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The Perception of Arabic-Accented English Vowels

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Abstract

This article examines the intelligibility of the English spoken by Arab speakers of English. This study started from three experiments designed to test whether Malay speakers of English can perceive the selected English vowels produced by an Arabic speaker of English from Oman. The findings suggest that the Arabic-accented English evaluated is generally intelligible to Malay speakers of English. It can be seen that Arabic speaker's productions of English vowel monophthongs that have Arabic analogs were not necessarily more intelligible than those that lack Arabic counterparts. Though an interference of the L1 vowel system was found, this study does agree with the statement of Flege and Port (1981, p. 133), that "phonetic differences between L1 and L2 will lead to non-L2 phonetic characteristics in the L2 produced by the learners of the L2 language".

Keywords: vowel monophthong, Arabic English, Malaysian English, vowel length, perception, Malaysian speakers of English

Introduction

Language as a means of communication bears the function of conveying the intended message from the speaker to the listener. If the listener understands the message conveyed, the communication is regarded as successful. However, this success is conditioned by many factors, such as phonation and word choice of the speaker, sentence structure, culture, and the context of situation. Since English, which was once only the privilege of people living in the British Isles, has become a global language that is applied to inter- and intra-communication between nations, it is critical to examine whether its users/speakers can use it appropriately.

English generally has three different groups of users: native (ENL), second (ESL), and foreign language (EFL) users. Despite the situation that "the English-language standards are determined by speakers of ENL" (Jenkins, 2003:16), other varieties of English are developing their own standards by adopting some language features of their own, such as sounds, sentence structures, vocabulary, and social norms. Those varieties of English are sometimes named the "New Englishes" (Platt, Weber & Ho), of which the vowel sounds vary in terms of both their quality and quantity (Cf. Jennifer Jenkins, 2003; Maxwell & Fletcher, 2009; Salbrina, 2006; Yan & Vaseghi, 2003). Therefore, it is a matter of dispute whether the second or foreign language speaker is intelligible enough to other speakers of English or is inferior to the standard varieties. Given that the Arabian Peninsula is an EFL area, it can be anticipated that the English language used there bears its own features distinguishing it from other varieties of English. Thus, it can also be assumed that the characteristics of the English pronunciation of Arabic speakers vary compared with that of other countries. However, whether this non-native variety of English is intelligible enough for users of English other than Arabs is still a question to be explored.

In the process of learning a second/foreign language, how well a learner learns depends on many factors, like their language ability, background, ways of learning, etc. Some often experience a reduction of satisfaction with their progress when communicating with others using the "new" lan-

guage. This lack of effectiveness in communication can be due to their non-native/foreign accent or differences between the speech sound production of the native speakers and that of the others, despite the fact there may be other factors accounting for this matter, for example, different syntactic structure and/or grammatical errors. However, it is not necessary that a remarkable accent of a second/foreign language blocks ordinary verbal interaction; people who speak with an accent may have no problem being understood by others.

Regarding this phenomenon, this paper aims to examine Malaysian ESL learners' perception of Arabic-accented English. The two parameters in this study are Malaysian speakers of English and Arabic-accented English, which correspondingly refer to native Malay speakers from Malaysia, and Omani English speakers. Only English vowel monophthongs are analyzed in the current study.

Modern Standard Arabic has six monophthong vowels /i/, /a/, /u/, /iː/, /aː/, /uː/ (Al-Ani, 1970; Alghamdi, 1998; Newman, 2002); therefore, according to Lado's (1957) Contrastive Analysis Hypothesis, which advocates that if a segment exists in the L2 but not in the L1 a learner will have trouble perceiving and producing the new segment. It can be anticipated that Arabic speakers of English might have some problems in producing certain vowels new to their own phonetic category.

In the Malay inventory, the long vowels are absent (Ismail, 1994). Since the two languages have their own sound systems different from English, it can be assumed that the pronunciations of English sounds possess distinctive features and this may contribute to problems of intelligibility (Ali Hubais, 2009), thus leading to difficulties in mutual comprehension of the speakers. Also, according to the Perceptual Assimilation Hypothesis, language-specific experience causes perceptual assimilation of non-native phonemes to native phonemes (Best, 1994).

Taking into consideration the assumptions and differences in sound systems noted above, this study will address the following research questions:

1. To what extent are the vowels produced by Arabic speakers of English intelligible to Malay speakers of English?

2. Which vowels are correctly perceived by native Malay speakers and which vowels are not?

It is expected that the findings would help contribute to the existing study on a variety of English spoken by L1 Arabic speakers and also provide for the development of material for the teaching of English pronunciation to these speakers

Materials and Methods

The methodology used in this study will be delineated in the following sub-sections.

Subjects

The subjects in this study include one speaker and a group of listeners. The speaker is an Omani postgraduate student who was selected from a group of five male potential informants aged between 29 and 33 years and had Arabic as their L1 and English as their L2. At the time of the study, they were doing postgraduate courses in Malaysia, where the medium of instruction was English. And all speakers participating had learned English since the age of 7 and had professional mastering of the English language.

As mentioned above, this study was listener-oriented, thus the focus would lay with the perception or understanding of the listeners' group involving 20 Malaysian listeners, towards the production of target vowels produced by the speaker. They were postgraduate students divided according to gender from the same age group of 23 to 32 years. To ensure that they have similar language

backgrounds, the speakers selected for this study were postgraduate students from the Department of Islamic Studies at the University of Malaya. With Bahasa Melayu being their first language, English is considered a second language in Malaysia (Asma, 1993). And English language was mostly used in their daily communication and activities with lecturers, classmates and friends.

Instruments

The instruments used in this study are recording and questionnaire. The requirements for recording were explained clearly to all speakers. The reading materials for recording included a list of multiple-choice tasks, a discrimination task of a list of minimal pair words with two-two in pair, and a sentence list (cf. Appendix E). Deemed to "provide recordings suitable for auditory evaluation and acoustic analysis" (Flege, Frieda and Nozawa, 1997:173), the recording was collected using a directional head-mounted microphone (Shure Model SM10A) through the professional voice processing software Goldwave in the video lab at the Main Library of the University of Malaya. Prior to participating, the speakers passed a pure tone hearing screening from 500 to 4000 Hz and did not exhibit obvious speech hearing and production problems. This pre-screening was widely adopted by researchers conducting language perception and production researches (cf. Fege MacKay and Meador, 1999; Schmidt, 1995). And before the recording took place, the speakers were familiarized with the orthography used in the list, and pronunciation guides were used from some parts. To give one example, the vowel in 'hawed' was elicited and embedded into 'horse' with the cluster 'or' underlined indicating the actual pronunciation. Amongst the five candidates, only one recording was chosen to be used after careful inspection by the researcher and two native speakers of English, both held a Ph.D. degree in Linguistics from Kentucky in the south of the US.

The questionnaire comprised subjects' personal information, their English training background, attitude towards the necessity of learning basic phonetic knowledge in the L2 as well as self-estimated percentage of daily use of English to extract useful information accounting for their performances reacting to the recordings. Before all the experiments, empirical pilot trainings had been conducted to familiarize all the informants of the expected operations in order to achieve the ultimate goals of the tests successfully.

