CHAPTER 4

FINDINGS AND DISCUSSION

4.0 Introduction

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 (cf. chapter two), the current study extracted data by using the same methods. To answer the research questions (see 1.3), 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. Firstly, 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. In order to avoid speaker variability in speech accent, the sample data is restricted to that produced by Omani speakers of English in the current study (cf. 1.3&3.1). Analysis of the results of individual listeners will be presented as well as that of across-gender groups.

4.1 Experiment One

Figure 4.1 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. 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 Contrastive Analysis Hypothesis, a second language learner will have trouble producing the new segment (Lado, 1957). Whereas, it is quite explicit that findings shows 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 the interference of ME for the listeners.
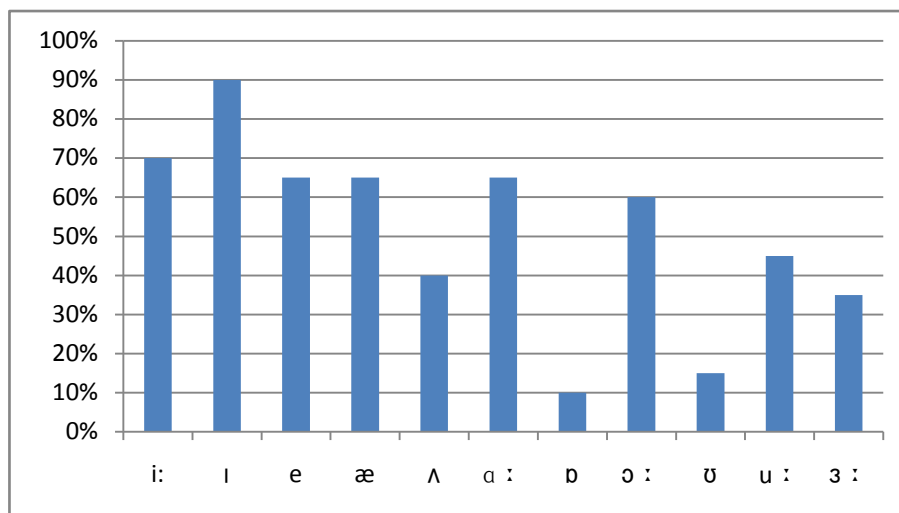
Figure 4.1: Percentage of Correct Identifications

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 4.2. 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' (2009) 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.
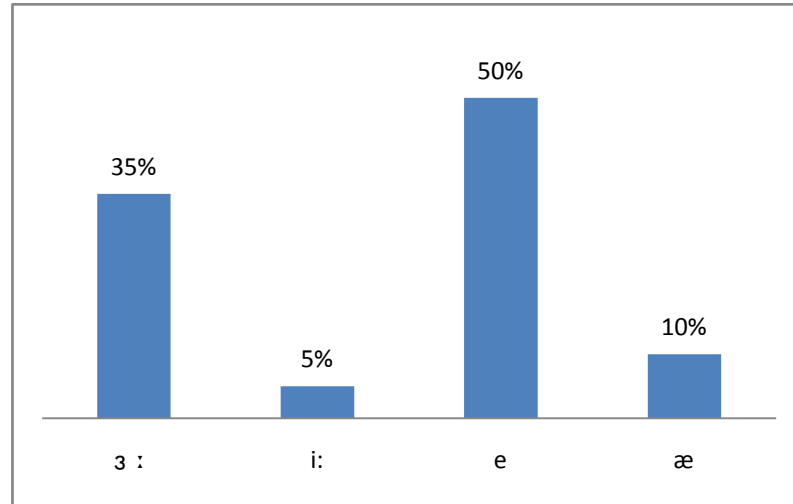

