buruŋ] ‘bird’ - <i>borong</i> [boronŋ] ‘wholesale’
/ə/ - /i/	<i>beri</i> [bəri] ‘give’ - <i>biri</i> [biri] ‘sheep’
/ə/ - /e/	<i>bela</i> [bəla] ‘preserve’ - <i>bela</i> [bela] ‘defend’
/ə/ - /a/	<i>entah</i> [əntah] ‘unknown’ – <i>antah</i> [antah] ‘remainings in the rice paddy’
/ə/ - /o/	<i>bela</i> [bəla] ‘preserve’ - <i>bola</i> [bola] ‘ball’

/ə/ - /u/	<i>sekat</i> [səkat] ‘barrier’ - <i>sukat</i> [sukat] ‘measure’
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Mardian Shah Omar (2005) conducted an acoustic analysis on Malay, which he presented spectrographic differences between the vowels and consonants. The study presents the F1 and F2 values of Malay in Hertz by one Malay participant.

Table 2. 12: F1 and F2 values (Hz) of Malay vowels
(reproduced from Mardian Shah Omar, 2005, p.5)

Formants	/i/	/e/	/a/	/o/	/u/	/ə/
F1	290	685	740	470	455	680
F2	2220	1970	1692	900	1333	1630

The study does not, however, explain how the sounds were produced, or whether the speaker was a male or female, or where the speaker came from. However, it is presumed that the vowels are demonstrative and representative of Standard Malay because the purpose of the study was to distinguish the output of spectrographic analysis of Malay vowels and consonants.

In a different acoustic study by Yunisrina Qismullah Yusuf (2013) which will be the basis of comparison for the findings in this study, ten female participants were selected from Kampung Aceh in Kedah. The average age was 54 years old and they were from the fourth generation of Acehnese in Kedah. This category was chosen based on the participants’ feedback during interviews about their use of Acehnese at home (Yunisrina Qismullah Yusuf, 2013). The participants in this study had an education up to at least secondary level (equivalent to high school), and neither of them had any speech or hearing problems. Yunisrina Qismullah Yusuf (2013) elicited data from interviews and word lists. The target words were adapted from a study by Pillai and Yunisrina Qismullah Yusuf (2012) to examine if the speakers in Kampung Aceh,

Kedah, produced similar vowels to Indonesian Acehnese. As the Kedah variety of Acehnese was acquired informally as a spoken variety, Yunisrina Qismullah Yusuf (2013) also used images and probing questions to elicit the target words rather than reading texts alone.

Yunisrina Qismullah Yusuf (2013) found that the vowel [i] from the word *cit* (too, also) was produced more fronted than the Indonesian Acehnese speakers; the *t*-tests comparing the formant values of Kampung Aceh and Indonesian Acehnese returned a significant difference for F2 values but not F1 values (F1: $t(58) = 0.66$, $p = 0.256$; F2: $t(58) = 3.67$, $p < 0.01$). Similarly, Yunisrina Qismullah Yusuf's (2013) study on the vowel /e/ shows no significant difference between the F1 values ($t(58) = 1.67$, $p = 0.050$), but a significant difference was found between the F2 values ($t(58) = 4.74$, $p < .0101$), with some tokens produced by the speakers at Kampung Aceh being more fronted than Indonesian Acehnese. According to Yunisrina Qismullah Yusuf (2013), the Kampung Aceh speakers in Kedah tended to produce [ɛ] in *cèt* (paint) as [a] as compared to the Indonesian Acehnese speakers, and this phenomenon may be linked to how the word 'paint' is pronounced as [tʃat] in Malay. T-tests of [ɛ] showed no significant differences between the F1 and F2 values (F1: $t(34) = 0.45$, $p = 0.326$; F2: $t(34) = 0.77$, $p = 0.224$). However, Yunisrina Qismullah Yusuf (2013) found that the *t*-tests between Kampung Aceh [ɛ] in the interviews and Indonesian Acehnese showed significant differences between the F1 and F2 values (F1: $t(480) = 1.65$, $p = < .01$; F2: $t(480) = 9.17$, $p = < .01$), indicating that [ɛ] was produced more fronted by speakers at Kampung Aceh than Indonesian Acehnese. Based on the tokens extracted for [u] from the word *peut* (four), *t*-tests showed no significant difference between their F1 values ($t(58) = 0.47$, $p = 0.320$), but there was a significant difference between their F2 values ($t(58) = 8.1$, $p < .01$) (Yunisrina Qismullah Yusuf, 2013).

Another acoustic study by Afiqah Jazmin Azli (2017) examines the monophthongs of Kedah Malay, in which it will also be the basis of comparison for this study. Eight participants were selected for her study; five participants were speakers of Kedah Malay and three were speakers of Standard Malay. The selection of participants was carefully done by distributing a set of questionnaires to potential participants in order to obtain crucial information such as the place of birth and the number of years that they have been residing in Kedah (Afiqah Jazmin Azli, 2017). The rationale behind the purposive sampling by Afiqah Jazmin Azli (2017) was to ascertain that the participants are indeed native speakers of Kedah Malay and they have been living in Kedah since birth. The same set of questionnaires was also given to their spouses to ensure that the spouse's first language did not have any influence on the participant's language (Afiqah Jazmin Azli, 2017). In collecting the elicitation tokens, the participants were not informed of the target vowels and they were asked to read the sentences naturally. For each vowel, there were four sentences that each participant had to read.

Based on the acoustic analysis of monophthongs of Kedah Malay by Afiqah Jazman Azli (2017), she found the eight vowels to be in accordance with Asmah Haji Omar's (1993) proposition of vowels. She also found several similarities and differences of the locations of vowels with Teoh (1994). For example, the locations of [i] and [e] in Afiqah Jazman Azli (2017) are almost parallel with the locations of [i] and [e] in Teoh (1994); however, the position of [e] in Afiqah Jazman Azli (2017) goes slightly away from the front position than the position of [e] in Teoh (1994). The vowels [i] and [e] in Afiqah Jazman Azli's (2017) study are also similar with Yunisrina Qismullah Yusuf's (2013) study, which are close, front position and half-close, near front position respectively. The vowel [e] in this study is also in accordance with Yunisrina Qismullah Yusuf's (2013) and Teoh's (1994) studies which is in front, close-mid position. However, the vowel [u] in Afiqah Jazman Azli (2017) is contradictory with the findings

in Yunisrina Qismullah Yusuf (2013) and Teoh (1994) in terms of the frontedness, as the vowel [u] in this study moves towards the central position instead of the close, back position in the other two studies. Afiqah Jazman Azli (2017) also found the vowels [o] and [ɔ] in her study to be similar to each other, and this is supported by the findings in Yunisrina Qismullah Yusuf (2013); however, the vowel [ɔ] in Afiqah Jazman Azli (2017) moves slightly towards the central position instead of the back position.

2.5 Jawi Peranakan

As this study explores the acoustic analysis of the monophthongs of Penang Malay as produced by the speakers of Penang Malay who are of the Jawi Peranakan origin, an overview of Jawi Peranakan will be provided in order to have a better understanding of this community.

The Jawi Peranakan community is a community that has long existed in Penang since the 1700's, while some theories have also suggested that the Jawi Peranakan to have existed in 1770's (Omar Yusoff & Noriah Mohamed, 2010). Penang as we know today is multicultural and made up of people of different ethnicities; however, the Malay and Jawi Peranakan communities were said to have explored Penang much earlier (Omar Yusoff & Noriah Mohamed, 2010). In the Malay Archipelago, the Jawi Peranakan are said to have existed since the seventh century, especially during the reign of Srivijaya. In addition, the Jawi Peranakan were already in existence when Kedah became an important port for trading routes between India and China, dating back to the third century (Ragayah Eusoff, 1997). Thus, the assumption can be made that this is the beginning of the formation of the Jawi Peranakan community in Malaya (Omar Yusoff & Noriah Mohamed, 2010). The opening of the port in Penang by the British as a

trading port boosted the arrival of this community from Kedah to Penang, and this situation has been going on since the 17th century (Ragayah Eusoff, 1997).

On the notion of terms, Jawi Pekan refers to the community formed as a result of mixed marriages between migrants and traders from outside of the country with the local Malay women (Crawford, 1820). Winstedt (1935) explains “Indian Muslims have married the children of the Sultan and Treasurer in Melaka” (p. 18). In Penang’s 18th century, this community had settled in urban areas and therefore the British government used the term Jawi Pekan to distinguish between foreigners or non-Malay Muslims who lived in the city and the Malay Muslims who lived in rural areas (Crawford, 1820). However, Jawi Pekan is a rather vague term in relation to its meaning. The term Jawi Pekan was not only used to refer to Malays of mixed Arab, Indian, Bengali, Punjabi, Gujarati, Afghan, and Indian Muslims who were born in Malaya (both parents were Indian Muslims) who have gone through the process of assimilation into the Malay culture, but the term was also used to refer to any person who is not a descendant of the local Malay community (Khoo Salma, 2002). The ambiguity of this definition has made it difficult and challenging for scholars to provide the exact meaning of Jawi Pekan (Crawford, 1820). However, starting from 1870, Jawi Pekan was longer used in the Annual Report of Straits Settlements and the term was replaced by Jawi Peranakan, which is a reference to the Malays of mixed heritage (Arab, Indian, Bengali, Punjabi, Gujarati, and Afghan) (Zaharah Mahmud, 1972; Vaughan 1857).

The definition by Zaharah Mahmud (1972) shows that the term Jawi Peranakan is a more specific term to refer to the Malays of mixed heritage (Arab, Indian, Bengali, Punjabi, Gujarati, and Afghan). The term Jawi Peranakan was first used in 1871 and it no longer acknowledged or defined Indian Muslims who were born in Malaya (both parents were Indian Muslims), who have gone through the process of assimilation into the Malay culture, or any groups of Muslims who did not have a local Malay origin as

Jawi Peranakan (Zaharah Mahmud, 1972). These changes were implemented to facilitate the division of groups in the Annual Report of Straits Settlements (Khoo Salma, 2002). In Singapore, this community is commonly known as Jawi Peranakan, while in Melaka they are known as Peranakan Keling (Khoo Salma, 2002).

2.6 Formant Frequency Model

Formant Frequency Model is adopted to examine the acoustic properties of the monophthongs of Penang Malay and Standard Malay. This model is by far the most effective way to analyze the relation between vowels. Based on the explanations of vowel development in 2.2.1, 2.3.1 and 2.4, it confirms to the Ladefoged and Johnson's (2010) proposal the three key parameters of vowel quality measurement which are tongue height, tongue advancement/retraction and lip rounding. Fant (1960), on the other hand, posits that vowels are characterized by their formants as well. Kent & Read (2002) describes formant as "a peak in the acoustic spectrum. In this usage, a formant is an acoustic feature that may or may not be evidence of a vocal tract resonance" (p. 24). Hayward (2000) and Watt and Tillotson (2001) clarify that the formant frequency varies according to vocal tract and duration, and therefore any varies resulting from tongue movement and lip shape influence the formant frequency. The formants are evident in a spectrogram as large and dark bands that run across the length of a vowel. Because of this clarification, this approach is adopted in most acoustic studies as the first two vowel formants (F1 and F2) are deemed significant for vowel perception (e.g., Flemming & Johnson, 2007; Ladefoged, 2001). Nevertheless, some studies also take the third formant (F3) into account (e.g., Watson & Harrington, 1999). The values F1 and F2 are in near agreement with the position of the tongue (Ladefoged, 2001).

Fry (1979) notes that the relation between vowels can be explored by comparing formant values. That is because the first formant (F1) and second formant (F2) that appear on the spectrogram reflect the high-low and front-back distinction of a vowel. As for the above-mentioned function (1), F1 represents vowel height as in the high-low distinction. Therefore, if the value of F1 is lower, then the vowel is higher. While, F2 represents the degree of the vowel retraction and lip rounding, or the front-back distinction. Thus, a close front vowel like /i:/ will have a low F1 frequency and a high F2 frequency, while an open back vowel like /a:/ would possibly have a higher F1 frequency and a lower F2 frequency. For the highest vowels and between the smallest and the lowest, the greatest difference between F1 and F2 occurs. As for the back vowel, F2 is slightly lower and closer to F1 than the front ones. In order to visualize the vowel positions, Deterding, Wong and Kirkpatrick (2008) propose that the estimation of their open/close and front/back quality can be determined by measuring the first two formants and converting them to an auditory bark scale and by plotting the values on a chart. The first formant is plotted on the y-axis in the Bark scale, and the second formant on the x-axis. The vowel charts are either plotted as F1 against (F2-F1) or as a simple F1 vs F2 plot in relation to this. Hayward (2000) also states that a simple F1 and F2 plot may have deeper meaning because it reveals a universal vowel space of perceptuality. The average formant values of F1 and F2 are transferred to Bark a scale introduced by Zwicker and Terhardt (1980) to plot the vowel chart in order to describe and categorize the vowels, as well as to find their distinction.