Data

In order to gain valid data, the present study examined the reception of English monophthongs /ɪ/, /e/, /ʊ/, /ʌ/, /ɒ/, /æ/, /iː/, /ɔː/, /ɜː/, /ɑː/, /uː/, which were contended by Ladefoged (2001, p.81) that the lax vowels /ɪ/, /e/, /æ/, /ʊ/ and /ʌ/ tend to be "shorter, lower, and slightly more centralized" than their tense pair (for those that can be paired) by resorting to sound recordings of discrimination and determination tests as main tools of data collection. The schwa was not examined in this study as it only appears in unstressed syllables. The rate at which the listeners heard those stimuli was fixed, and they were not allowed to stop during the tasks.

The participants' profiles were also documented to explore their personal details, hoping to get some hints for potential factors leading to their main problems of perception of target vowels.

Experiment One: Multiple-Choice Segmental Determination Test

The purpose of this experiment was to evaluate speakers' production of eleven English vowels. This was realized through a determination test gotten by the development of a multiple-choice segmental intelligibility test on word bases, where a list of words was embedded in a /hVd/ format (cf. Appendix C). All the tokens were written in standard orthography, and were adapted from Ladefoged (2006:39). Moreover, they were recorded in a sentence frame "Say ___ again" by each Arab participant and were recorded in random order. There were a total of 44 items used in the test after

selection (1 talker x 11 tokens x 4 randomiztions). The target words were carefully separated from the carrier sentences and were digitized at 48 kHz (cf. Rogers, 1997) using the Goldwave software.

The experiment has two objectives: estimate the degree of intelligibility of the production of English vowel monophthongs; and estimate the degree of intelligibility of each vowel individually to provide a description of the frequency of occurrence of its being misunderstood.

Experiment Two: Minimal-Pair Discrimination Test

Regarding Experiment Two, where the discrimination test was carried out, a list of words with the target vowels embedded in a CVC context were used for data collection, which were arranged in ABX design. Since the schwa was not examined, there was no corresponding minimal pair word for the "central, front vowel /ɜ:/" (Peter Ladefoged, 2006:88).

For each minimal pair words, the speaker was to read both of the words once throughout the recording process. At the end, one of them was chosen randomly and recorded by the very speaker. This recording was used later for the informants to decide what the third word was based on the discrimination of the previous two sounds heard.

Experiment Three: Word Determination Test

In this experiment, there were a group of twenty unrelated sentences selected from the Harvard Sentences (IEEE,1969) with ten sentences for each session. The two sets of sentences are shown in Appendix E. The listeners were played with the recording which lasted for a period of around 3 minutes. In each sentence, there was one word missing, and their tasks were to fill in the blanks with the words they heard. This experiment exhibited that speech perception could also be affected by the presence of context as in a real situation when the conversation takes place rather than simply word or segmental based.

Data Analysis

Since both qualitative and quantitative data were collected in this study, they were analyzed separately and then combined to make a synthetical study. The individual analysis may provide diagnostic information indicating the weakness to be highlighted and emphasized in training. Thus, when managing the quantitative data, individual performance of the vowel discrimination and determination tasks would be examined thoroughly for each listener in the subjects' group and contrasted according to their genders so that gender differences as a dimension affecting vowel perception in the current study would be discussed. In addition, error profiles would be established diagnostically to reveal the vowel(s) which needed the most and least attention in the teaching and learning processes of Omani L2 speakers of English. During the whole process, the software SPSS was adopted to generate the intended data. The other critical portion of data was generated by resorting to the Learner Profile (cf. Appendix B).

Results and Discussions

Quite a few researches have demonstrated correlations between word intelligibility and sentence intelligibility for normal and atypical speech, such as hearing-impaired and dysarthric speech (cf. Boothroyd, 1985; Ansel & Kent, 1992). Since the methods of discrimination and identification have been adopted to examine the intelligibility of varieties of speech, the current study extracted data by using the same methods. Results and their respective implications obtained from the three experiments on the understanding of twenty Malay speakers of English towards a recording of English monophthong vowels produced by one Omani speaker are presented and discussed. Each of the experiments is investigated separately followed by a combined synthesis of the findings in order to provide a comprehensive interpretation, which will reveal the difficulty of acquisition of selected

phonemic contrasts in the process of learning the target English language by Arabic speakers of English. Analysis of the results of individual listeners will be presented as well as that of across-gender groups.

Experiment One

Figure 1 shows the mean percentage of correct identifications of the 11 selected vowels by the twenty Malay subjects. There are variations in the percentage for each vowel, where only six were determined correctly by more than half of the subjects (twenty Malay speakers of English), while the percentage of correct identification for the rest of the vowels is below 50%. On average, the vowels had a correct identification rate of 51%. This result suggests that there is a problem in the perception of Arabic English by Malay speakers of English. And an interesting pattern in the vowels produced by the Omani speaker can be observed. In general, his English vowels that have Arabic counterparts, like /i/, /a/, /u/, /iː/, /aː/, /uː/ (cf. 1.3&2.1, Al-Ani, 1970; Alghamdi, 1998; Newman, 2002), were not more intelligible than those that had no counterparts. Though these vowels are not identical in all acoustic parameters, they were expected to be perceived better than those that are "new" in the speaker's native language, Arabic, since, according to the Contrastive Analysis Hypothesis, a second language learner will have trouble producing the new segment (Lado, 1957). Whereas, it is quite explicit that findings show the vowels /ʌ/ and /ʊ/ are not consistent with this hypothesis. The correct identification or determination rate for the former was below average, where only 40% of the population of the participants achieved the task of determination correctly; whilst for /ʊ/, an even lower rate was manifested, 15% of the whole population. No obvious explanation could be found for this exception at this stage except for the interference of ME for the listeners.

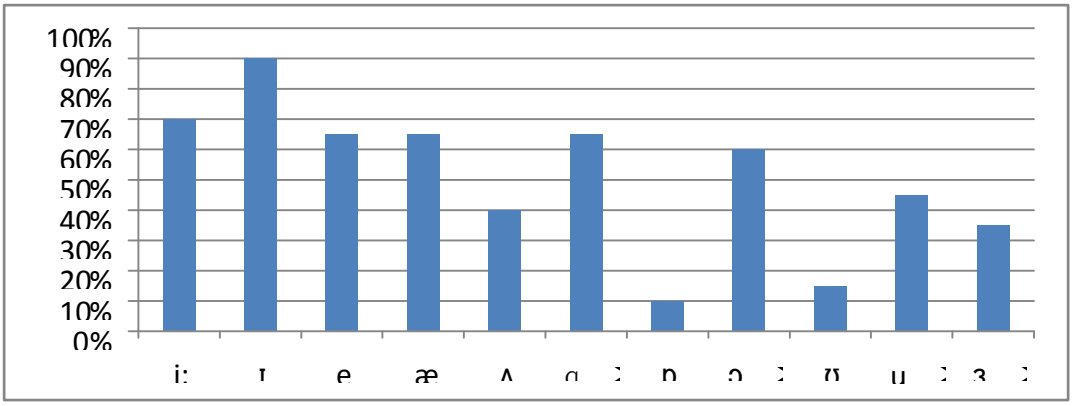

Figure 1. Percentage of Correct Identifications

There are two distinctive facts about the generally less well identified vowel categories. First, it is worth noting that the identification scores for the vowels /ɒ/ and /uː/ were significantly less than those of all the other nine vowels, which earned 10% and 15% respectively for correct identification score; they are also well below the average rate of correct determination, which is 50%. The other fact is that the Malay informants' performances on /e/, /æ/, /ɔː/, which do not have obvious Arabic counterparts, were actually quite good, well above the average scores (50%).