Figure 4.2: Percentage of Determination for /ɜː/

Hubais (2009) also reported that /ɒ/ in Omani English is always realized "higher than /ɔː/ and closer to /uː/" as plotted in Figure 4.3, from which it can be assumed that there might be a discrepancy between the Malay subjects' perception and the actual pronounced vowel. Figure 4.4 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 a 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 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 (cf. 2.3.2), it can be indicated the results of those Malay participants identifying the target vowel are compatible with the previous findings of Munro (1993).
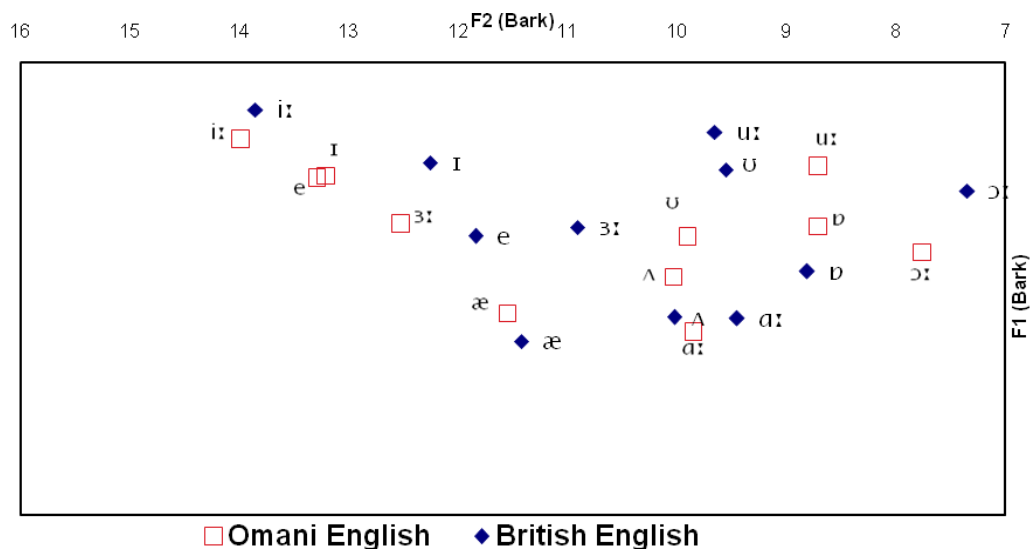

Figure 4.3: Comparisons of Vowels in British and Omani English
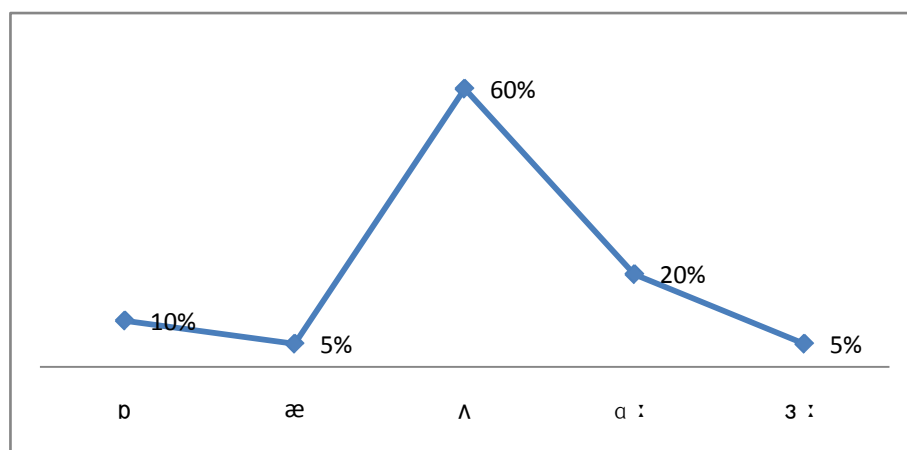
(Source: Hubais, 2009)

Figure 4.4: 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/ (cf. 2.2). Such a merger is demonstrated clearly in Figure 4.3, 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 4.5, the Malay subjects' performances on the target vowel /e/ was quite good, however some of them misidentified /e/ as /æ/ (20%) and /ɜː/ (15%).
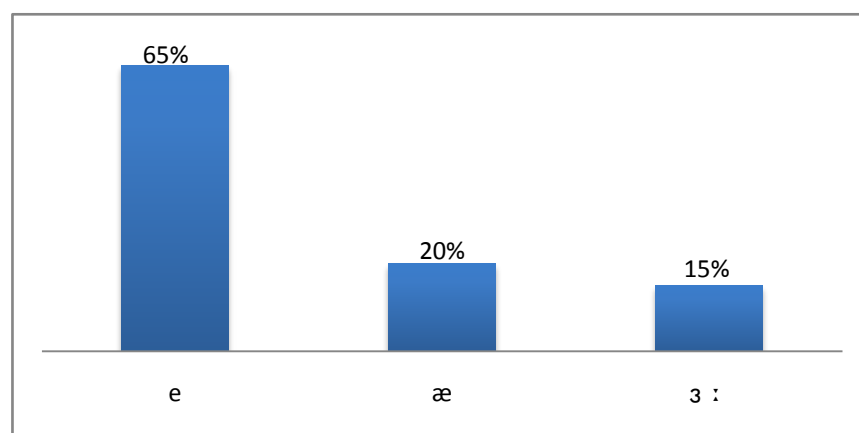

Figure 4.5: Percentage of Determination for /e/

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 4.2 displays an obvious difference between the duration realization of English of /ɪ/, /iː/, and /uː/, /ʊ/ of Omani and Malay speakers. 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 4.6; yet, for the pair /ʌ/, /ɑː/, it can be seen that the Omani speakers do maintain the contrast. Moreover, 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 replacing /ɑː/ with /ʌ/. Detailed percentage of listeners' performance is demonstrated in Figure 4.7 and 4.8. 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 (2009), the Omanis do contrast between these two vowels, the Malay listeners still have considerable difficulty in discriminating between them.