2.7 Conclusion

In this chapter, the background and characteristics of Penang Malay and Standard Malay were explained. Other related studies on Malay sounds and the Formant

Frequency Model were explained as well. In summary, Asmah Haji Omar (2008) states that there are eight vowels in Kedah Persisiran, which is the standard subdialect of Kedah. The vowels are /a/, /i/, /u/, /ɛ/, /ɔ/, /ə/, /e/, and /o/. Asmah Haji Omar (2008) has also argued that the first significant difference between Balik Pulau subdialect and Tanjung subdialect lies in the production of prevocalic /r/ and intervocalic /r/. In Balik Pulau subdialect, the production of /r/ is uvular fricative [R], which is similar to that of Kedah Persisiran. The production of /r/ in Tanjung subdialect is velar fricative [r̠] as found in the Southern dialects. However, there could be two variations of /r/ among Tanjung speakers, some may use the velar fricative [r̠], and some may use the alveolar trill [r].

In describing Standard Malay, Yunus Maris (1980), Farid (1980), Raja Mukhtaruddin Raja Mohd Dain (1985), Nik Safiah (1989), Teoh (1994) and others, describe the nature of the vowel sounds of Standard Malay (i.e., [i, e, a, o, u, ə]) through the impressionistic approach. Indirawati Zahid and Mardian Shah Omar (2012) have proposed the same set of vowels with the addition of three vowels: [ɛ], [ɔ] and [ɒ].

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter discusses the methodology used to collect and analyze the data in this study. The details of the participants, research instruments, recording procedures, and tokens are discussed in this chapter as well.

3.2 Participants

There were seven (7) female participants who were selected for this study. Five (5) participants are speakers of Penang Malay who are of the Jawi Peranakan origin, and two (2) participants are speakers of Standard Malay. In dialectology, Ajid Che Kob (1985) has introduced the NORF (non-mobile, old, remote, female) method to elicit dialectal data in Malaysia. He further argues that the NORF method is more suitable to be used in Malaysia as opposed to the NORM (non-mobile, old, remote, male) method due to the expressive nature of female participants in describing dialects. The selection of participants was based on the NORF method. There are four (4) characteristics of the NORF method that have to be taken into consideration when selecting the participants. The first characteristic is *'non-mobile'*, which means the participant lives in their hometown or any given area permanently. The second characteristic is *'old'*, which requires the participant to be in their 40's to 60's. The third characteristic is *'remote'*, which means the participant has to live far away from the city center. The last characteristic of this method is *'female'*, which requires only female participants. In addition to the NORF method, a questionnaire (see Appendix A) was distributed to the participants. Questions like the occupation, place of birth, the primary language spoken at home, and the length of residency in the current location were among the questions asked in the questionnaire. The significance behind this was to ascertain that the

participants are native speakers of Penang Malay, speak Malay as their first language at home, and they have been living in Penang throughout their lives. Table 3.1 shows the demographic background of the participants of Penang Malay.

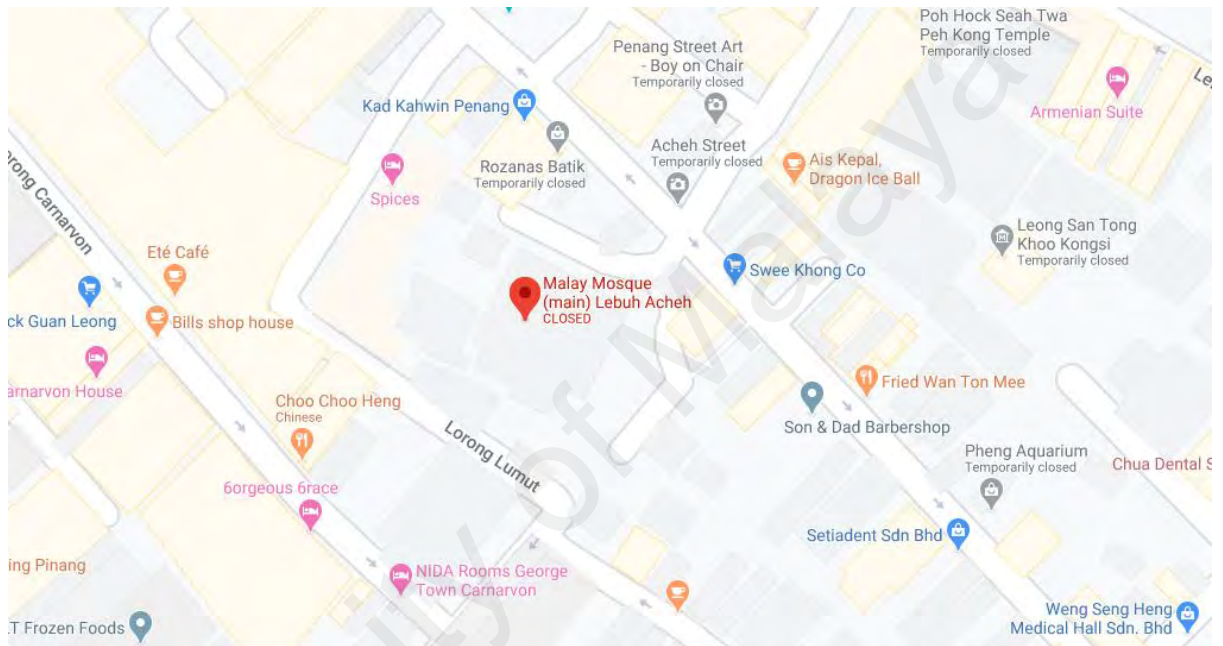
Table 3. 1: Demographic background of Penang Malay participants

Penang Malay speakers	Age	Occupation	Place of birth	Period of residency	Level of education	Primary language
PM1	54	Housewife	Penang	Since birth	SPM	Bahasa Malaysia
PM2	68	Housewife	Kedah	38 years	SPM	Bahasa Malaysia
PM3	63	Housewife	Penang	Since birth	SPVM	Bahasa Malaysia
PM4	67	Housewife	Penang	Since birth	SPM	Bahasa Malaysia
PM5	65	Housewife	Penang	Since birth	Senior Cambridge	Bahasa Malaysia

Due to the rapid urbanization that takes place on Penang Island in general, all participants were selected from the community of Jawi Peranakan at Masjid Jamek Lebuh Aceh, George Town, Penang because the Jawi Peranakans in the surrounding area still converse in Penang Malay dialect daily and also to keep the geographical variable consistent. They are also actively involved in the preservation of Penang Malay dialect and Jawi Peranakan identity. The participants were all born in Penang except for Participant 2 (PM2) who was born in Kedah. Besides, she was married to a Penang-born

man and has been living in Penang for 38 years. Notwithstanding, further auditory and acoustic analyses reveal that PM2's realizations were similar to other participants' realizations, and she was not influenced by her Kedahan roots. Figure 3.1 shows the location of Masjid Jamek Lebu Acheh, George Town, Penang on Google Maps.

Figure 3. 1: The location of Masjid Jamek Lebu Acheh, George Town, Penang



The level of education was one of the criteria in choosing the participants as well. In terms of the level of education, only Speaker 5 had a Senior Cambridge certificate, which is equivalent to Cambridge O Level. In contrast, the rest of the participants had SPM and SPVM qualifications. Lastly, all participants are housewives and speak Malay as their first language. Table 3.2 shows the demographic background of the participants of Standard Malay.

Table 3. 2: Demographic background of Standard Malay participants

Standard Malay speakers	Age	Occupation	Place of birth	Period of residency	Level of education	Primary language
SM1	51	Housewife	Johor Bahru	Since birth	SPM	Bahasa Malaysia
SM2	50	Housewife	Johor Bahru	Since birth	Diploma	Bahasa Malaysia

For Standard Malay speakers, both are from Johor Bahru, Johor. Asmah Haji Omar (1987) concurs that the Johor-Riau dialect is considered as Standard Malay. Both are housewives and they have been living in Johor Bahru, Johor since birth. In terms of the level of education, Speaker 1 had SPM qualification and Speaker 2 had a diploma qualification. The two participants also speak Malay as their first language.

3.3 Instruments

The participants were given a word list to read without being informed of the target vowels to avoid them from being cautious of their pronunciation. The words were written using the spelling normally used by the speakers of Penang Malay in everyday speech. Krapp (1926) and Bowdre (1964) labeled this phenomenon as Eye Dialect, which means the use of nonstandard spelling for speech to place greater emphasis on pronunciation. The rationale behind this method was to ensure the reading of the word list by the participants would be more natural. There were eight (8) vowels analyzed for Penang Malay namely [a], [i], [u], [ɛ], [ɔ], [ə], [e], and [o]. For Standard Malay, there were six (6) vowels analyzed namely [a], [i], [u], [ə], [e], and [o]. Each participant was

asked to repeat the word list three (3) times to determine the consistency of their pronunciation. To minimize the possibility of co-articulatory effects on the target vowels, all vowels that occurred after approximants /j/, /w/, /r/ or before /l/ were avoided (Deterding, 1997). Tables 3.3 and 3.4 show the word lists used for Penang Malay and Standard Malay, respectively.

Table 3. 3: The word list used for Penang Malay

Target vowel	Word	Gloss
[a]	bakaq bakui bahu	burn basket shoulder
[i]	kipaih pikiaq pikat	fan think flirt
[u]	pudaq pukui bukak	fade hit open
[ɛ]	sepak besok meja	kick tomorrow desk
[ɔ]	sotong pokok potong	squid tree cut
[ə]	besaq kecik kebah	big small numb
[e]	pesta sate hemah	festival satay polite
[o]	katok soto	knock soto (food)

	mohon	apply
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Table 3. 4: The word list used for Standard Malay

Target vowel	Word	Gloss
[a]	bakar bakul bahu	burn basket shoulder
[i]	kipas fikir pikat	fan think flirt
[u]	pudar pukul buka	fade hit open
[ə]	besar kecil kebas	big small numb
[e]	pesta sate hemah	festival satay polite
[o]	kekok pohon mohon	knock tree apply

3.4 Data collection

The participants were given one (1) to two (2) minutes to go through the word list before the recording sessions took place. The rationale behind this was to ensure that the participants were familiar and comfortable with the words that they had to pronounce. All the words were presented in a carrier frame: *ulang WORD semula* (say WORD again). The main reason behind this was to ensure that the participants read the words in a stable and normal pace. Ladefoged (2003) concedes to the fact that if *say* and *again*

are used in the same context, it can be assumed that the speaker is speaking at a constant rate. The recordings were set to mono and sampled at 22050 Hz, as recommended by Ladefoged (2003). Marantz PMD661MKII handheld solid-state recorder was used to record all the tokens. The software used to analyze the vowels was Praat version 6.0.50 (Boersma & Weenink, 2019). Praat is an open-software tool of analysis to analyze speeches in phonetics.

3.5 Data analysis

The tokens collected from Penang Malay participants were 360 tokens (24 words x 3 recordings x 5 participants) and 108 tokens from Standard Malay participants (18 words x 3 recordings x 2 participants). There were 468 tokens collected in total. The tokens were then imported to Praat version 6.0.50 (Boersma & Weenink, 2019) to be analyzed. The software was used to listen to the sound files, view the spectrograms and waveforms. The Formant Frequency Model was used to analyze the vowels as this model is commonly used in the instrumental analysis of vowels (see Watt & Tillotson, 2001; Deterding, 2003; Hawkins & Midgley, 2005). According to Watt and Tillotson (2001), the current practice in instrumental phonetics is to:

reduce individual vowel sounds to a pair of figures representing the frequencies in Hertz of the two lowest formants, which are conventionally labelled F1 and F2. Formants can be defined as narrow bands within the acoustic spectrum in which energy is concentrated during the production of speech sounds; the frequency of each formant is determined by the volumes and resonances of various vocal tract cavities (pharyngeal, oral, nasal). Formants contain most energy during sonorant sounds such as vowels, and the frequencies of F1 and F2 relative to one another are thought to provide the human speech perception system with the cues necessary for the recognition of individual vowel qualities. F1 and F2 frequencies are, moreover, said to correlate closely with tongue position, such that an increase in F1 frequency corresponds to tongue lowering and jaw opening, while an increase in F2 frequency results from fronting of the tongue body. (p. 275)

Based on the Formant Frequency Model, the midpoint of each vowel was measured to get the F1 (first formant) and F2 (second formant) values. The midpoint of a vowel is considered the steadiest state of the vowel and the least influenced sound (Smiths & Hout, 2004; Ladefoged, 2003; Watt & Tillotson, 2001; Yunisrina Qismullah Yusuf & Pillai, 2012). After every vowel was measured, the values of the formants in Hertz were converted into a Bark scale because “it is thought to be a good approximation of the actual frequency analysis performed by the ear” (Pillai, Muthiah, & Teip, 2012, p. 115), and it would help in the plotting of vowels on the scatter plot. The formula used to convert Hertz into a Bark scale was reproduced from (Zwicker & Terhardt, 1980):

$$Z = 13 \arctan (0.00076F) + 3.5 \arctan (F/7500)^2$$

The measurements of all vowels from each participant were listed in Appendix B of this dissertation. The Bark values of each vowel were then transformed into vowel charts.