The data on vowel /ɜː/ indicates that it was not well identified since the corresponding determination score is below the average as illustrated below in Figure 2. The majority of the subjects

misinterpreted the target vowel as either /iː/, /e/ or /æ/. In addition, it is clear that half of the population of listeners chose /e/ for the target vowel /ɜː/. This resembles Hubais' (2010) findings that the production of Omani speakers' /ɜː/ is "front rather than central position" compared with the production of British English and is closer to the /e/ vowel in British English.

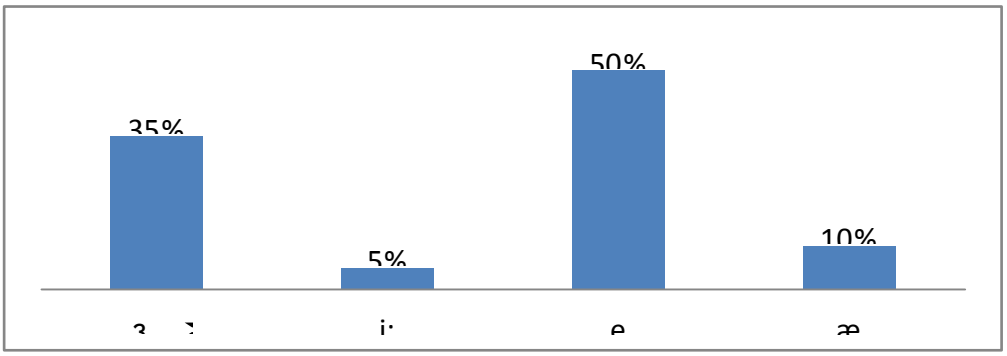

Figure 2. Percentage of Determination for /ɜː/

Hubais (2009) also reported that /ɒ/ in Omani English is always realized "higher than /ɔː/ and closer to /uː/" as plotted in Figure 3, from which it can be assumed that there might be a discrepancy between the Malay subjects' perception and the actually pronounced vowel. Figure 4 shows the distribution of determination for /ɒ/ by the subjects, which was the least well-identified token in this experiment, where 90% of the population failed in identification. It can be seen that quite a large portion of participants regarded the target vowel as /ʌ/ up to a percentage of 60%. /ɒ/ was also heard as /ɑː/ by 20% of the listeners. However, though the result does display difficulty in the subjects' performance identifying the token, there is an inconsistency with Hubais's discovery, according to which most of the mistakes should be at the vowel /uː/ instead of /ʌ/. A parallel study was conducted by Munro (1993), who used American English as a reference, and found this vowel is generally substituted with /ɑː/. Since it is reported that there is a tendency for Malay speakers of English to confuse the vowel pair /ɑː/ and /ʌ/ for the existence of a lack of contrast, it can be indicated the results of those Malay participants identifying the target vowel are compatible with the previous findings of Munro (1993).

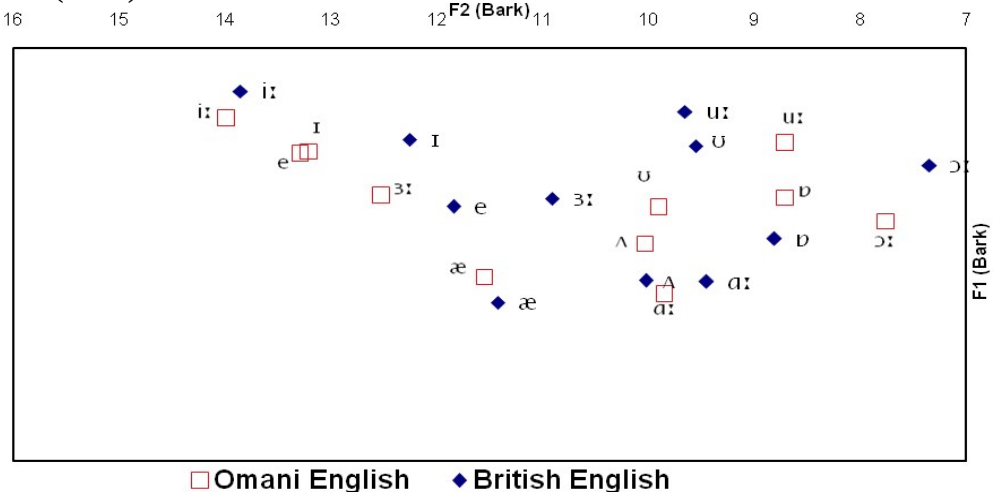

Figure 3. Comparisons of Vowels in British and Omani English

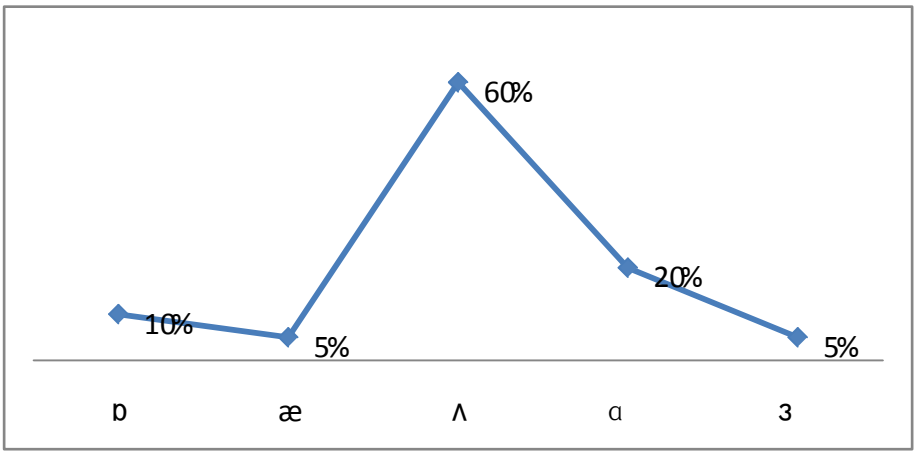

Figure 4. Percentage of Determination for /ɒ/

Another distinctive finding which is not consistent with the research of Munro (1993) on Arabic speakers of English and Hubais' study (2009) on Omani speakers of English is the vowel /e/, which is asserted to merge with /ɪ/. Such a merger is demonstrated clearly in Figure 3, where it can be seen that the vowel /e/ appears to collapse to /ɪ/. Whereas in the current study, there is no clear evidence to support their findings. As shown in Figure 5, the Malay subjects' performances on the target vowel /e/ was quite good, however some of them misidentified /e/ as /æ/ (20%) and /ɜː/ (15%).