Table 4.1
Vowel Duration for Malaysian and Omani Speakers

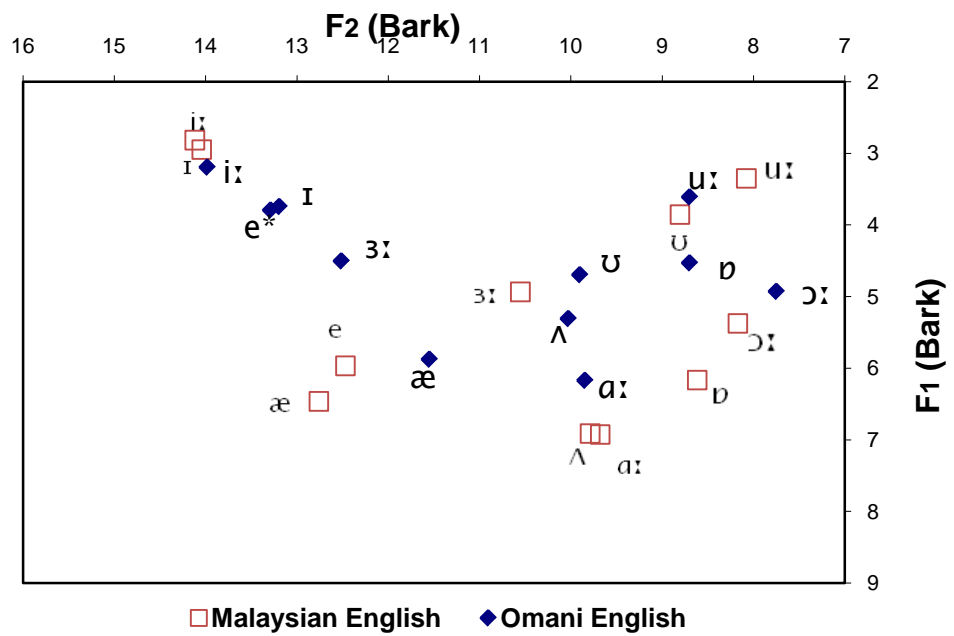| Vowels	ɪ	iː	ʊ	uː	ɔː	ɒ
Malaysian	109	172	104	195	228	139
Difference		63		91		89
Omani	74	166	94	209	164	98
Difference		**92**		**115**		**66**

Figure 4.6: Comparison of All Vowels in Omani and Malaysian English
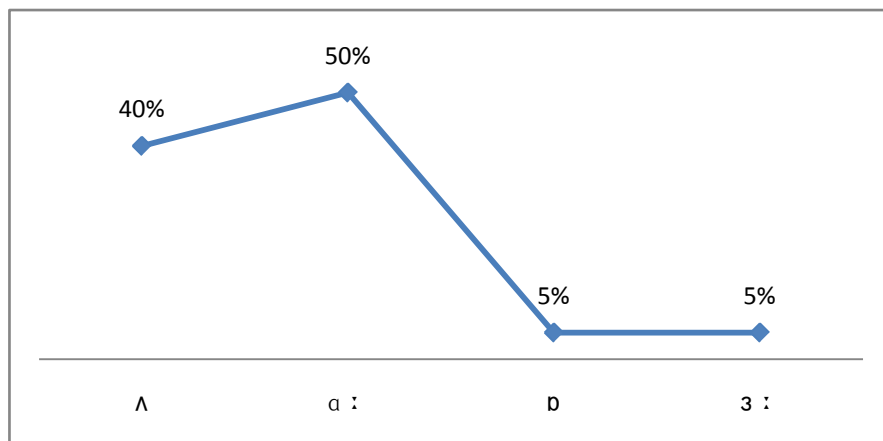
(Source: Hubais, 2009)