3.6 Statistical analysis

Independent samples *t*-test was carried out in this study to examine the significance between Penang Malay and Standard Malay vowels. The primary goal of adopting this statistical analysis was to determine the significance between the means of three or more sets of data from similar groups in research (Harrington, 2010; Bohn & Fledge, 1992). In this study, GraphPad Prism version 8.0.0 for Windows was used to analyze the independent samples *t*-test.

3.7 Conclusion

In this chapter, the methodology used to analyze the monophthongs of Penang Malay and Standard Malay was explained. The data collected from Penang Malay and Standard Malay speakers were used to determine the acoustic features of Penang Malay and Standard Malay, and to identify the similarities and differences between the monophthongs of Penang Malay and Standard Malay based on their acoustic properties. The vowels were collected from seven (7) female participants comprising of Penang Malay and Standard Malay speakers, and the targeted words were repeated thrice for each participant to determine the consistency of their pronunciation.

Based on the Formant Frequency Model, F1 and F2 values were extracted from the midpoint of each vowel because it was considered the steadiest state of a vowel. The findings of the monophthongs of Penang Malay and Standard Malay are presented and further discussed in the following chapter.

CHAPTER 4: FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents and discusses the findings of the study. The findings from Penang Malay and Standard Malay are discussed separately and subsequently compared. The primary focus of the discussion would be on Penang Malay as it is the main emphasis of this study and Standard Malay is discussed as a comparator.

4.2 Findings on the monophthongs of Penang Malay

The averages of F1 (Hz) and F2 (Hz) values for all eight (8) vowels of Penang Malay, standard deviations of F1 and F2 values, and averages of F1 (Bark) and F2 (Bark) values are presented in Table 4.1. The measurements for each vowel are presented in Appendix C.

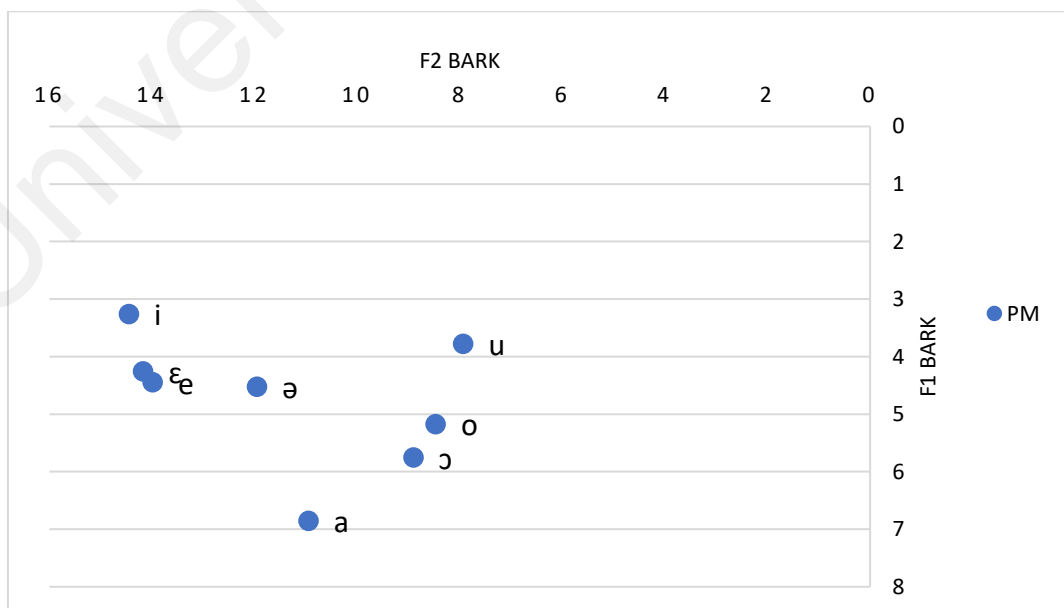
Table 4. 1: Averages of F1 and F2 values for Penang Malay monophthongs

Tokens	Ave F1 (Hz)	SD F1 (Hz)	Ave F2 (Hz)	SD F2 (Hz)	Ave F1 (Bark)	SD F1 (Bark)	Ave F2 (Bark)	SD F2 (Bark)
a	761.4	97.8	1446.1	170.7	6.8	0.7	10.9	0.8
i	336.6	45.8	2477.4	224.2	3.3	0.4	14.4	0.6
u	392.4	45.8	912.8	182.8	3.8	0.4	7.9	1.1
ɛ	445.7	64.8	2368.3	315.2	4.2	0.6	14.1	0.9
ɔ	620.4	49.5	1063.2	95.0	5.7	0.4	8.9	0.6
ə	475.4	65.5	1680.1	311.7	4.5	0.6	11.8	1.3
e	467.1	64.6	2298.8	362.8	4.4	0.6	13.9	1.1
o	550.9	67.2	993.9	164.6	5.2	0.6	8.4	1.0

Ave = Average, SD = Standard deviation

Figure 4.1 shows the monophthongs of Penang Malay on a vowel quadrilateral. Based on the findings, the positioning of six (6) out of the eight (8) vowels on a vowel quadrilateral are in accordance with Asmah Haji Omar's (1993) initial impressionistic study of vowels. The vowels [ɛ] and [e] were found to be conflated in vowel quality. Based on the independent samples *t*-test, there were no significant differences between F1 and F2 average values of the said vowels (F1: $t(90) = 1.57$, $p = 0.120$; F2: $t(90) = 0.97$, $p = 0.335$), indicating that these vowels were produced similarly. The vowels [ɛ] and [e] in this study were produced differently as well as compared to the ones in Afiqah Jazmin Azli (2017). The vowel [ɛ] in this study is in a close-mid, front position, whereas in Afiqah Jazmin Azli (2017), it is in an open-mid, front position. On the other hand, the vowel [e] in this study is in an open-mid, front position, whereas in Afiqah Jazmin Azli (2017), it is in a close-mid, front position. It should also be noted that the vowels [o] and [ɔ] in this study moved further towards the central position, whereas in Afiqah Jazmin Azli (2017), the vowels [o] and [ɔ] remained as back vowels.

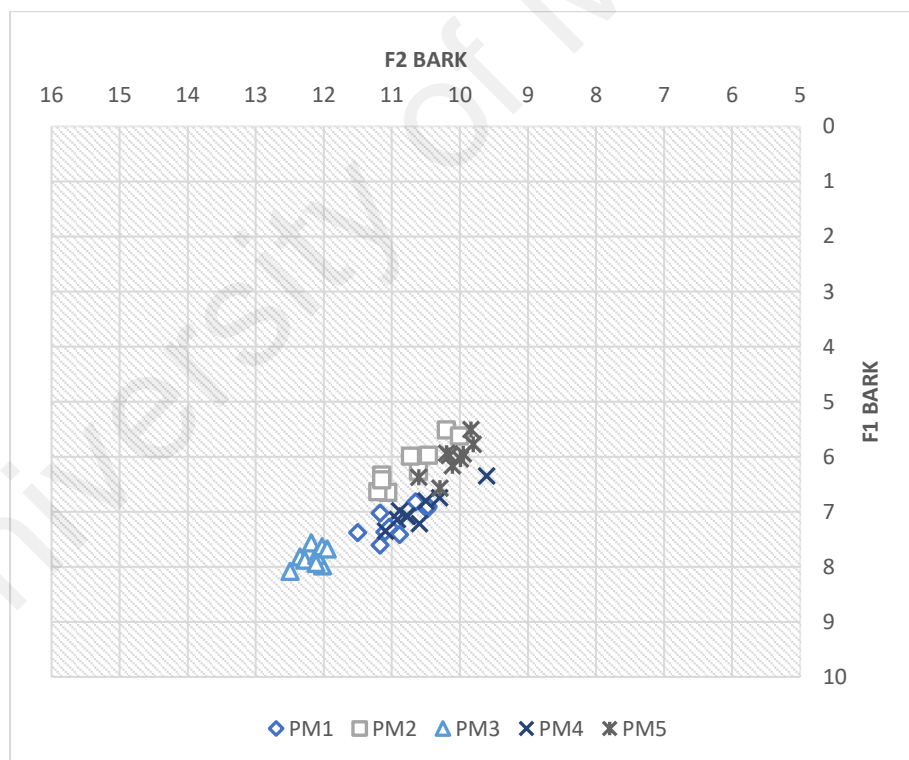
Figure 4. 1: Vowel quadrilateral for Penang Malay monophthongs



4.2.1 Penang Malay [a]

Figure 4.2 shows the distribution of [a] by the participants of Penang Malay. Here, there is an overlapping distribution of [a] among the participants of Penang Malay except PM3 as her production of the vowel is distant in the vowel space compared to the other participants. PM3's realization is further fronted and lower compared to the near front, open position realized by other participants of Penang Malay. The distribution of [a] in Afiqah Jazmin Azli (2017) moves towards half-close, near front position. In addition, the distribution of [a] in this study is closely scattered as opposed to Afiqah Jazmin Azli's (2017) distribution of [a] which is more scattered.

Figure 4. 2: Scatter plot for [a] of Penang Malay monophthong

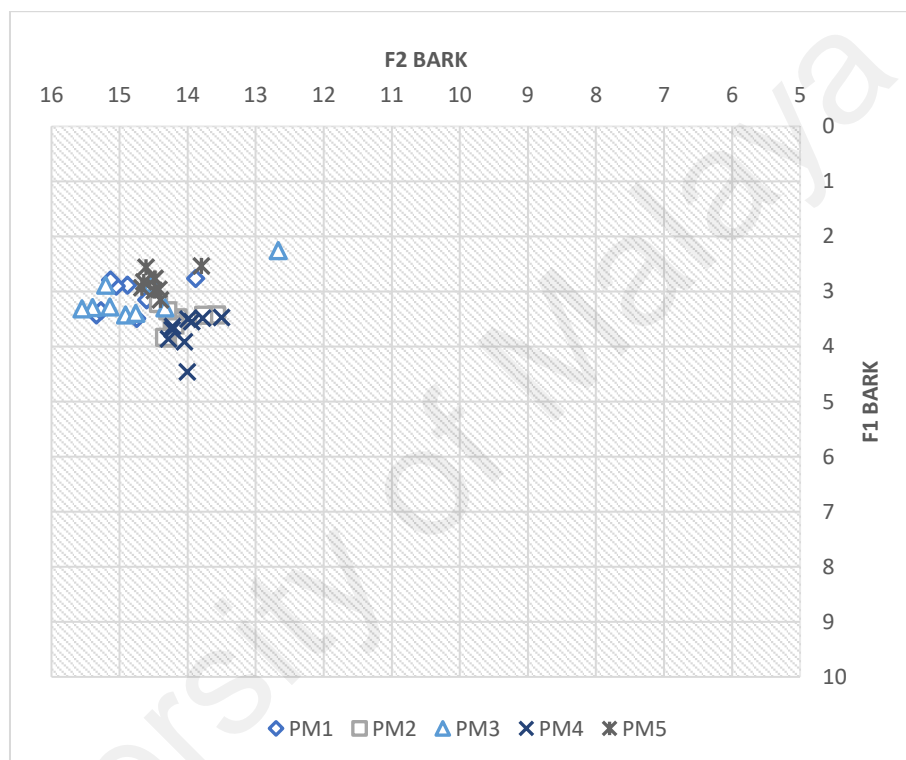


4.2.2 Penang Malay [i]

Figure 4.3 shows the distribution of [i] by the participants of Penang Malay. It shows a high overlapping distribution among the participants of Penang Malay except for a

minor inconsistency and deviation made by PM3 in one of her realizations. According to Figure 4.3, the distribution of [i] in the vowel space is distributed in a close, front position. The findings of [i] in this study are in accordance with the findings in Yunisrina Qismullah Yusuf (2013) and Afiqah Jazmin Azli (2017).