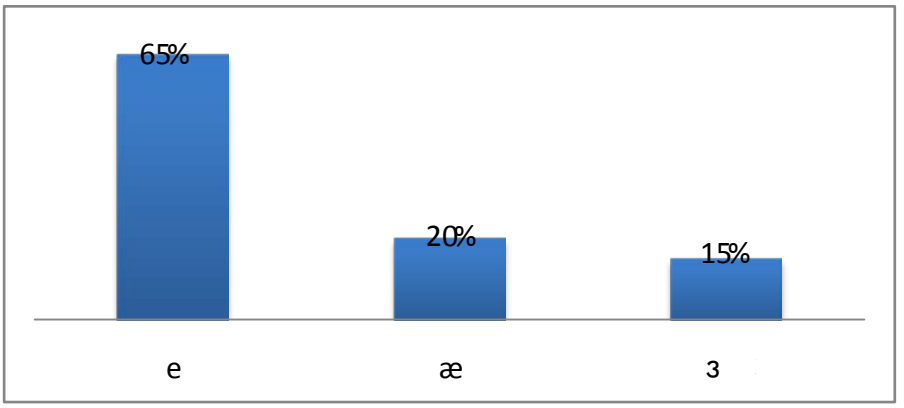

Figure 5. Percentage of Determination for /e/

In order to investigate the listeners' performance and better interpret the data obtained, there is a need to conduct a comparison between the English vowel monophthongs produced by Malaysian and Omani speakers. The differences between these two varieties of English may contribute to the ill-performance of the Malay subjects towards the target vowels. Table 1 displays an obvious difference between the duration realization of English of /ɪ/, /iː/, and /uː/, /ʊ/ of Omani and Malay speakers. A discussion of these two pairs of vowels will be presented below. Besides, there is also a lack of contrast between vowel pairs /ʌ/, /ɑː/ in Malaysia English as depicted in Figure 6 (Hubais, 2009); yet, for the pair /ʌ/, /ɑː/, it can be seen that the Omani speakers do maintain the contrast. And

in the current experiment, the target vowel /ʌ/ was mostly misheard as its counterpart /ɑː/ at a rate of 50%; whilst there were only 5% of the listeners replaced /ɑː/ with /ʌ/. Detailed percentage of listeners' performance is demonstrated in Figure 7 and 8. Thus, it can be assumed that there is an interference of Malaysian English towards the production of the Omani speaker. Though, according to Hubais's study (2010), the Omanis do contrast between these two vowels, the Malay listeners still have considerable difficulty in discriminating between them.

Table 1. Vowel Duration for Malaysian and Omani Speakers

Vowels	**ɪ**	**iː**	**ʊ**	**uː**	**ɔː**	**ɒ**
Malaysian	109	172	104	195	228	139
Difference		63		91		89
Omani	74	166	94	209	164	98
Difference		**92**		**115**		**66**

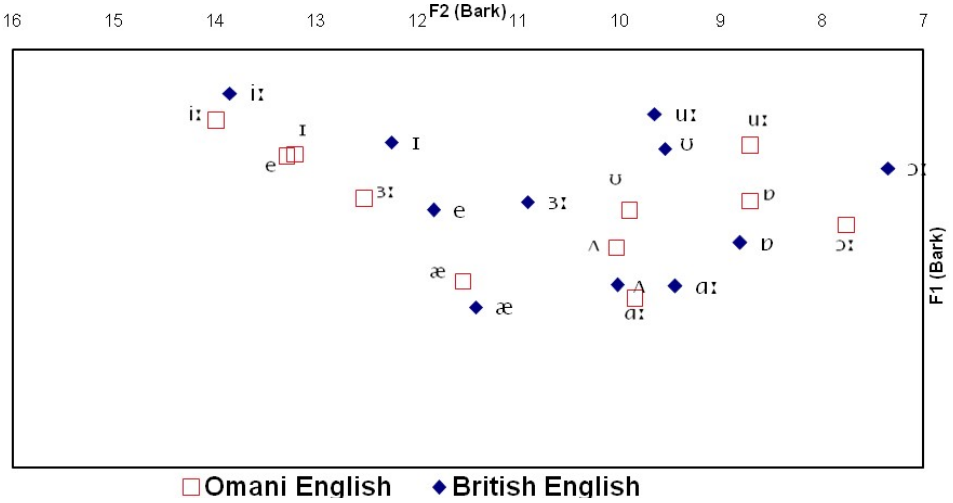

Figure 6. Comparison of All Vowels in Omani and Malaysian English

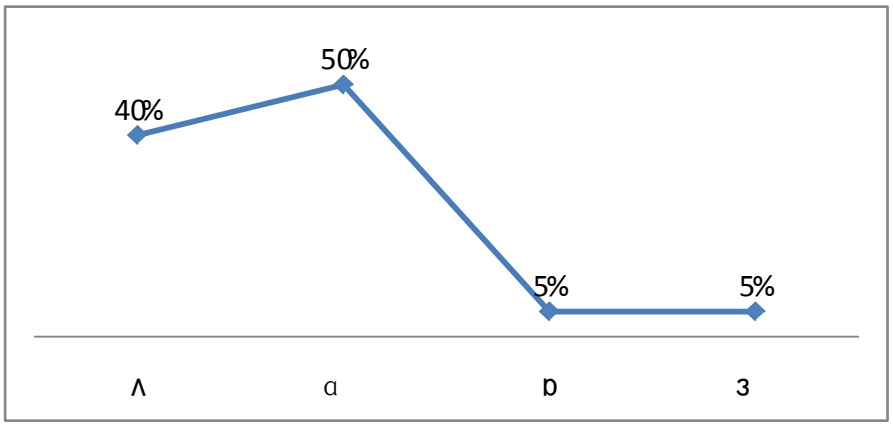

Figure 7. Percentage of Determination for /ʌ/

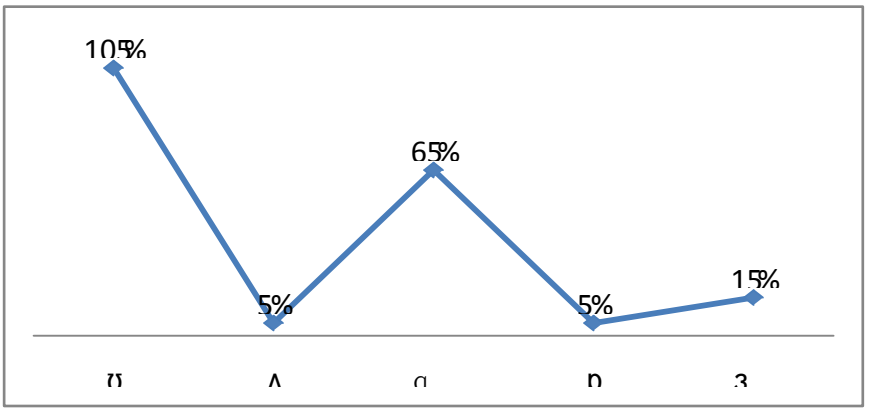

Figure 8. Percentage of Determination for /ɑ:/

Concerning the rate of each target vowel monophthong being correctly or misdetermined, a confusion matrix was created based on the average of correct identifications of each listener (cf. Table 1). Findings can be drawn from the data that the vowel /ɪ/, which obtained the highest identification rate, was misidentified as either /e/ or /u:/. Each of them bore a rate of 5% in contrast with the 90% correct identification rate for the target vowel. For /i:/, the counterpart of /ɪ/ in terms of duration, the majority of the participants heard it correctly at a rate of 70% (cf. Figure 9). Though /i:/ and /ɪ/ were reported to "have similar length" in Malaysian English and Arabic speakers of English tend to exaggerate length contrast between this pair of vowels (Munro, 1993) most of the Malay participants in this study were able to distinguish these vowels. However, though there were no reports of /i:/ chosen for the target vowel /ɪ/, 25% of the subject population misheard /i:/ as /ɪ/. Thus indications can be drawn that the Malay subjects still have problems in distinguishing the vowel pair /i:/ and /ɪ/ produced by Omani speakers. From the data generated in the current experiment it seems there is considerable difficulty in the Malay listeners' discrimination of these two vowels. As shown in Table 1, a majority of misidentified /ʊ/s was heard as /u:/s (75%); while, a considerable number of /ʊ/s replaced the correct /u:/s (35%), though most of the listeners were able to identify the vowel /u:/ correctly (45%). Thus, it can be concluded that these two vowels in Arabic-accented English, represented by Omani English, is not intelligible enough for the selected Malay speakers of English.