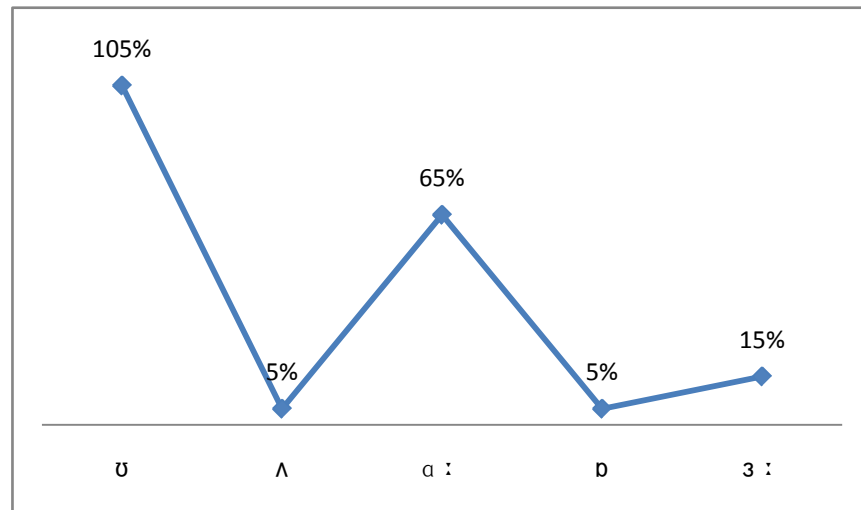**Figure 4.7: Percentage of Determination for /ʌ/**

Figure 4.8: Percentage of Determination for /ɑː/

There was considerable variation among the Malay listeners in the correct rate of identifications. The best listener had a correct identification rate of 82%, while the worst had a distinctively lower rate of 18%. The percentage of vowels being determined correctly by each individual listener is scattered (see Figure 4.6). Obvious differences in individual performance can be observed easily. Analyzing the listeners' individual performance may provide diagnostic information, which will help the speaker to establish an error profile indicating the contrasts that needs more training.
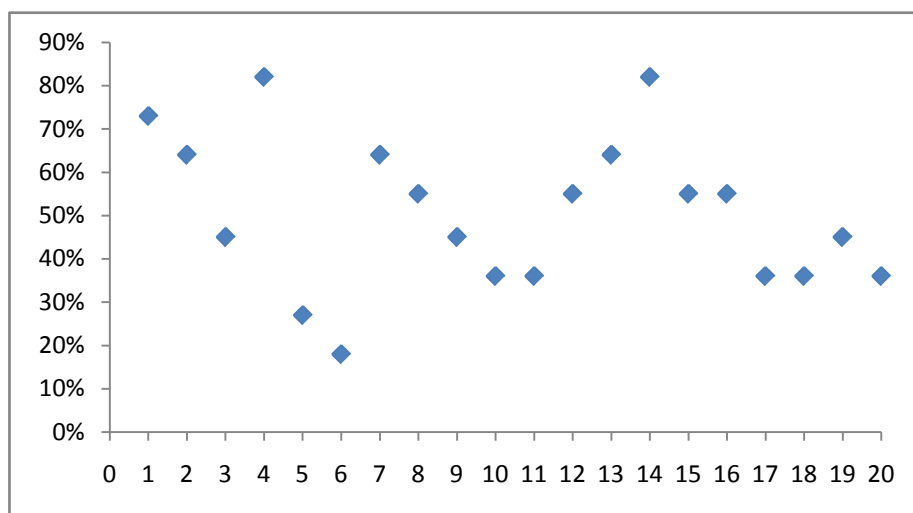
Note: The horizontal axis represents each of the participants.

Figure 4.9: Correct Percentage of Individual Performance of Identifications of English Monophthongs produced by Omani Speaker

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 4.1). Findings can be drawn from the data that the vowel /ɪ/, which obtained the highest identification rate, was misidentified as either /e/ or /uː/. Each of them bore a rate of 5% in contrast with the 90% correct identification rate for the target vowel. For /iː/, the counterpart of /ɪ/ in terms of duration, the majority of the participants heard it correctly at a rate of 70% (cf. Figure 4.10). Though /iː/ and /ɪ/ were reported to "have similar length" (cf. 2.3.2) 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 /iː/ chosen for the target vowel /ɪ/, 25% of the subject population misheard /iː/ as /ɪ/. Thus indications can be drawn that the Malay subjects still have problems in distinguishing the vowel pair /iː/ and /ɪ/