Figure 4. 3: Scatter plot for [i] of Penang Malay monophthong

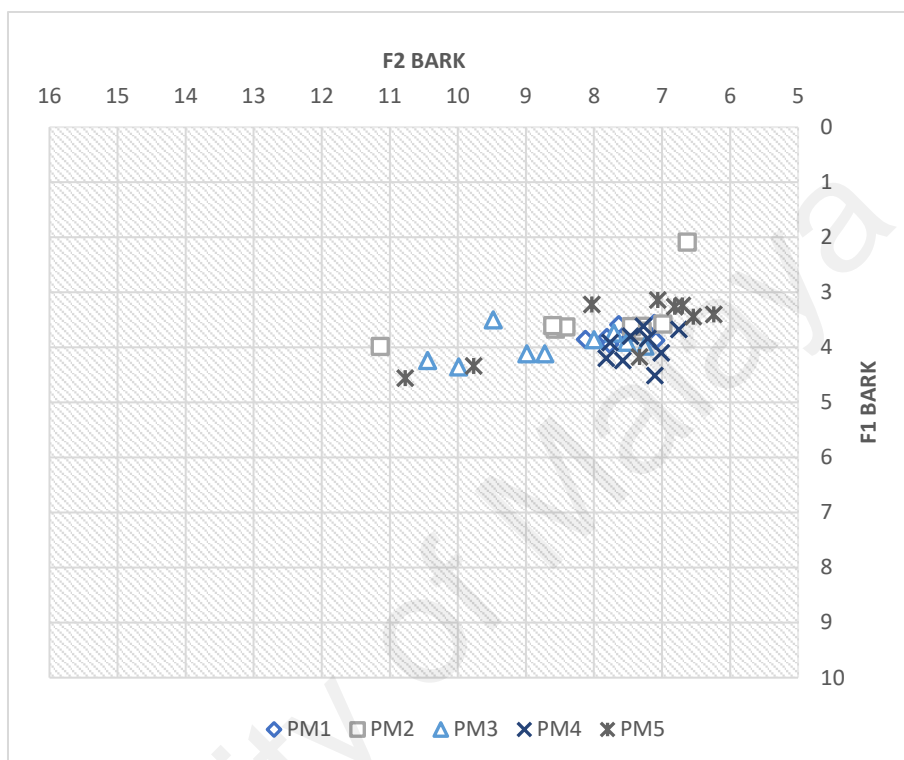


4.2.3 Penang Malay [u]

Figure 4.4 shows the distribution of [u] by the participants of Penang Malay. Here, there is a considerably overlapping distribution of [u] in the vowel space despite the few inconsistencies and deviations made by the participants. The distribution of [u] in Figure 4.4 moves towards the central position instead of in a close, back position as found in the other studies (Yunisrina Qismullah Yusuf, 2013; Afiqah Jazmin Azli, 2017). According to Figure 4.4, there are several inconsistencies and deviations made

by PM2, PM3, and PM5; however, the rest of the realizations are still closely scattered to one another.

Figure 4. 4: Scatter plot for [u] of Penang Malay monophthong



4.2.4 Penang Malay [ɛ] and Penang Malay [e]

Figure 4.5 shows the distribution of [ɛ] by the participants of Penang Malay. There is a high overlapping distribution of [ɛ] in the vowel space among the participants of Penang Malay except for several inconsistencies and deviations made by PM1 and PM4. Based on the average values of F1 (445.7 Hz) and F2 (2368.3 Hz) for all participants, the vowel [ɛ] in this study moves towards the mid, front position. PM1's production of the vowel moves towards mid-open, front position, while PM4's production of the vowel moves towards open mid, front position. However, PM1's and PM4's realizations considerably overlapped with the other participants of Penang

Malay. On contrary, Afiqah Jazmin Azli (2017) found the vowel [ɛ] to be in an open-mid, front position in her study.

Based on the convention of vowels from an impressionistic approach as proposed by Asmah Haji Omar (1993), Yunus Maris (1980), and Teoh (1994), the vowels [ɛ] and [e] in this study were found to be inverted in terms of the positioning on the vowel chart, and to be conflated in vowel quality with each other.

Figure 4. 5: Scatter plot for [ɛ] of Penang Malay monophthong

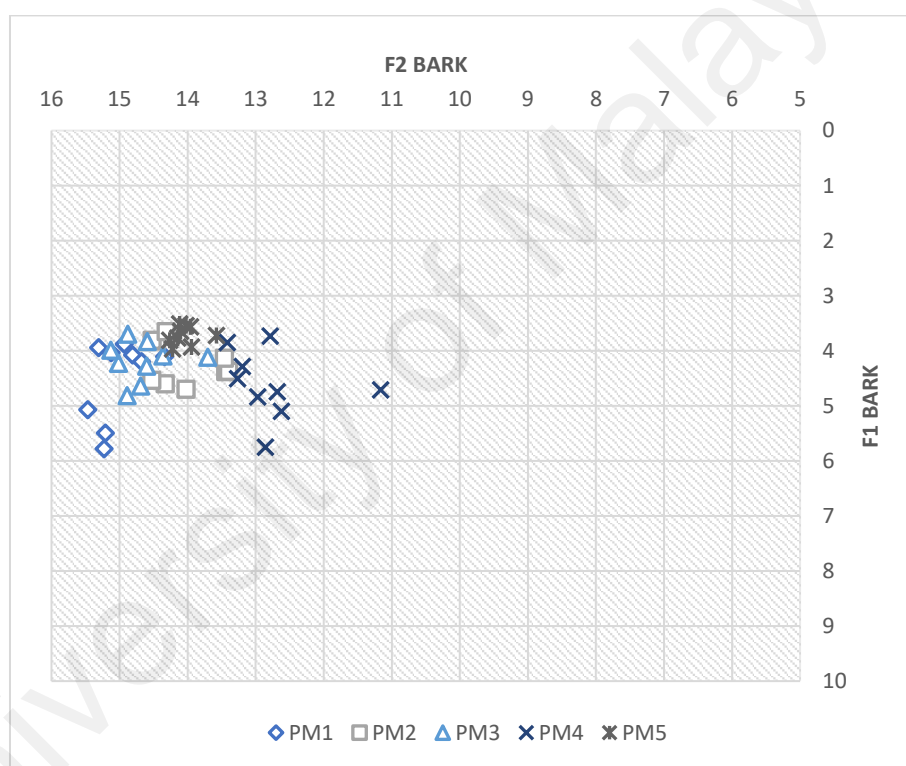


Figure 4.6, on the other hand, shows the distribution of [e] by the participants of Penang Malay. Based on the figure, there is a considerably overlapping distribution of [e] in the vowel space among the participants of Penang Malay except for a minor inconsistency from PM1 in one of her realizations, while the rest of her realizations were consistent with the other speakers. Afiqah Jazmin Azli's (2017) and Yunisrina Qismullah Yusuf's (2013) findings of the vowel [e] move towards the close-mid, front

position, as opposed to the production of [e] in this study which is in an open-mid, front position.

Figure 4. 6: Scatter plot for [e] of Penang Malay monophthong

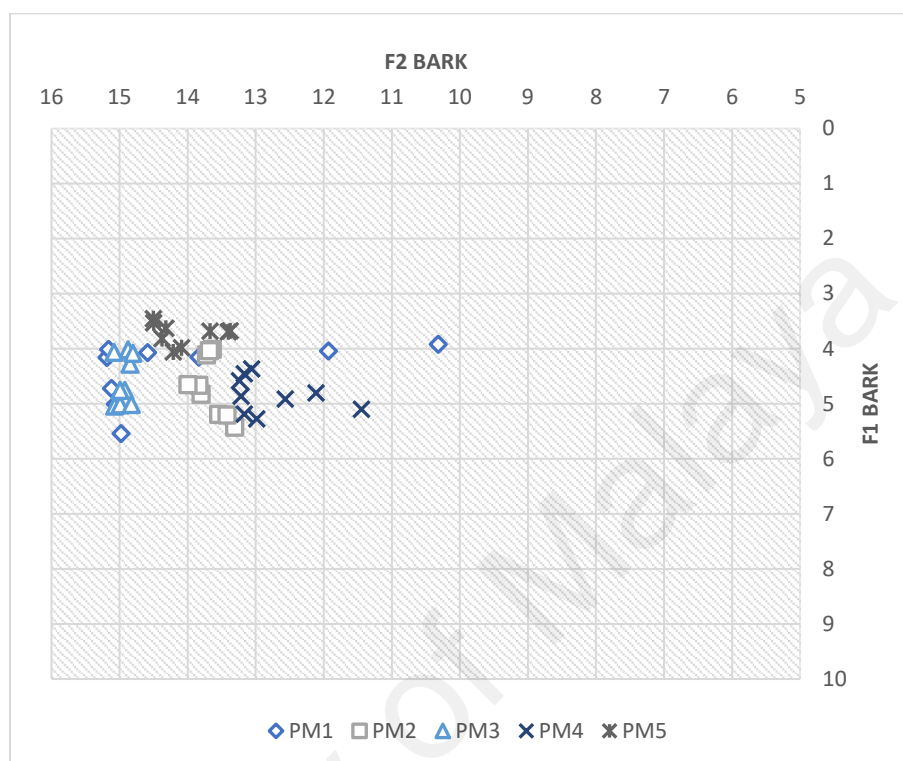
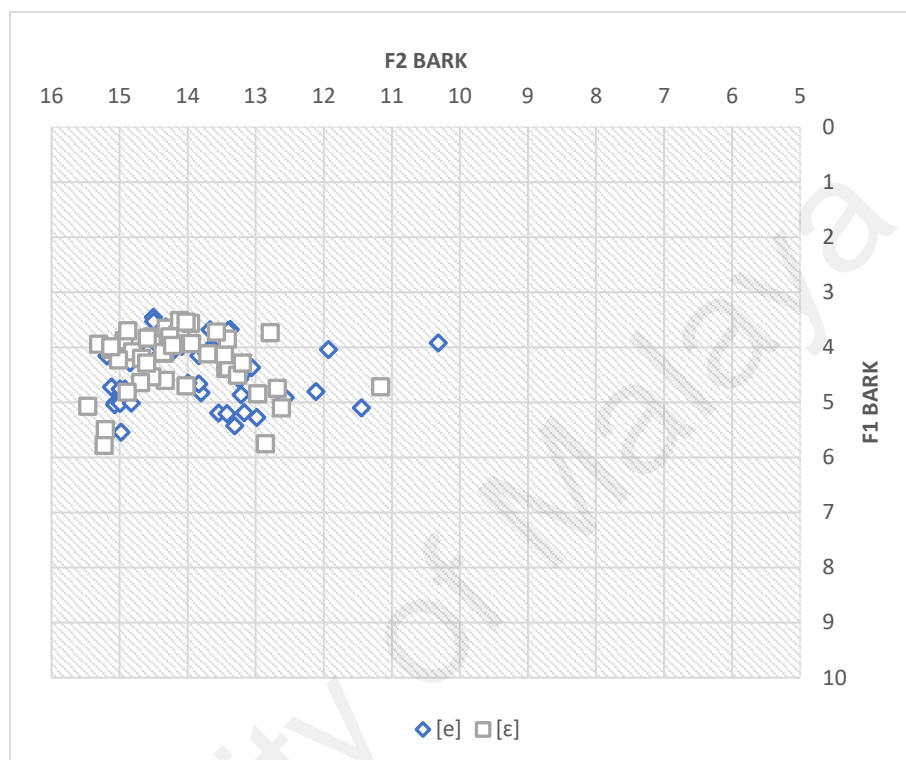


Figure 4.7 shows the distribution of the vowels [e] and [ɛ] on a scatter plot. Based on the findings of this study, vowels [ɛ] and [e] were found to be conflated in quality and inverted in terms of the positioning on the vowel chart. Based on the independent samples *t*-test, there were no significant differences between F1 and F2 average values of the said vowels (F1: $t(90) = 1.57$, $p = 0.120$; F2: $t(90) = 0.97$, $p = 0.335$), indicating that these vowels were produced similarly. This phenomenon is not in agreement with the initial proposition of vowels from an impressionistic approach by Asmah Haji Omar (1993), Yunus Maris (1980), and Teoh (1994). The findings of the vowels [ɛ] and [e] in this study were found to be different as well than Afiqah Jazmin Azli's (2017) acoustic analysis of vowels. However, based on the findings from this study, this conflation can

be best represented by [e] because this vowel exists in Penang Malay and Standard Malay.