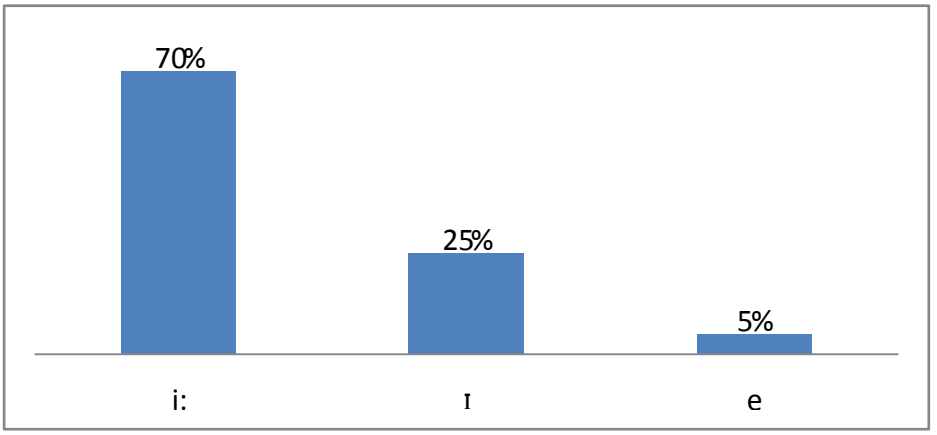

Figure 9. Percentage of Determination for /i:/

Experiment Two

The goal of this test was to explore the intelligibility of duration contrasts among vowel pairs of Arabic-accented English. In this experiment, there were altogether ten vowel monophthongs being tested, which were embedded into ten words with their pairs according to duration contrast. Since there are twenty respondents and each vowel was tested twice, this made 400 pairs of stimuli in total (20×20). Thus, for each vowel monophthong, a number of 40 pairs of tokens (2×20) were used; and there were 80 pairs of tokens for each pair of vowels respectively (2×20×20).

Among all 400 pairs of stimuli, there were 361 that were discriminated successfully by the Malay respondents. Thus, the false discrimination rate is only 10%, which indicates a quite satisfactory result for the listeners' performances as depicted in Figure 10.

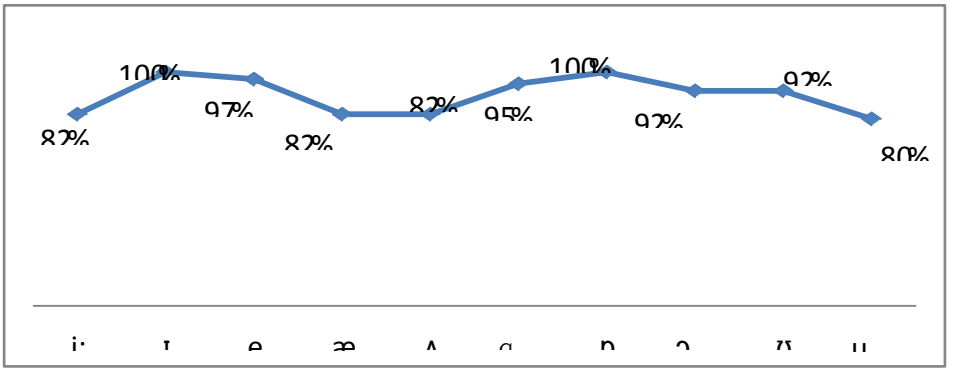

Figure 10. Percentage of Correct Discriminations

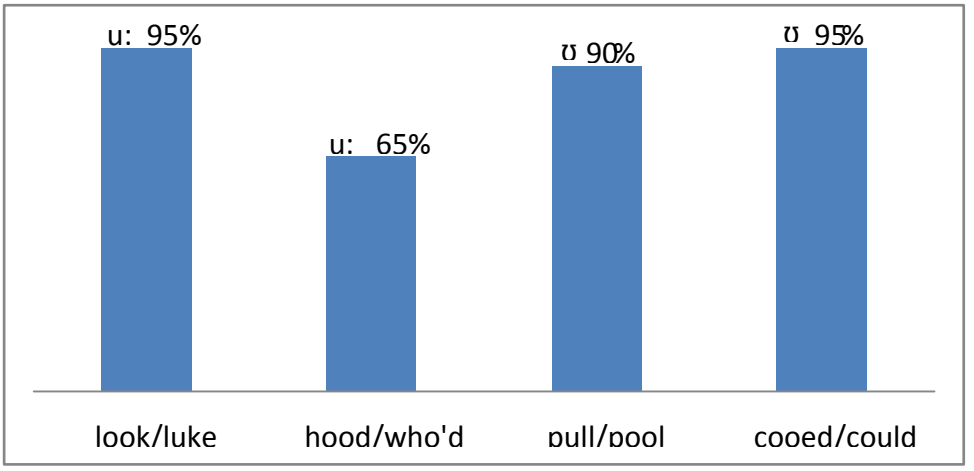

Figure 11. Percentage of Correct Discrimination for /u:/ and /ʊ/

For vowel pair /u:/ and /ʊ/ (cf. Figure 11), there were four pairs of stimuli, two for each. There is an interesting finding in that in the pair "look/luke" for target vowel /u:/, only one respondent failed the discrimination; whilst in the second pair of "hodd/who'd", seven respondents failed to discriminate /u:/ from /ʊ/. In addition, in the stimuli for target vowel /ʊ/, eighteen out of twenty listeners discriminated "pull/pool" successfully; and in "cooed/could" pair, nineteen people succeeded in discrimination. Thus, though the ultimate correct discrimination percentage for the two

sets of four pairs of stimuli for /uː/ and /ʊ/ was 80% and 92%, it still can be generated from the data that the Malay respondents have difficulty in distinguishing these vowel pairs of the tested Arabic-accented English.

Figure 12 depicts the performance of Malay subjects in the discrimination test for the vowel pair /e/ and /æ/. Similar findings were observed for these two vowels. In the test for /e/ in "had/head" and "sad/said", only one respondent failed; whilst for its corresponding vowel /æ/, there were seven cases of failure, four and three respectively. Reasons are not implicit at this stage for this phenomenon of deviance in the same sets of tests of discriminating the same pair of vowels.