produced by Omani speakers. For the vowels /uː/ and /ʊ/, which had a correct determination percentage of 15% and 45% respectively, a contradiction of Hubais' study (2009) is generated. In his study of Omani English vowel monopthongs, he suggested that "length is contrasted" between this pair of vowels with /ʊ/ realized more fronted than /uː/. However, 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 4.1, a majority of misidentified /ʊ/s was heard as /uː/s (75%); while, a considerable number of /ʊ/s replaced the correct /uː/s (35%), though most of the listeners were able to identify the vowel /uː/ 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.
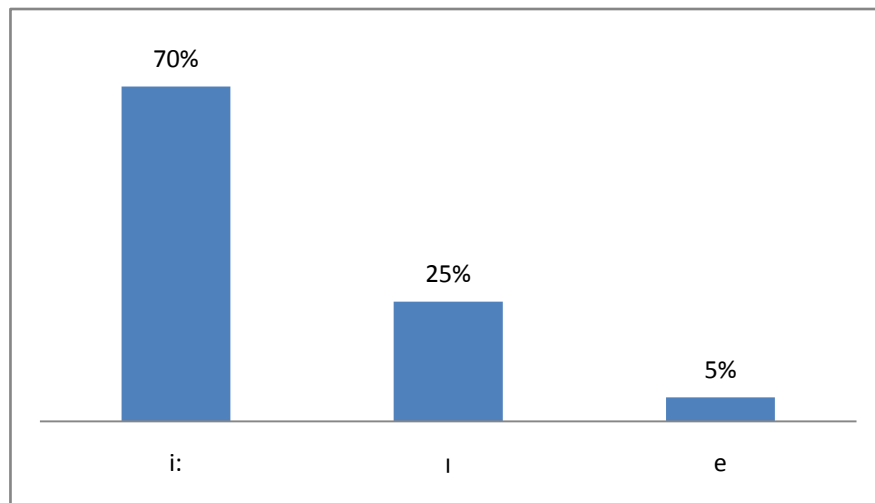

Figure 4.10

Percentage of Determination for /i:/

Table 4.2

Confusion Matrix (%) for the Production of English Vowel Monophthongs of Omani Speaker of English

Heard	iː	ɪ	e	æ	ʊ	uː	ʌ	ɑː	ɒ	ɔː	ɜː
Target	**Percentage N=20**										
iː	70	25	5								
ɪ		90	5			5					
e			65	20							15
æ			20	65			5			5	5
ʌ							40	50	5		5
ɑː				10			5	65		5	15
ɒ				5			60	20	10		5
ɔː					5	15			20	60	
ʊ					15	75	5		5		
uː				5	7	9			10		5
ɜː	5		50	10							35

Note: The vertical coordinate indicates the target vowels; the horizontal one represents all the variables for multiple-choices. N represents the number of participants.

In this study, the listeners were divided into two groups according to gender. There is no distinctive difference between the total scores of correct determination between the two groups, where the females got 50% of the target vowels correctly identified; the score of the male group is only a bit higher at 51%. Therefore, it can be implied that there is no implicit gender differences in this experiment. For individual performance (cf. Table

4.3), the false percentage of male respondent No. 6 is 18% corresponding to that of four

of female respondents (36%). To explore details of the results of this experiment, a

Confusion Matrix describing the frequency for the Malay respondents' performances on

production of English vowel monophthongs of Omani speaker of English is provided in

Appendix F.

Table 4.3

Correct Percentage of Individual Performance of Identifications across Genders

%	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
Female	36	55	64	82	55	36	36	36	45	35
Male	73	64	45	82	27	18	64	55	45	36

Note: R= respondent

4.2 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 (cf. 3.4.2), 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). In order to analyze data

obtained more effectively, different standards of measurements have to be adopted

based on the distribution of overall stimuli, single vowel and vowel pairs.

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. The overall percentage of correct discrimination of the vowels by each of the 20 Malay participants is depicted in Figure 4.11.
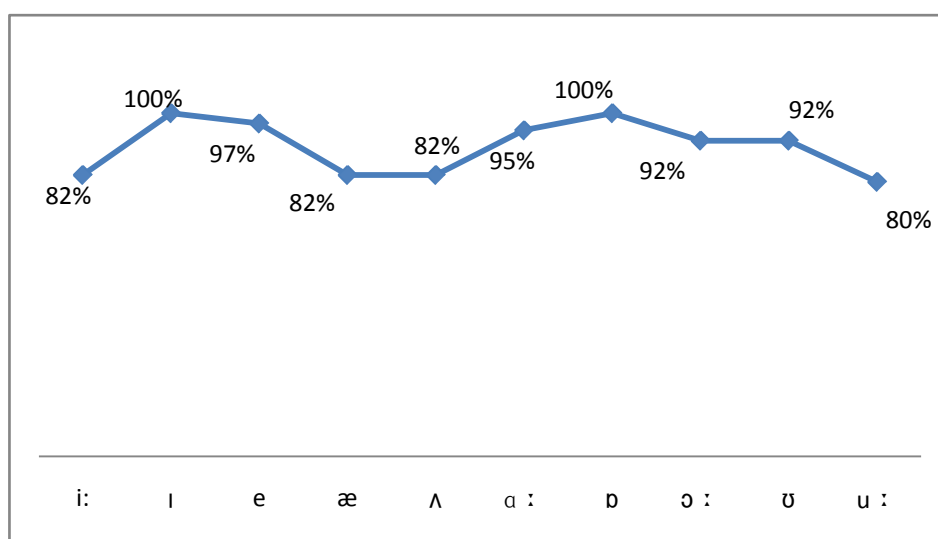