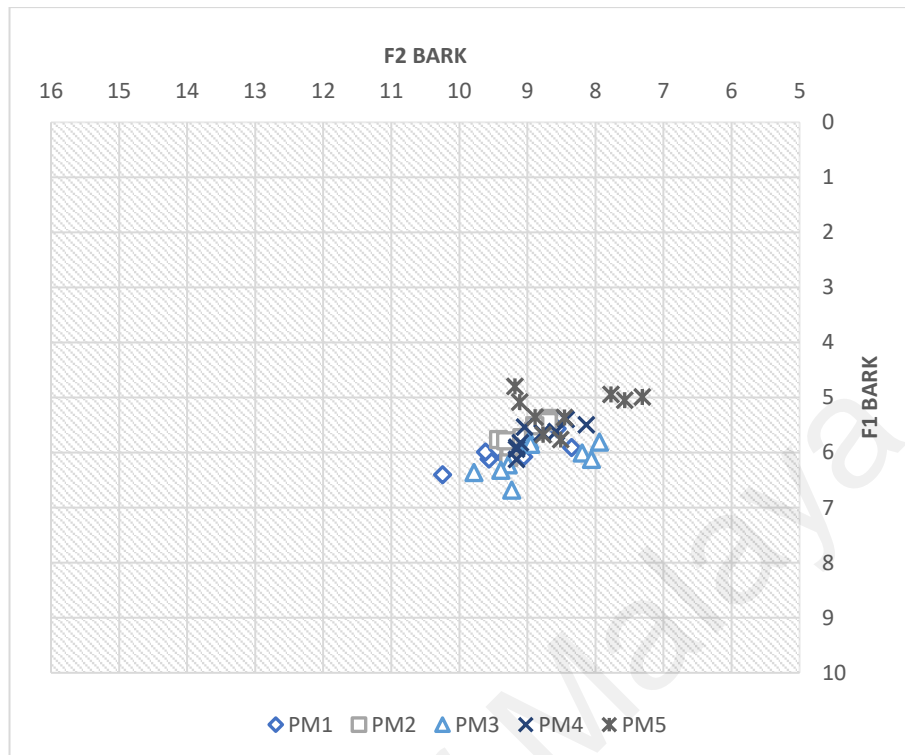
Figure 4. 7: Scatter plot for [e] and [ɛ] of Penang Malay monophthongs



4.2.5 Penang Malay [ɔ]

Figure 4.8 shows the distribution of [ɔ] by the participants of Penang Malay. Here, there is a high overlapping distribution of [ɔ] in the vowel space by the participants of Penang Malay despite some inconsistencies from PM5. PM5's realizations moved towards mid, back position as opposed to other participants. Based on the average values of F1 (620.4 Hz) and F2 (1063.2 Hz) for all participants, the vowel [ɔ] in this study moved towards near open, central position, which is in tandem with Afiqah Jazmin Azli's (2017) study. However, in Yunisrina Qismullah Yusuf (2013), the vowel [ɔ] is considered as a back vowel in her acoustic analysis.

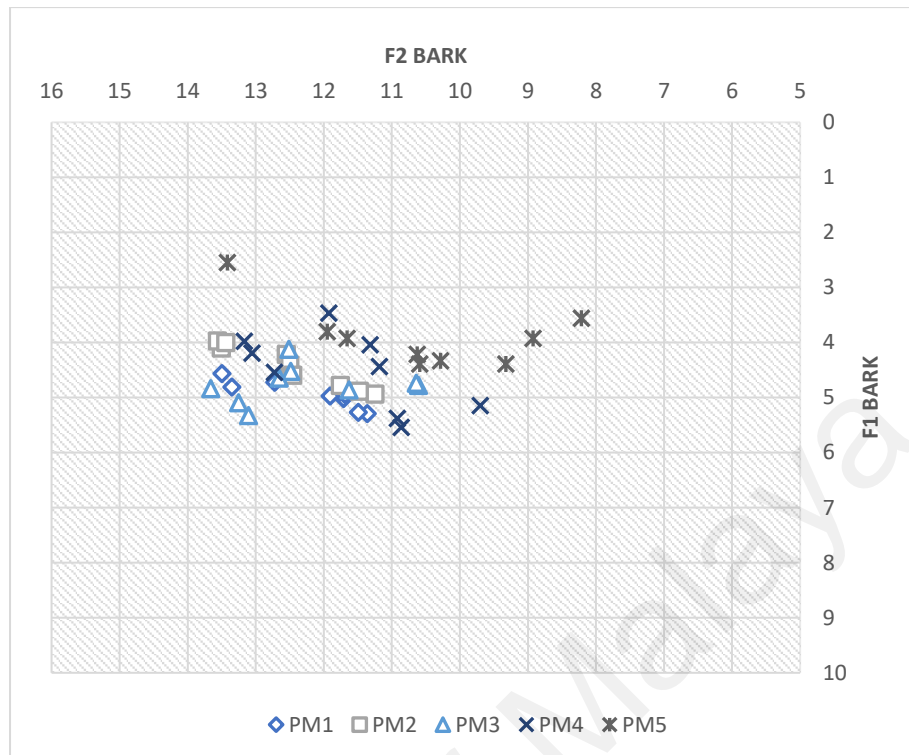
Figure 4. 8: Scatter plot for [ə] of Penang Malay monophthong



4.2.6 Penang Malay [ə]

Figure 4.9 shows the distribution of [ə] by the participants of Penang Malay. The results for schwa [ə] in this study are inconclusive as all participants had produced different realizations which caused the plotting to be scattered all over the place. The inconsistent results for this vowel are similar to what Afifah Jazmin Azli (2017) had found in her study, in which the elicitation tokens were greatly scattered on the scatter plot. This phenomenon is supported by Bates (1995), in which she concurs that schwa [ə], articulatorily, is “inherently unspecified for tongue position” (pp. 266-267), while Teoh (1994) assumes that schwa lacks any distinctive height and backness specification, and thus denotes schwa as the empty vowel.

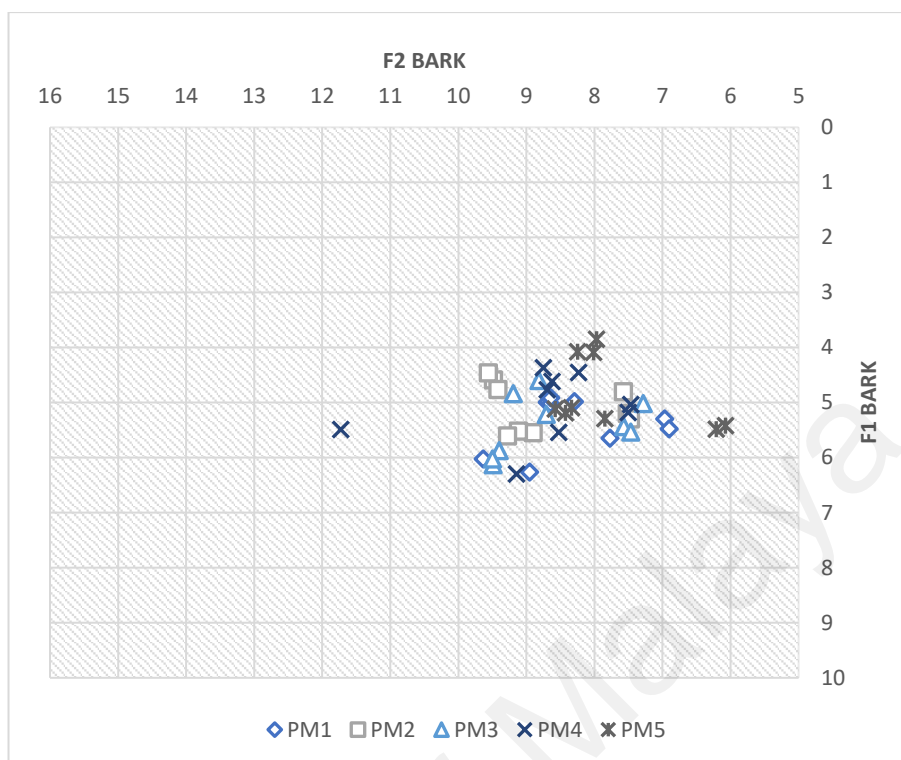
Figure 4. 9: Scatter plot for [ə] of Penang Malay monophthong



4.2.7 Penang Malay [o]

Figure 4.10 shows the distribution of [o] by the participants of Penang Malay. There is a noticeably high overlapping distribution of [o] among the participants of Penang Malay despite a minor inconsistency and deviation from one of PM4's realizations. Based on Figure 4.10, the vowel [o] in this study moved towards an open-mid, central position. However, in Yunisrina Qismullah Yusuf (2013), the vowel [o] was found to be in a half-close, back position, whereas Afiqah Jazmin Azli's (2017) findings were inconclusive due to greater inconsistencies involved.

Figure 4. 10: Scatter plot for [o] of Penang Malay monophthong



4.3 Findings on the monophthongs of Standard Malay

The averages of F1 (Hz) and F2 (Hz) values for all six (6) vowels of Standard Malay, standard deviations of F1 and F2 values, and averages of F1 (Bark) and F2 (Bark) values are presented in Table 4.2. The measurements for each vowel are presented in Appendix D.

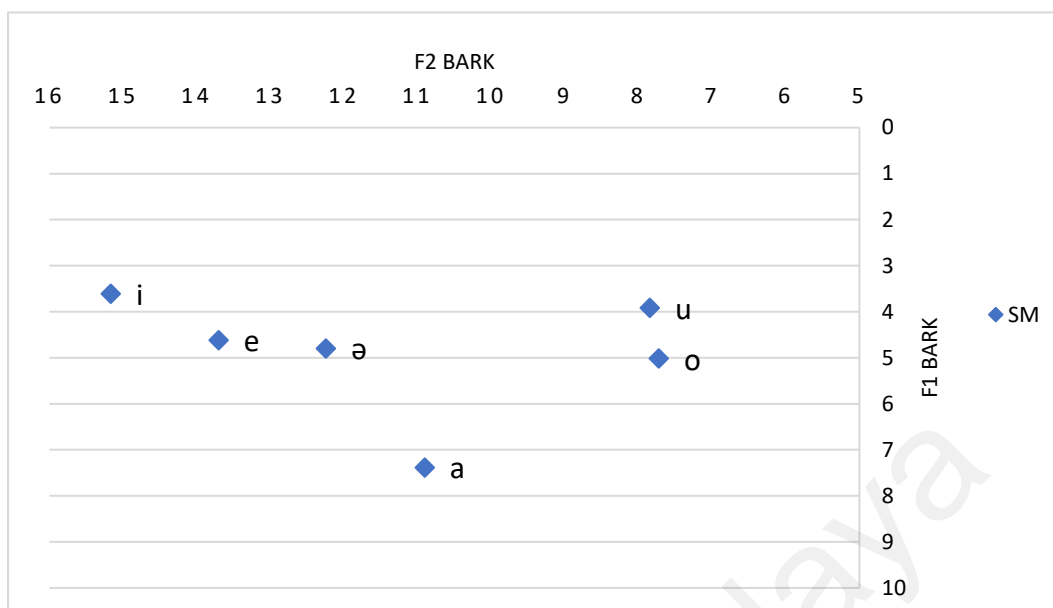
Table 4. 2: Averages of F1 and F2 values for Standard Malay monophthongs

Tokens	Ave F1 (Hz)	SD F1 (Hz)	Ave F2 (Hz)	SD F2 (Hz)	Ave F1 (Bark)	SD F1 (Bark)	Ave F2 (Bark)	SD F2 (Bark)
a	833.4	52.7	1435.8	89.6	7.4	0.4	10.9	0.4
i	374.2	25.5	2788.8	122.5	3.6	0.2	15.2	0.3
u	407.5	17.8	900.0	88.8	3.9	0.2	7.8	0.6

ə	506.8	45.3	1754.3	304.0	4.8	0.4	12.1	1.1
e	491.6	78.4	2538.5	224.6	4.7	0.7	14.6	0.5
o	532.6	98.4	881.9	83.2	5.0	0.8	7.7	0.6

Figure 4.11 shows the monophthongs of Standard Malay on a vowel quadrilateral. Based on the findings, the positioning of the six (6) vowels on a vowel quadrilateral are in accordance with the initial impressionistic study of Standard Malay vowels by Yunus Maris (1980) except for the vowels [u] and [o]. In this study, the vowel [u] was found to be in a half-close, back position, and the vowel [o] was found to be in a close, back position. While in Yunus Maris (1980), the vowel [u] is in a close, back position, while the vowel [o] is in a half-close, back position. This phenomenon was also observed in Afiqah Jazmin Azli's (2017) acoustic analysis, in which she had found the vowel [u] to be in a half-close, back position, and the vowel [o] to be in a close, back position. In addition, the vowel [a] in this study moved towards the open, central position, whereas in Afiqah Jazmin Azli (2017), the vowel [a] moved towards mid-open, near front position. The vowel [e] in this study was found to be in a close-mid, near front position, which is in agreement with Afiqah Jazmin Azli's (2017) findings of the same vowel. In terms of the vowel [ə], it was found to be in a mid, near front position, whereas in Afiqah Jazmin Azli (2017), the vowel [ə] was found in a close-mid, central position. Last but not least, the vowel [i] in this study was found to be in a near close, front position, which is in agreement with the findings of the same vowel in Afiqah Jazmin Azli (2017) and Yunisrina Qismullah Yusuf (2013).