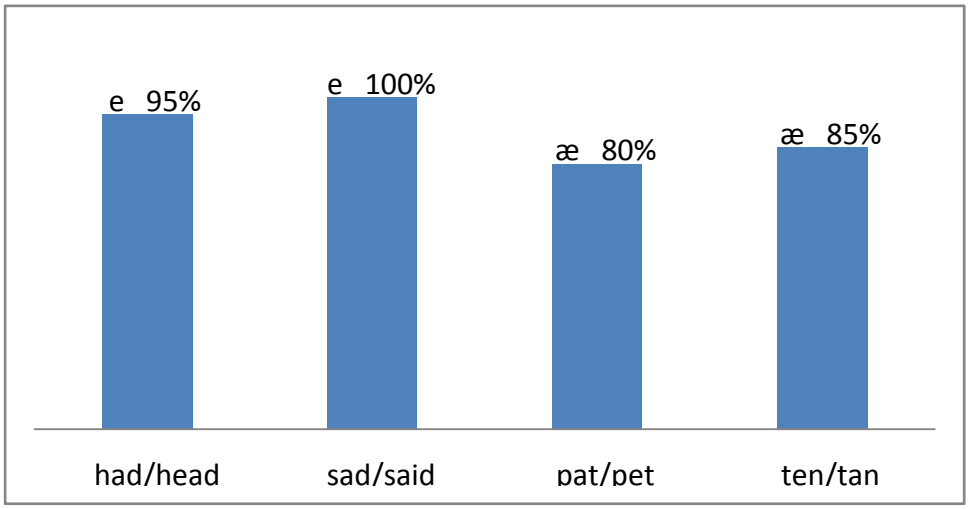

Figure 12. Percentage of Correct Discrimination for /e/ and /æ/

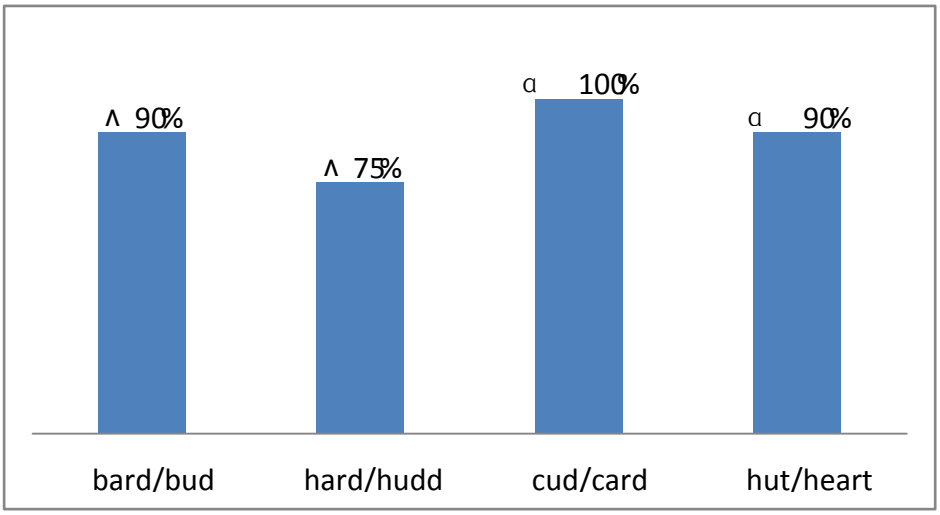

Figure 13. Percentage of Correct Discrimination for /ʌ/ and /ɑː/

Results presented in Figure 13 indicate that duration differences between /ʌ/ and /ɑː/ lead to misperception of Malay listeners towards Arabic-accented English produced by Omani speakers of English tested in the current experiment, though the impact is not very obvious. From the stimuli

"cud/card", which obtained the highest correct discrimination percentage, it seems the listeners are able to distinguish the two vowel monophthongs embedded in a perfect way; however, the other set of stimuli "hard/hudd" revealed difficulty, with the listeners understanding the speech of the Omani participant, specifically with the production of the vowels /ʌ/ and /ɑː/.

There are two monophthongs in this experiment, which all listeners identified correctly in all tests. However, their corresponding counterparts were not so well discriminated. Detailed information is provided in Figures 14 and 15, where it can be observed that for the five sets of stimuli tested for the vowels /ɪ/ and /ɒ/, which are "bead/bid", "keyed/ kid" and "pot/port", "bawd/bod", "hod/hawed" the correct percentages for discrimination are 100%; however, there were listeners who failed to discriminate between the stimuli tested for their counterparts /iː/ and /ɔː/, which are "lip/leap", "hit/heat" and "cawed/cod" consistently.

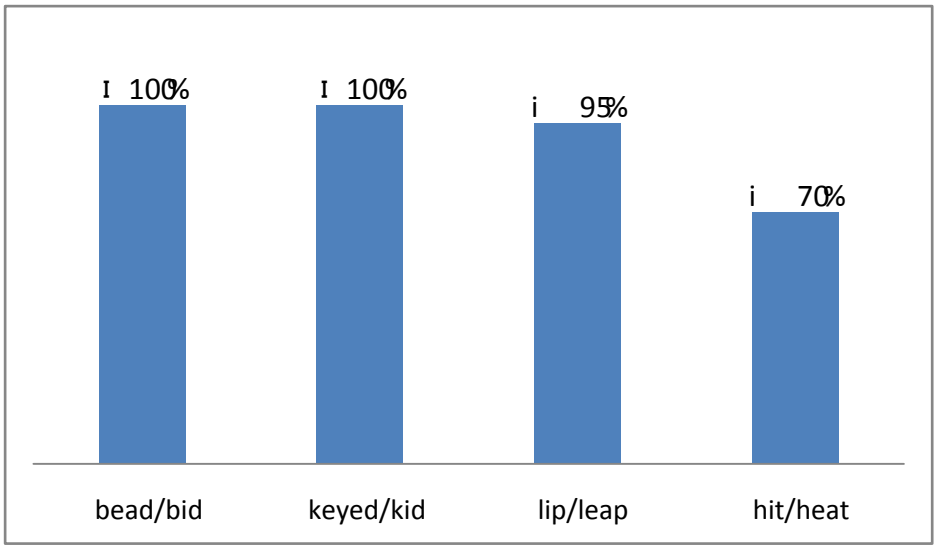

Figure 14. Percentage of Correct Discrimination for /ɪ/ and /iː/

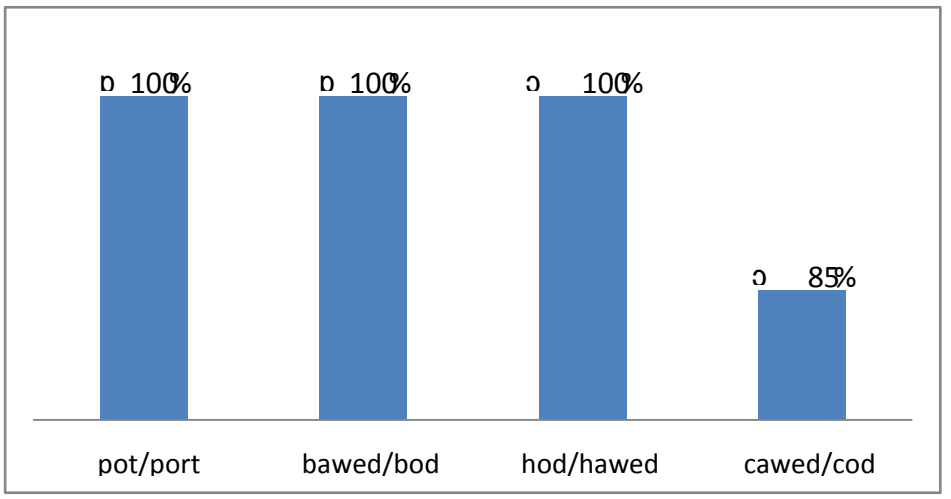

Figure 15. Percentage of Correct Discrimination for /ɒ/ and /ɔː/

Concerning the influence of gender differences on the performance of the listeners, data were also sorted into two groups. Generally, the overall correct percentage of the male group is higher (93%) than that of the females (88%), which shows no obvious gender variation. For the male group, most of the mistakes are at Question 19, which is testing target vowel /uː/ in the stimuli "hood/who'd"; whilst the situations for the female group vary. Two of the female candidates failed Question 19; four failed Question 6, where the tested target vowel /æ/ was embedded in a pair of stimuli for discrimination "pat/pet".