Figure 4.11: Percentage of Correct Discriminations

Across gender groups, on average, a total of 90% of the production of Omani speakers of English of target monophthongs were correctly discriminated. However, there was variation among listeners in the correct rate of discrimination though all scores of the participants were above 75%, which can be considered as quite high. The best listener obtained a rate of 100% in correction, while the worst had a rate of 80%.

For vowel pair /uː/ and /ʊ/ (cf. Figure 4.12), there were four pairs of stimuli, two for each. There is an interesting finding in that in the pair "look/luke" for target vowel /uː/, only one respondent failed the discrimination; whilst in the second pair of

"hodd/who'd", seven respondents failed to discriminate /uː/ 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.
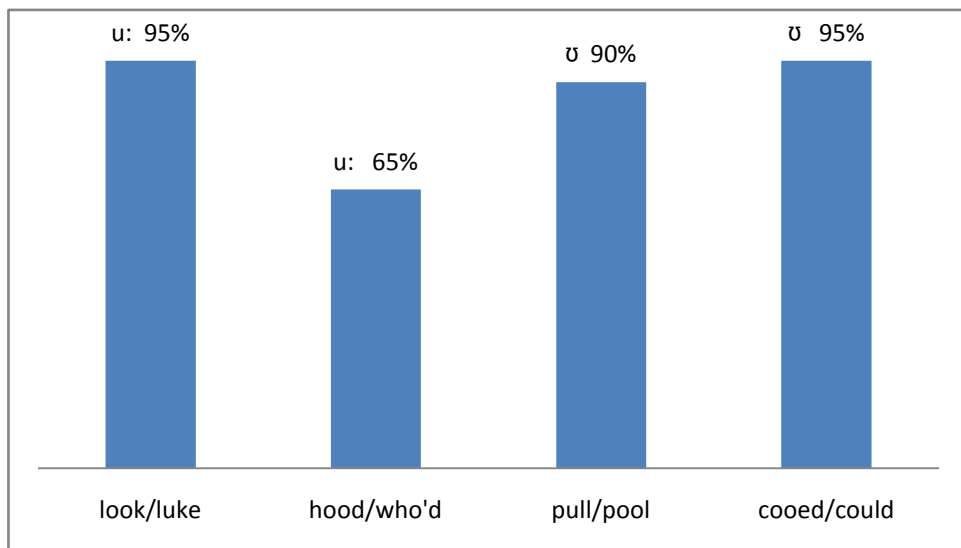

Figure 4.12: Percentage of Correct Discrimination for /uː/ and /ʊ/

Figure 4.13 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 though the target vowels are different.
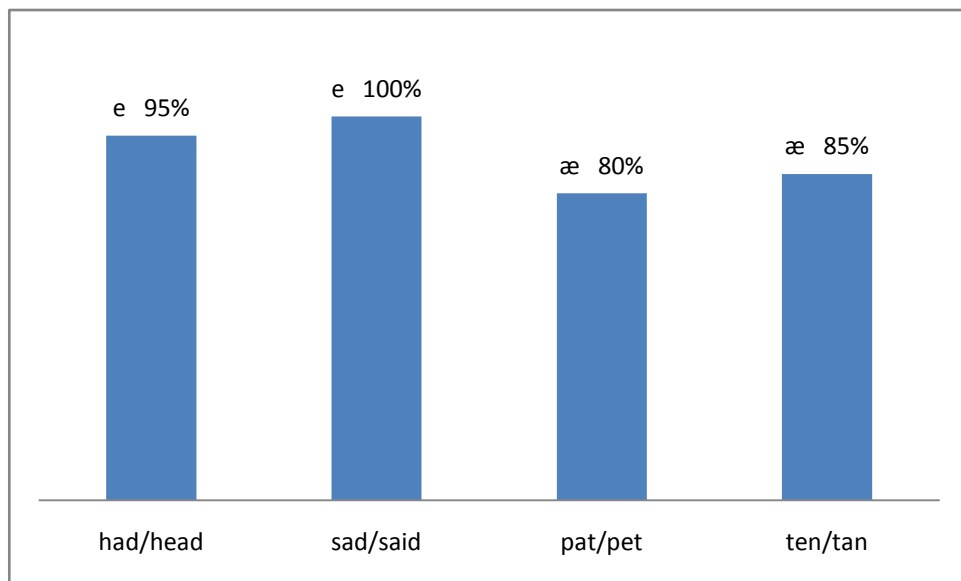
Figure 4.13: Percentage of Correct Discrimination for /e/ and /æ/