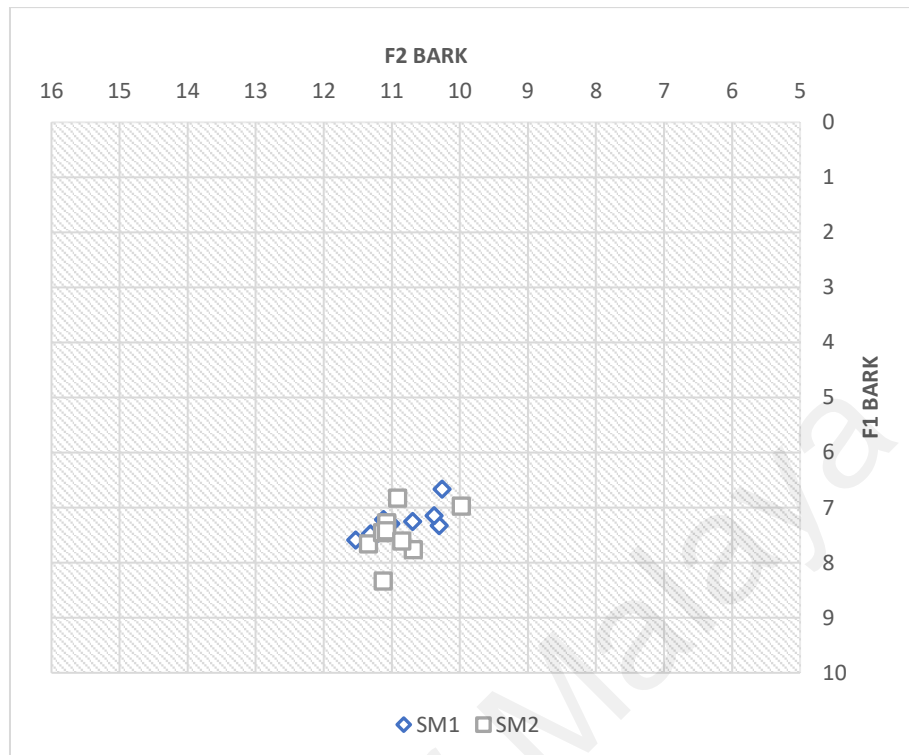
Figure 4. 11: Vowel quadrilateral for Standard Malay monophthongs



4.3.1 Standard Malay [a]

Figure 4.12 shows the distribution of [a] by the participants of Standard Malay. There is a high overlapping distribution of [a] among the participants of Standard Malay except SM2 as one of her realizations was moving towards near open position. The findings of [a] in this study are similar to what Yunisrina Qismullah Yusuf (2013) found in her analysis of [a]. In this study, the vowel [a] moves towards the open, central position, whereas in Afiqah Jazmin Azli (2017), the vowel [a] moved towards near open, near front position.

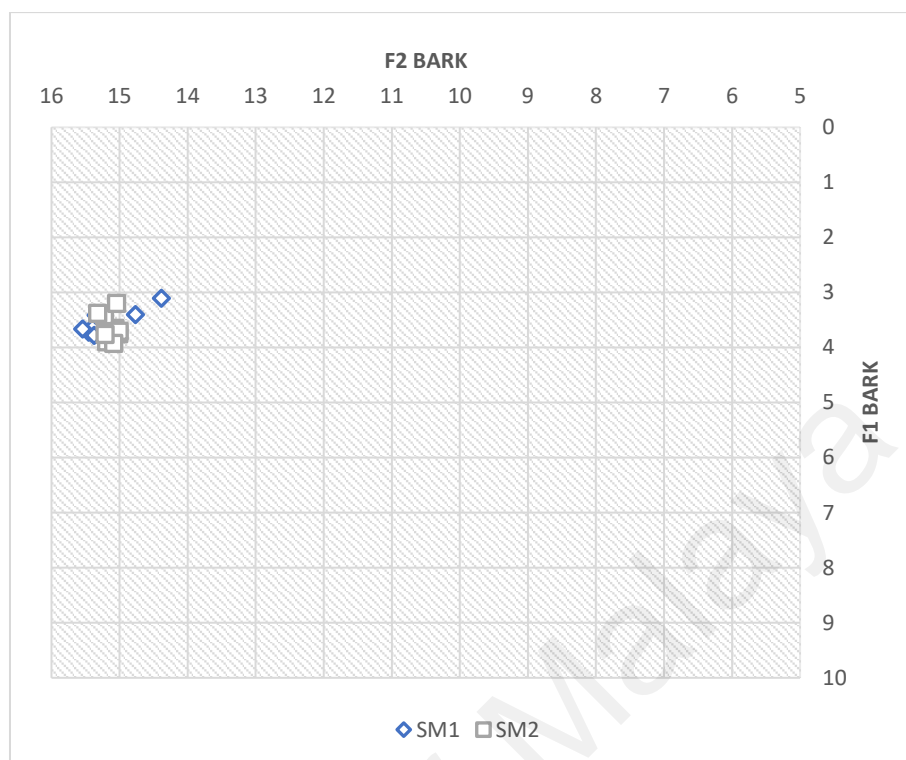
Figure 4. 12: Scatter plot for [a] of Standard Malay monophthongs



4.3.2 Standard Malay [i]

Figure 4.13 shows the distribution of [i] by the participants of Standard Malay. Here, the distribution of the vowel [i] is highly overlapped by the participants of Standard Malay except SM1 where one of her realizations was moving towards the central position slightly. The findings of [i] in this study are similar to what Yunisrina Qismullah Yusuf (2013) and Afiqah Jazmin Azli (2017) have found in their studies. The vowel [i] in this study was found to be in a near close, front position.

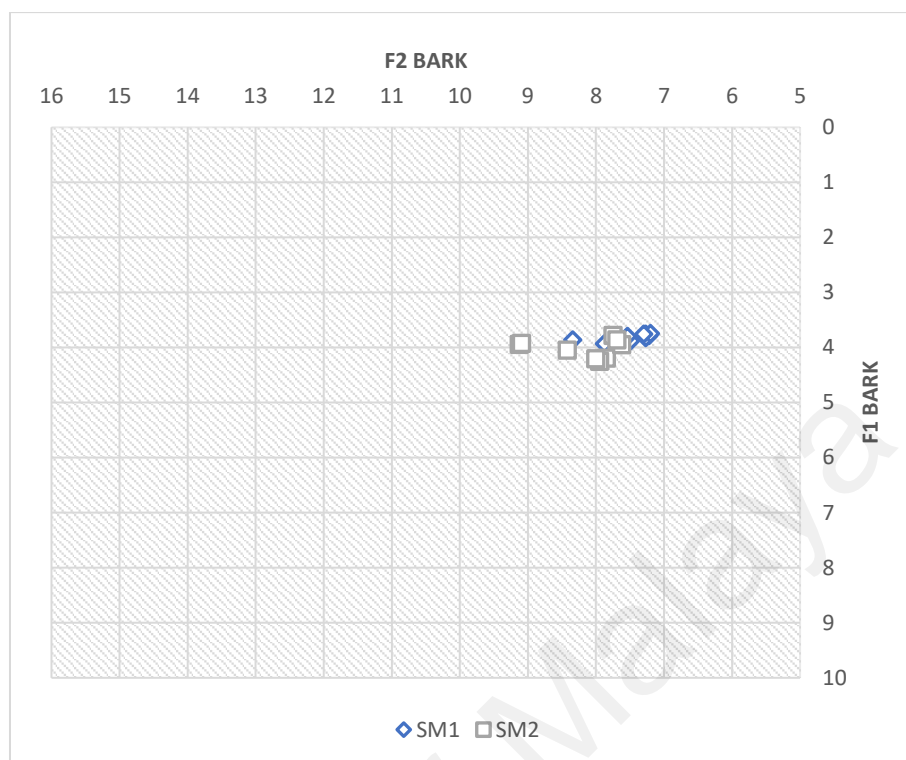
Figure 4. 13: Scatter plot for [i] of Standard Malay monophthongs



4.3.3 Standard Malay [u]

Figure 4.14 shows the distribution of [u] by the participants of Standard Malay. There is a considerably high overlapping distribution of [u] among the participants of Standard Malay except SM2 whose realizations moved slightly to the mid position. However, the inconsistencies are not significant as other realizations from SM2 are closely scattered with SM1's realizations. In this study, the vowel [u] was found to be in a half-close, back position. While in Yunus Maris (1980), the vowel [u] is in a close, back position, while the vowel [o] is in a half-close, back position. This phenomenon was also observed in Afiqah Jazmin Azli's (2017) acoustic analysis, in which she had found the vowel [u] to be in a half-close, back position.

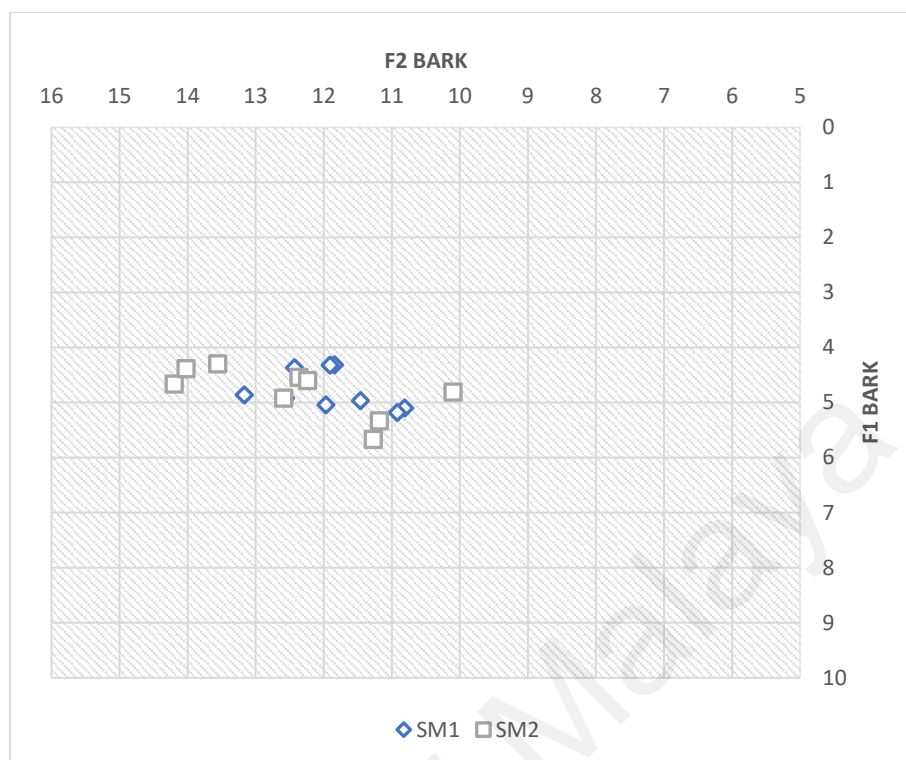
Figure 4. 14: Scatter plot for [u] of Standard Malay monophthongs



4.3.4 Standard Malay [ə]

Figure 4.15 shows the distribution of [ə] by the participants of Standard Malay. The results for schwa [ə] in this study are inconclusive as all participants had produced different realizations which caused the plotting to be scattered all over the place. The same phenomenon was also observed by the vowel [ə] that was produced by the participants of Penang Malay in this study. The inconsistent results for this vowel are also similar to what Afiqah Jazmin Azli (2017) had found in her study, in which the elicitation tokens were greatly scattered on the scatter plot. This phenomenon is supported by Bates (1995), in which she concurs that schwa [ə], articulatorily, is “inherently unspecified for tongue position” (pp. 266-267), while Teoh (1994) assumes that schwa lacks any distinctive height and backness specification, and thus denotes schwa as the empty vowel.