Table 2. Correct Frequency of Individual Performance of Determinations across Genders

%	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
Female	95	70	100	90	85	95	90	90	100	60
Male	100	100	100	100	95	75	100	85	95	80

Note: R=respondent

Throughout the whole experiment, data collected on the stimuli for target vowel /uː/ obtained the lowest correct percentage for discrimination (65%), compared with five of the best discriminated target vowels in Question 1, 2, 3, 4, 5 and 12, correspondingly /ɪ/, /ɑː/, /ɪ/, /ɒ/ and /ɔː/. Thus it is revealed that the target vowel /ɪ/ is the most easily identified item of all. However, one thing has to be noted, as discussed above (cf. Figure 14): the result of /ɪ/ cannot be generated to the whole pair of vowels (/ɪ/ and /iː/).

Experiment Three

As reported by Roger (1997), the most strongly correlating error category with sentences in speech intelligibility is vowel tenses, the last experiment tested targeted monophthongs by embedding them into word context.

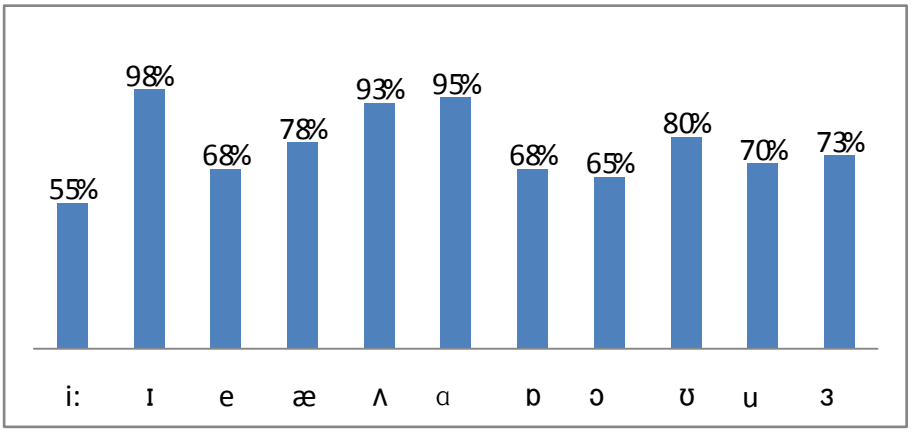

Figure 16. *Percentage of Correct Determinations in Experiment Three*

It can be observed in Figure 16 that there is a variation in listeners' determinations of different monophthongs. Overall, the mean percentage for correct determination is 77%, which indicates the evaluated Arabic-accented English is intelligible enough for the majority of Malay respondents. However, there is a distinctive feature generated from these results. The vowel pair /ɪ/ and /iː/ ob-

tained the highest and lowest score respectively (98% and 55%) in the perception of listeners of the Omani speaker's speech production. Therefore, implications extracted from this phenomenon are that there might be deviance between the speaker's pronunciation and the variety of English which the listeners are used to hearing or are accustomed to manipulating. However, findings from Hubais' research (2010), where the features of Malaysian English and Omani English were measured and compared (cf. Figure 6), shows the realization in the two English varieties of vowel /ɪ/ is quite different; those of vowel /iː/ appear quite close to each other. Whereas, the data of the current experiment demonstrates totally reverse results. Therefore, more studies on the vowel pair in these two varieties of English should be conducted.

Comparison of Data from the Three Experiments

The recorded data clearly shows that the overall correct perception rate of the three experiments is 73%. And among all the vowel monopthongs evaluated, the best perceived vowel by the Malay speakers of English is /ɪ/, where 96% of the listeners were able to perceive it correctly; compared to the intelligibility of vowel /ɒ/ which is low at a correct percentage of 59 (cf. Figure 17). Since the monophthong /ɜː/ was not examined in the second test, it is not included in the percentage of correctly perceived vowels.

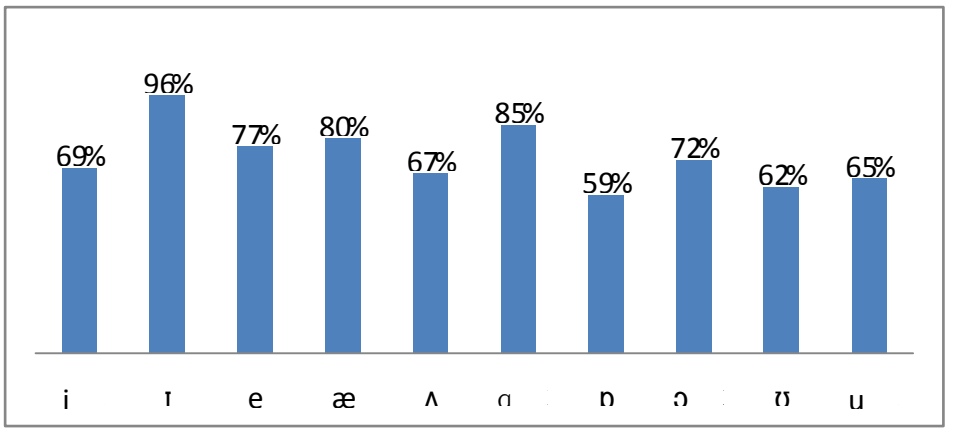

Figure 17. Overall Percentage of Correct Perception

Individual Listener Differences

Most of the data discussed so far were based on average perceptions of twenty Malay listeners. In order to explore individual listener differences, the correct percentage of perceptions of the tested monophthongs in the three experiments are summarized in Table 3. The data suggests that there are no huge differences between genders for each experiment, though the individual performance varies.

Contextual and Segmental Speech Perception

The first two experiments in this study aim at evaluating the segmental intelligibility of Arabic-accented English; whilst, the third experiment tested the perception of the same variety of English of Malay speakers of English based on given sentence context. The mean average of correct perception of the first two experiments is 71% (51% and 90% respectively); that of the third experiment is 77% as mentioned in previous discussions. Although it shows the listeners' performance is better with context than in a solely segmental situation, there is no huge difference between them.

Table 3. The Percentage of Correct Perception of All Vowels by Twenty Malay Listeners in Each Experiment

%	Experiment 1	Experiment 2	Experiment 3	Mean
F1	36	95	59	63
F2	55	70	95	73
F3	64	100	90	85
F4	82	90	77	83
F5	55	95	55	68
F6	55	75	55	62
F7	36	90	68	65
F8	36	90	73	66
F9	45	100	77	74
F10	36	80	73	63
M1	73	100	82	85
M2	64	100	86	83
M3	45	100	95	80
M4	82	100	82	88
M5	27	85	68	60
M6	18	95	77	63
M7	64	100	82	82
M8	55	85	90	77
M9	45	95	50	63
M10	36	60	82	59
Mean	50	90	76	72
Mean F	50	89	73	71
Mean M	51	92	79	74

Note: F=female listener; M=male listener.

Comparison with Previous Findings on Arabic-accented English

As mentioned above, Munro (1993) in studies of Arabic speakers of English and Hubais (2010) in comparing vowel productions between Omani and British English, found that there is an obvious merger of the /e/ and /ɪ/ vowels. Findings of the first two experiments did not reveal any evidences supporting such findings, however the research found in experiment three that five of the listeners misheard /iː/ as /e/. Since there is a lack of duration contrast between vowel pairs in Malaysian English, the listeners may have mistaken /iː/ for /ɪ/. Therefore, it can be implied that the result of experiment three on /e/ are consistent with that the previous studies.