Results presented in Figure 4.14 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/.
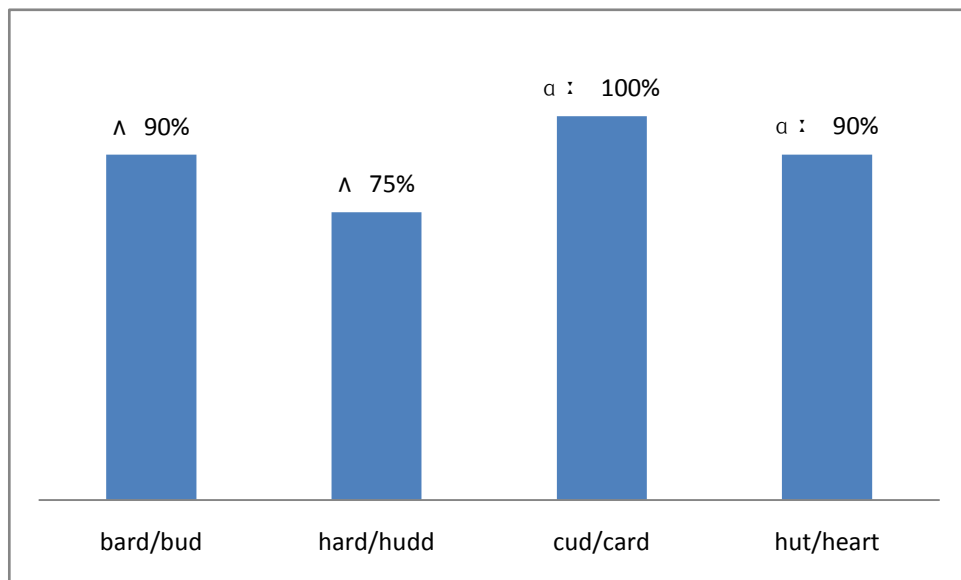
Figure 4.14: Percentage of Correct Discrimination for /ʌ/ and /ɑː/