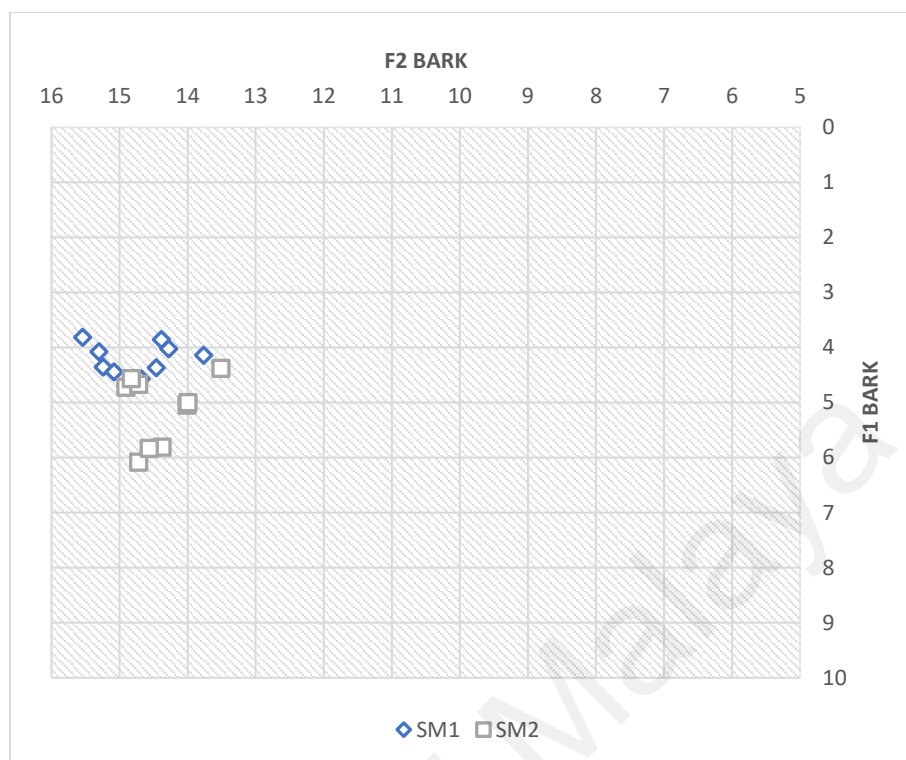
Figure 4. 15: Scatter plot for [ə] of Standard Malay monophthongs



4.3.5 Standard Malay [e]

Figure 4.16 shows the distribution of [e] by the participants of Standard Malay. Here, there is a slight overlapping distribution of [e] by the participants of Standard Malay. However, the inconsistencies between the realizations of the two participants are rather apparent on the scatter plot. Based on the independent samples *t*-test, the realizations were statistically different between SM1 and SM2 (F1 : $t(18) = 4.61$, $p = <.003$; F2: $t(18) = 2.56$, $p = 0.0208$). In this study, the vowel [e] was found to be in a close-mid, near front position, which is in agreement with Afiqah Jazmin Azli's (2017) findings of the same vowel.

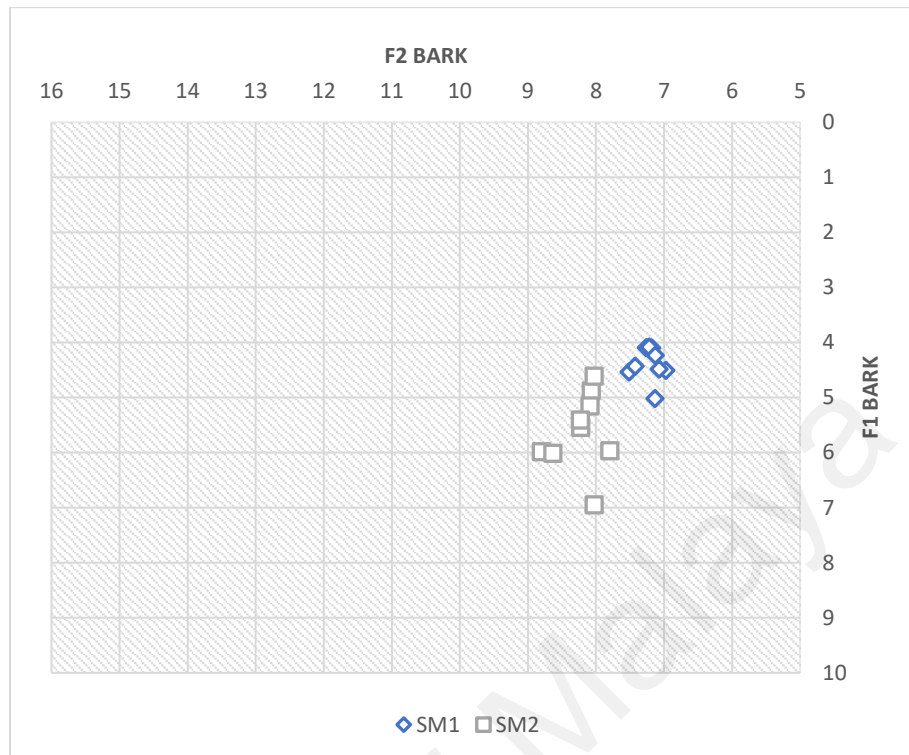
Figure 4. 16: Scatter plot for [e] of Standard Malay monophthongs



4.3.6 Standard Malay [o]

Figure 4.17 shows the distribution of [o] by the participants of Standard Malay. Based on the scatter plot, there is noticeably no overlapping distribution of [o] among the participants. An auditory analysis was also conducted to examine this phenomenon further and it could be deduced that the presence of aspiration in the participants' realizations had influenced the distribution of the vowel [o]. In this study, the vowel [o] was found to be in a close, back position, which confirms Afiqah Jazmin Azli's (2017) acoustic analysis of the vowel [o].

Figure 4. 17: Scatter plot for [o] of Standard Malay monophthongs

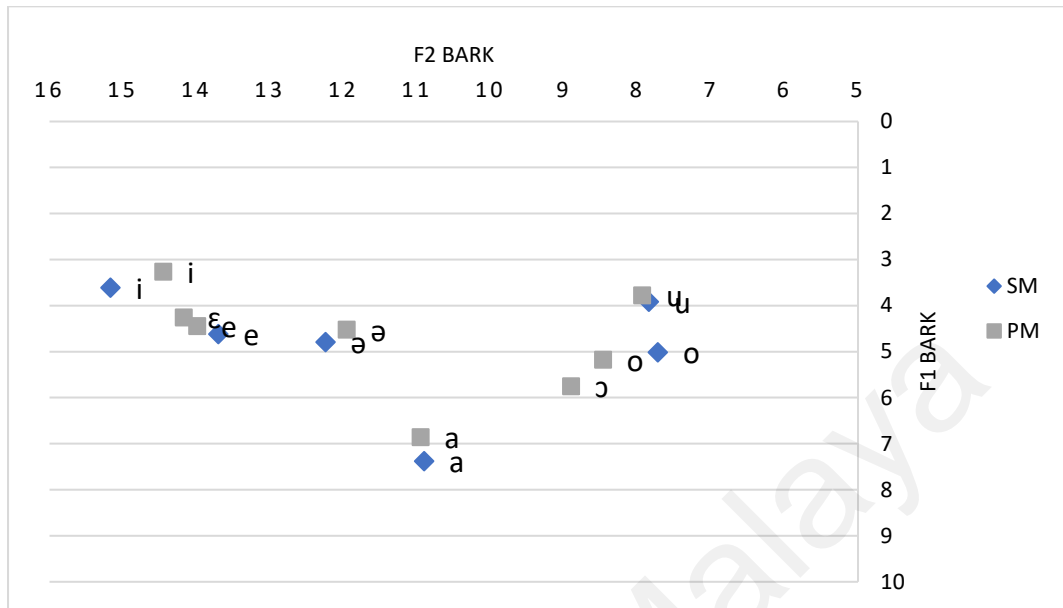


4.4 Comparison between Penang Malay and Standard Malay monophthongs

Given the fact that acoustic studies on Penang Malay monophthongs are scarce, the researcher has chosen to draw a comparison between Penang Malay and Standard Malay monophthongs. The same method was also used in Yunisrina Qismullah Yusuf (2013) and Afiqah Jazmin Azli (2017) in their acoustic analyses of Acehnese Malay and Kedah Malay.

Figure 4.18 shows the monophthongs of Penang Malay and Standard Malay on a vowel quadrilateral. Based on Figure 4.18, there are several similarities and differences between Penang Malay and Standard Malay monophthongs.

Figure 4. 18: Vowel quadrilateral for Penang Malay and Standard Malay monophthongs



Based on the independent samples *t*-test, there was a significant difference between the F1 values for PM /a/ and SM /a/ (F1: $t(63) = 2.95$, $p < .001$) and no significant difference was recorded for the F2 values (F2: $t(63) = 0.24$, $p = 0.81$). The same results apply to the vowels /ε/ and /e/ between PM and SM, where the F1 values were found to be statistically significant while there was no significant difference recorded for the F2 values (F1: $t(63) = 2.09$, $p < .001$; F2: $t(63) = 1.62$, $p = 0.11$). There were no significant differences recorded for PM /u/ and SM /u/ (F1: $t(63) = 1.36$, $p = 0.178$; F2: $t(63) = 0.28$, $p = 0.78$), PM /ə/ and SM /ə/ (F1: $t(63) = 1.86$, $p = 0.07$; F2: $t(63) = 0.86$, $p = 0.39$), PM /e/ and SM /e/ (F1: $t(63) = 0.99$, $p = 0.33$; F2: $t(63) = 0.90$, $p = 0.37$). On the vowel /o/ between PM and SM, there was no significant difference in the F1 values, but the F2 values were found to be statistically significant (F1: $t(63) = 0.85$, $p = 0.40$; F2: $t(63) = 2.74$, $p < .001$). Last but not least, there were significant differences recorded between PM /i/ and SM /i/ (F1: $t(63) = 3.28$, $p < .001$; F2: $t(63) = 5.55$, $p < .001$), and between PM /ɔ/ and SM /o/ (F1: $t(63) = 4.71$, $p < .001$; F2: $t(63) = 7.08$, $p < .001$). For

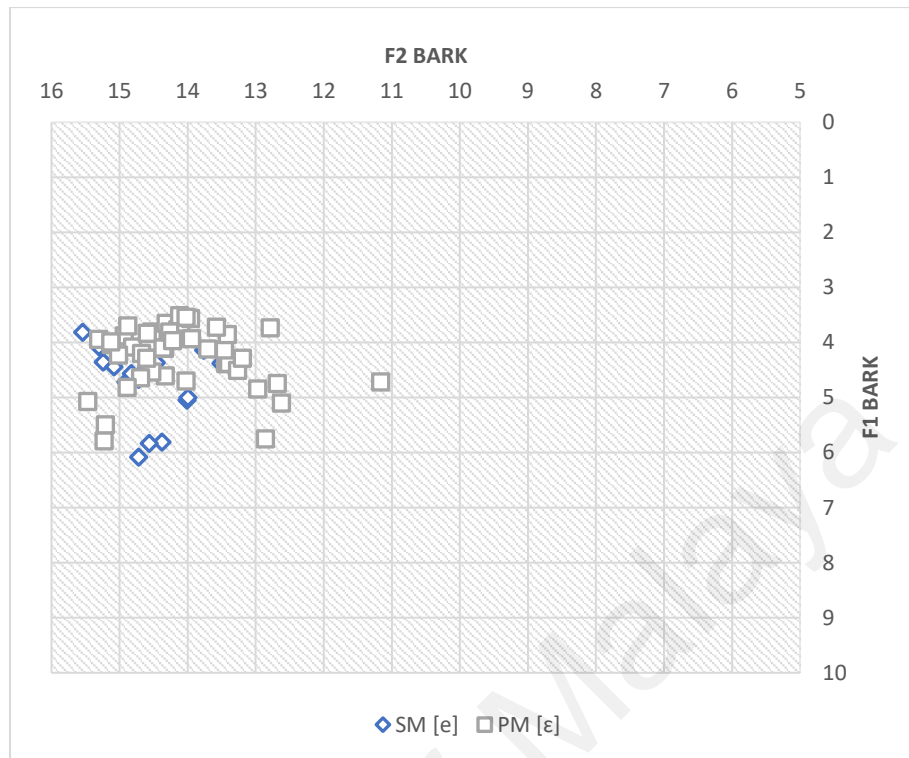
illustration purposes, comparisons between Penang Malay [ɛ] and Standard Malay [e] and Penang Malay [ɔ] and Standard Malay [o] will be explained in detail in 4.4.1 and 4.4.2 because [ɛ] and [ɔ] do not exist in Standard Malay.

4.4.1 Comparison between Penang Malay [ɛ] and Standard Malay [e]

Figure 4.19 shows the distribution of Penang Malay [ɛ] and Standard Malay [e] on a scatter plot. Based on the findings of this study, vowels [ɛ] of Penang Malay and [e] of Standard Malay were found to be considerably overlapped. Based on the independent samples *t*-test, F1 values of these two vowels were found to be statistically significant ($F1: t(63) = 2.09, p < .001$). On the other hand, there was no significant difference recorded for the F2 values of these two vowels ($F2: t(63) = 1.62, p = 0.11$).