Another vowel that appears to be misperceived frequently is /ɜː/. Comparing the correct percentage given for each vowel in experiment one and three, where this target vowel was tested, it was among the less identified ones. This is also consistent with what is reported by Hubais (2010). However, Munro (1993) did not highlight this vowel specifically in his study.

Another finding of Hubais' study (2009) that is worth noting is "/ɒ/ which is produced higher than /ɔː/ and closer to /uː/". This deviance from the standard British English is expected to affect the listeners' perception of the Omani English in the current study. As it illustrated in Figure 1, the vowel /ɒ/ is among the worst perceived vowels at a rate of 59%.

As length is contrasted between /ʊ/ and /uː/ (Munro, 1993), it is surprising to see that the Malay listeners' performance on this pair of vowels is not quite satisfactory. One reason for this discrepancy may be due to the typical feature of Malaysian English, where there is a lack of contrast in its vowel lengths as reported by Zuraidah (1997). Therefore, it may be assumed that the Malay listeners' correct perception of this pair of vowels was interfered or blocked by their daily use of the English language. The data obtained shows that Malay listeners have difficulties in perceiving these two vowels. This may support Hubais' statement (2010), that Omani speakers of English face difficulties in pronouncing the vowel pair /ɒ/ and /ɔː/.

Conclusion

The data analysis of all the three experiments conducted revealed the problems of Arabic-accented English in terms of production. It can be seen that the Arabic-accented English evaluated in the current study is generally understandable or intelligible to Malay speakers of English since the overall correct perception rate of the vowel 79 monophthongs in the three experiments is 73%, which indicates the majority of the Omani production is intelligible. Even the less perceived vowels gained correct rates of 54% for /ɜː/ and 59% /ɒ/, where it can be asserted that over half of the population of the listeners was able to perceive these two vowels.

No vowels that were correctly perceived by all Malay respondents. Arabic speaker's productions of English vowel monophthongs that have Arabic analogs were not necessarily more intelligible than those that lack Arabic counterparts. The acoustically deviant Arabic-accented vowels, like the vowels /e/, /æ/, /ɔː/, pair /ɒ/ and /ɔː/, had low intelligibility scores due to an interference of the L1 vowel system. Thus, a discrepancy can be observed between the findings of this research and the predictions of the traditional Contrastive Analysis Hypothesis (CAH), which declared that difficulties in learning the segments of an L2 can be predicted by 80 comparing the sound inventories of the L1 and L2 system, indicating those segments that have L1 counterparts are easily to be learnt properly.

However, this study does agree with the statement of Flege and Port (1981, p. 133), that "phonetic differences between L1 and L2 will lead to non-L2 phonetic characteristics in the L2 produced by the learners of the L2 language".

There are two major factors that may lead to the failure of the Malay listeners' misperception of Arabic-accented English vowel monophthongs. The first is L1 interference of the Arabic vowel system. For example, Hubais (2009) reported that Omani English speakers tend to produce the English vowel /iː/ close to Arabic /iː/ and /ɪ/. This may lead to problems in the perception of other speakers of English towards the vowel /iː/ produced by Omani speakers. The other factor is the deviance between Malaysian English and Arabic-accented English. The lack of vowel contrasts in Malaysian English may also contribute to a breakdown in the intelligibility of evaluated Arabic-accented English vowel monophthongs of the Malay speakers of English. For example, the Malay speakers of English tend to replace the vowel /ʌ/ with its counterpart /ɑː/ (cf. Figure 7) at a rate of 50%, though the Omani speakers maintain the contrast between the vowel pair /ʌ/ and /ɑː/ (Hubais, 2009); and the phenomenon of mistaking /e/ as /iː/. Some minor factors, like listeners' English training and education background, and the individual perspective on the importance of 81 learning basic pronunciation of English may also play a role in the Malay perception of Arabic-accented English vowel monophthongs.

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Appendix A
Personal Information of Omani Participants

Studying Background of the Omani Subject

Speaker	Age	First Degree		Postgraduate	
		Major	**MOI**	**Major**	**MOI**
1	32	Teaching English as a Second Language	English	Master of English as a Second Language	English
2	29	Computer Science	English	Computer Science	English
3	33	Computer Science	English	Computer Science	English
4	30	Mathemetics	English/Arabic	Computer Science	English
5	30	Accounting	English	MBA	English

Note: "MOI" indicates the medium of instruction of program.

Characteristics of the Omani Subject

Speaker	Gender	E P	AOL	LOR	% English
1	M	GA	25	1.5	75
2	M	RP	22	2	50
3	M	RP	26	3	50
4	M	RP	23	2.5	60
5	M	GA	23	2	70

Note: "EP" indicates the English preference. "AOL" and "LOR" indicate the age of learning English and length of residence in Malaysia, in years, and "%English" self-estimated daily percentage use of English. The parameters used in the tables below were very similar to the ones used by Flege, MacKay & Meador (1999)**.**

Appendix B
Learner Profile

Surname:	**First names:**	
Age:	**Female:**	**Male**
Nationality: Native language: Father's mother tongue:		

Mother's mother tongue: Language(s) spoken at home:
Education: Primary school – medium of instruction: Secondary school – medium of instruction: Degree – medium of instruction: Current studies: Current year of study: Institution: Faculty: Major: Medium of instruction: English only Other language(s) (specify) Both
Years of English at school: Years of English at university:
Stay in an English-speaking country: Where? When? How long?
Other languages in decreasing order of proficiency:
How many percent do you use the English language in your daily life? (%)
General American English and Received Pronunciation of British English, which do you prefer?
Do you think learning the basic knowledge of English pronunciation is important?

I hereby give permission for my essay to be used for research purposes.

Date: **Signature: (sgd)**

Appendix C
Word List for Experiment One

heed;
hid;
head;
had;
who'd;
hood;
Hudd;
hard;
hod;
hawed;
herd;

Appendix D
Minimal Pairs for Experiment TWO

1. bead/bid	bid
2. cud/card	card
3. keyed/ kid	kid
4. pot/port	pot
5. hut/heart	heart
6. pat/pet	pat
7. lip/leap	leap
8. ten/tan	tan
9. bard/bud	bud
10. pull/pool	
p u l	l
11. had/head	head
12. hod/hawed	hawed
13. hard/Hudd	Hudd
14. cawed/cod	cawed
15. look/Luke	Luke
16. bawd/bod	bod
17. sad/said	said
18. cooed/could	could
19. hood/who'd	hood
20. hit/heat	heat

Appendix E
Experiment Three: Sentences

1. Let's all join as we sing the last chorus.
2. The store walls were line with colored frocks.
3. The last switch cannot be turned off.
4. The beam dropped down on the workman's head.
5. Paper is scarce, so write with much care.
6. The peach league met to discuss their plans.
7. The rise to fame of a person takes luck.
8. A rod is used to catch pink salmon.
9. Pink clouds floated with the breeze.
10. The fish twisted and turned on the bent hook.
11. Glue the sheet to the dark blue background.
12. The fight will end in just six minutes.
13. Screw the round tap on as tight as needed.
14. Men think and plan and sometimes act.
15. The plant grew large and green in the window.
16. The tube was blown and tire flat and useless.
17. Time brings us many changes.

18. It was later morning on the old wall clock.
19. The quick fox jumped on the sleeping cat.
20. The purple tie was ten years old.
21. Slide the box into that empty space.
22. The meal was cooked before the bell rang.