Based on the scatter plot, Standard Malay [e] was found to be in a close-mid, near front position, which is similar to Afiqah Jazmin Azli's (2017) findings of the same vowel, while Penang Malay [ɛ] moves towards the back slightly. On contrary, Afiqah Jazmin Azli (2017) found the vowel [ɛ] to be in an open-mid, front position in her study.

Figure 4. 19: Scatter plot for Penang Malay [ɛ] and Standard Malay [e]

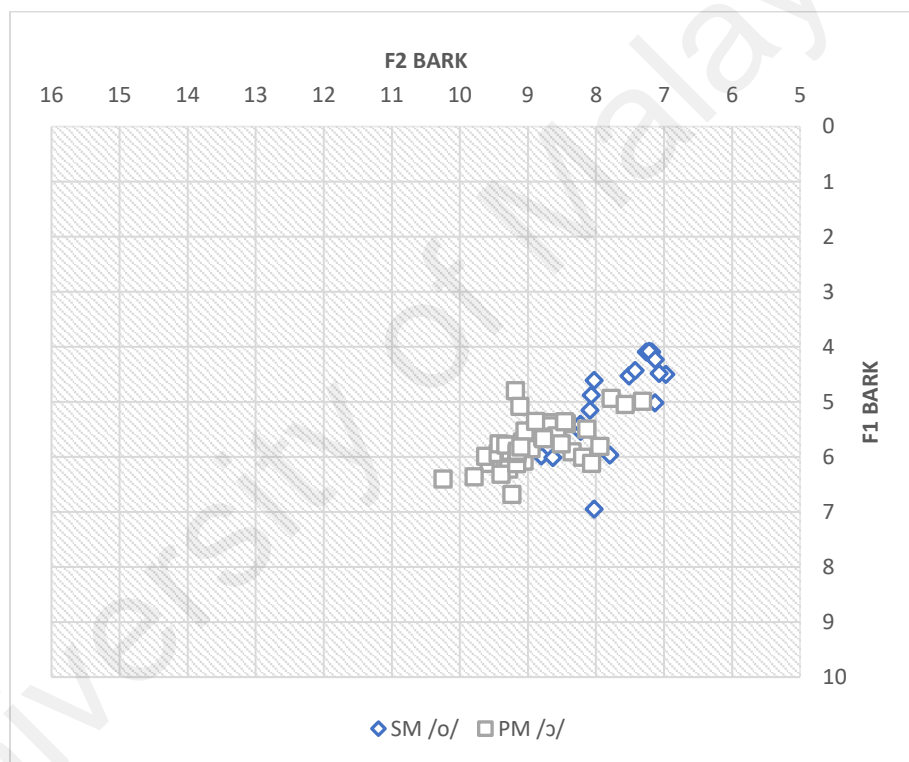


4.4.2 Comparison between Penang Malay [ɔ] and Standard Malay [o]

Figure 4.20 shows the distribution of Penang Malay [ɔ] and Standard Malay [o] on a scatter plot. Based on the findings of this study, vowels [ɔ] of Penang Malay and [o] of Standard Malay were found to be considerably overlapped. Based on the independent samples t-test, there were no significant differences recorded between Penang Malay [ɔ] and Standard Malay [o] (F1: $t(63) = 4.71, p < .001$; F2: $t(63) = 7.08, p < .001$). In this study, the vowel [o] of Standard Malay was found to be in a close, back position, which confirms Afiqah Jazmin Azli's (2017) acoustic analysis of the vowel [o]. On the other hand, the vowel [ɔ] in this study moved towards near open, central position, which is in tandem with Afiqah Jazmin Azli's (2017) study. However, in Yunisrina Qismullah Yusuf (2013), the vowel [ɔ] is considered as a back vowel in her acoustic analysis.

It can be deduced that Penang Malay [ɔ] and Standard Malay [o] were produced similarly by the participants. Since reading from the word lists was the method used to elicit the data from the participants, this phenomenon happened because the participants (especially the Penang Malay speakers) might have felt the need to speak in a more formal way. Please refer to 5.3 where recommendations on future research are provided.

Figure 4. 20: Scatter plot for Penang Malay [ɔ] and Standard Malay [o]



4.5 Summary

Eight (8) monophthongs of Penang Malay following Asmah Haji Omar (2008) were produced by the participants of Penang Malay in this study namely /a/, /i/, /u/, /ɛ/, /ɔ/, /ə/, /e/, and /o/. Six (6) monophthongs of Standard Malay following Yunus Maris (1980) were produced by the participants of Standard Malay in this study namely /a/, /i/, /u/, /ə/, /e/, and /o/. Based on the acoustic analysis, the vowels /ɛ/ and /e/ did not conform to

the impressionistic proposition of vowels by Asmah Haji Omar (2008) as the vowels in this study were found to be conflated in vowel quality and inverted with each other in terms of the positioning on the vowel chart. While almost all the vowels were scattered highly closely to one another, the acoustic analysis on the vowel /ə/ in both Penang Malay and Standard Malay showed inconclusive results. This phenomenon is supported by Bates (1995), in which she concurs that schwa [ə], articulatorily, is “inherently unspecified for tongue position” (pp. 266-267). Lastly, given the studies on Penang Malay monophthongs are scarce, comparisons had to be drawn between Penang Malay and Standard Malay. This method of comparison was also found in Yunisrina Qismullah Yusuf’s (2013) and Afiqah Jazmin Azli’s (2017) acoustic studies.

University of Malaya

CHAPTER 5: CONCLUSION

5.1 Introduction

This chapter presents the summary of the findings based on the results in Chapter 4. The findings of the two research questions are presented in this chapter as well. In addition, recommendations for future studies are also included at the end of this chapter.

5.2 Summary of research questions

This study was conducted to analyze the acoustic features of the monophthongs of Penang Malay based on the F1 and F2 formant frequencies, and to look at the similarities and differences between the monophthongs of Penang Malay and Standard Malay acoustically. A total of seven (7) participants were selected to participate in this study.

5.2.1 Research question 1: What are the acoustic features of the monophthongs of Penang Malay and Standard Malay based on the F1 and F2 formant frequencies?

Based on the acoustic analysis of Penang Malay monophthongs, it was found that only six (6) of the eight (8) vowels as suggested by Asmah Haji Omar (1993) were present in the study. The participants of Penang Malay did not distinguish between the production of [ɛ] and [e] and ended up conflating the two vowels as one. The independent samples *t*-test of the two vowels also confirmed that the statistical difference between them was not significant. In addition, based on the findings from this study, this conflation can be best represented by [e] because this vowel exists in Penang Malay and Standard Malay. The vowels [ɛ] and [e] in this study were produced differently as well as compared to the ones in Afifah Jazmin Azli (2017).

The vowel [ɛ] in this study is in a close-mid, front position, whereas in Afiqah Jazmin Azli (2017), it is in an open-mid, front position. On the other hand, the vowel [e] in this study is in an open-mid, front position, whereas in Afiqah Jazmin Azli (2017), it is in a close-mid, front position. It should also be noted that the vowels [o] and [ɔ] in this study moved further towards the central position, whereas in Afiqah Jazmin Azli (2017), the vowels [o] and [ɔ] remained as back vowels. The distribution of [a] in Afiqah Jazmin Azli (2017) moved towards half-close, near front position. In addition, the distribution of [a] in this study was closely scattered as opposed to Afiqah Jazmin Azli's (2017) distribution of [a] which was more scattered. The distribution of [i] in this study was distributed in a close, front position. The findings of [i] in this study were in accordance with the findings in Yunisrina Qismullah Yusuf (2013) and Afiqah Jazmin Azli (2017). The results for schwa [ə] in this study were inconclusive as all participants had produced different realizations which caused the plotting to be scattered all over the place. The inconsistent results for this vowel were similar to what Afiqah Jazmin Azli (2017) had found in her study, in which the elicitation tokens were greatly scattered on the scatter plot. This phenomenon is supported by Bates (1995), in which she concurs that schwa [ə], articulatorily, is "inherently unspecified for tongue position" (pp. 266-267), while Teoh (1994) assumes that schwa lacks any distinctive height and backness specification, and thus denotes schwa as the empty vowel.

Based on the acoustic analysis of Standard Malay monophthongs, the positioning of the six (6) vowels on a vowel quadrilateral are in accordance with the initial impressionistic study of Standard Malay vowels by Yunus Maris (1980) except for the vowels [u] and [o]. In this study, the vowel [u] was found to be in a half-close, back position, and the vowel [o] was found to be in a close, back position. While in Yunus Maris (1980), the vowel [u] is in a close, back position, while the vowel [o] is

in a half-close, back position. This phenomenon was also observed in Afiqah Jazmin Azli's (2017) acoustic analysis, in which she had found the vowel [u] to be in a half-close, back position, and the vowel [o] to be in a close, back position. In addition, the vowel [a] in this study moved towards the open, central position, whereas in Afiqah Jazmin Azli (2017), the vowel [a] moved towards near open, near front position. The vowel [e] in this study was found to be in a close-mid, near front position, which is in agreement with Afiqah Jazmin Azli's (2017) findings of the same vowel. In terms of the vowel [ə], it was found to be in a mid, near front position, whereas in Afiqah Jazmin Azli (2017), the vowel [ə] was found in a close-mid, central position. The results for schwa [ə] in this study were rather inconclusive as all participants had produced different realizations which caused the plotting to be scattered all over the place. The same phenomenon was also observed by the vowel [ə] that was produced by the participants of Penang Malay in this study. Last but not least, the vowel [i] in this study was found to be in a near close, front position, which is in agreement with the findings of the same vowel in Afiqah Jazmin Azli (2017) and Yunisrina Qismullah Yusuf (2013).

5.2.2 Research question 2: What are the similarities and differences between the monophthongs of Penang Malay and Standard Malay based on the acoustic properties?

Based on the findings in Chapter 4, it can be summarized that there are several similarities and differences between the monophthongs of Penang Malay and Standard Malay based on their acoustic properties. Based on the independent samples *t*-test, there was a significant difference between the F1 values for PM /a/ and SM /a/ (F1: $t(63) = 2.95, p < .001$) and no significant difference was recorded for

the F2 values (F2: $t(63) = 0.24$, $p = 0.81$). The same results apply to the vowels /ɛ/ and /e/ between PM and SM, where the F1 values were found to be statistically significant while there was no significant difference recorded for the F2 values (F1: $t(63) = 2.09$, $p < .001$; F2: $t(63) = 1.62$, $p = 0.11$). There were no significant differences recorded for PM /u/ and SM /u/ (F1: $t(63) = 1.36$, $p = 0.178$; F2: $t(63) = 0.28$, $p = 0.78$), PM /ə/ and SM /ə/ (F1: $t(63) = 1.86$, $p = 0.07$; F2: $t(63) = 0.86$, $p = 0.39$), PM /e/ and SM /e/ (F1: $t(63) = 0.99$, $p = 0.33$; F2: $t(63) = 0.90$, $p = 0.37$). On the vowel /o/ between PM and SM, there was no significant difference in the F1 values, but the F2 values were found to be statistically significant (F1: $t(63) = 0.85$, $p = 0.40$; F2: $t(63) = 2.74$, $p < .001$). Last but not least, there were significant differences recorded between PM /i/ and SM /i/ (F1: $t(63) = 3.28$, $p < .001$; F2: $t(63) = 5.55$, $p < .001$), and between PM /ɔ/ and SM /o/ (F1: $t(63) = 4.71$, $p < .001$; F2: $t(63) = 7.08$, $p < .001$). On PM /ɔ/ and SM /o/, since reading from the word lists was the method used to elicit the data from the participants, this phenomenon happened because the participants (especially the Penang Malay speakers) might have felt the need to speak in a more formal way.

5.3 Recommendations

Future researchers who are interested in studying the acoustic features of Penang Malay should use a different method in eliciting data from participants such as using a wider range of words or conducting an interview. Future researchers should also look at different age groups, different male and female populations, and different ethnic groups to have a better grasp of Penang Malay.

Apart from that, future researchers may want to focus more on the production of /ɛ/ and /e/ in Penang Malay to further determine if the two vowels are now conflated as one vowel.

5.4 Conclusion

The findings from this study are hoped to shed light on students or researchers who are interested in studying Penang Malay. It is also hoped to add new knowledge to the body of knowledge of Penang Malay as studies on Penang Malay are scarce and those done on it were primarily impressionistic in nature. Based on the findings, it can be deduced that Penang Malay and Kedah Malay are not homogenous as claimed by past researchers. As monophthongs are considered as one of the fundamental steps before looking at other aspects of sounds such as diphthongs, vowel clusters, pharyngealization, glottalization, and prosody.

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