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 4.15 and 4.16, 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. Thus, even one of the target vowels in these two pairs were well perceived, conclusion cannot be drawn easily that the Malay speakers of English do not confuse between these two sets of vowel pairs.
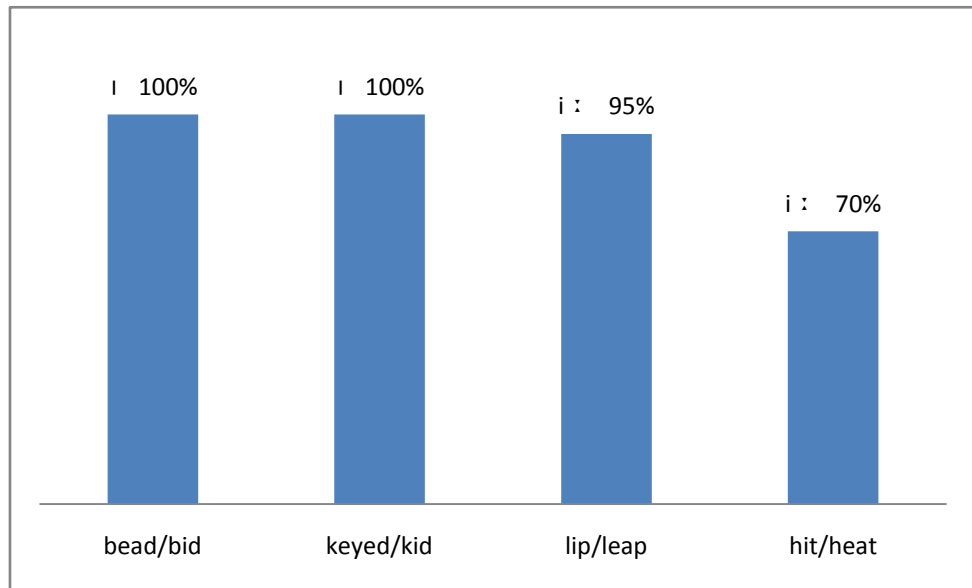
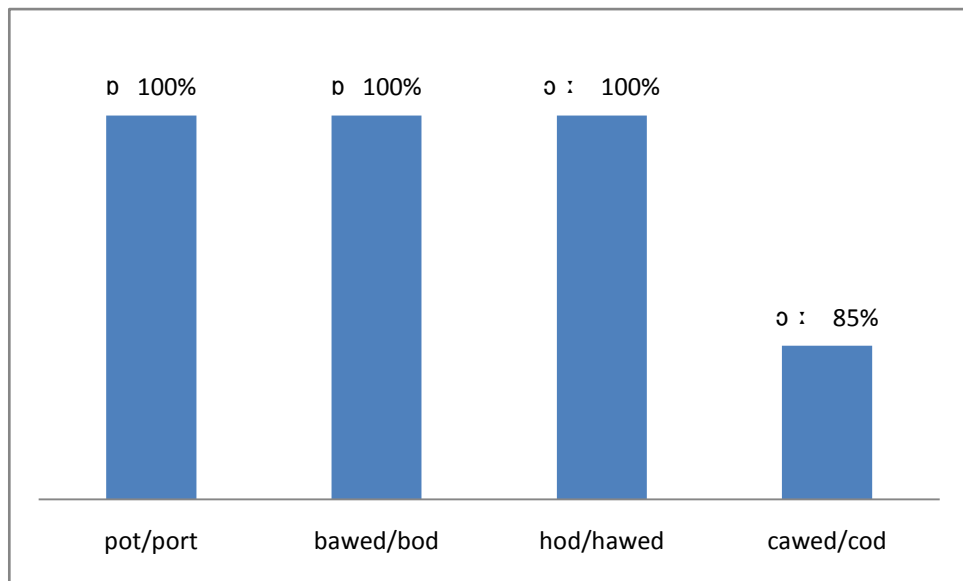**Figure 4.15: Percentage of Correct Discrimination for /ɪ/ and /iː/**

Figure 4.16: Percentage of Correct Discrimination for /ɒ/ and /ɔː/

Concerning the influence of gender difference on 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. It is worth noting that there were five male listeners who discriminated all

stimuli correctly, whilst only two out of ten female listeners scored the same mark. In addition, the worst performance of all Malay participants is in the female group, where a correct rate of 60% was gained throughout all the tested stimuli, which means she failed eight out of twenty pairs of stimuli. 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"; three for Question 13 and 20 each, where the tested vowels and stimuli were /ʌ/, /iː/ , "hard/Hudd" and "hit/heat" correspondingly, and the rest varies.

Table 4.4

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 4.15): the result of /ɪ/ cannot be generated to the whole pair of vowels (/ɪ/ and /iː/),

since evidence has shown the confusion between them by the Malay listeners. Appendix G demonstrates the precise data obtained in this experiment for each target monophthong in a paired sequence.

4.3 Experiment Three

The last two experiments tested targeted monophthongs by embedding them into word context. The goal was to test segmental intelligibility of Arabic-accented English through the Omani speaker of English. Whereas, the connected-speech intelligibility of the same variety of English is investigated in the current experiment, the target vowels are measured in the context of sentences. As mentioned in the previous chapter, eleven vowel monophthongs were measured (cf. 3.4.3). It is reported that the most strongly correlating error category with sentence in speech intelligibility is vowel tenses (Roger, 1997). Nevertheless, this category is not measured in the current study. Only the vowels in the listeners' answers were evaluated through careful separation from the words filled in each blank of the twenty-two sentences by each listener. If there was a blank appearing in the answer, it would be automatically added into the false percentage of the corresponding vowel tested.

The mean percentage of correctly determined items of the eleven vowel productions in twenty-two sentences (pooled over twenty Malay respondents across genders) is displayed in Figure 4.17. It can be observed 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/ obtained the highest and lowest score respectively (98% and 55%) in the perception of listeners of the Omani speaker's speech production. Therefore, implications can be extracted from this phenomenon is 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. Otherwise, they would be able to distinguish both vowels quite easily. However, findings from Hubais' research (2009), where the features of Malaysian English and Omani English were measured and compared (cf. Figure 4.6), 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.
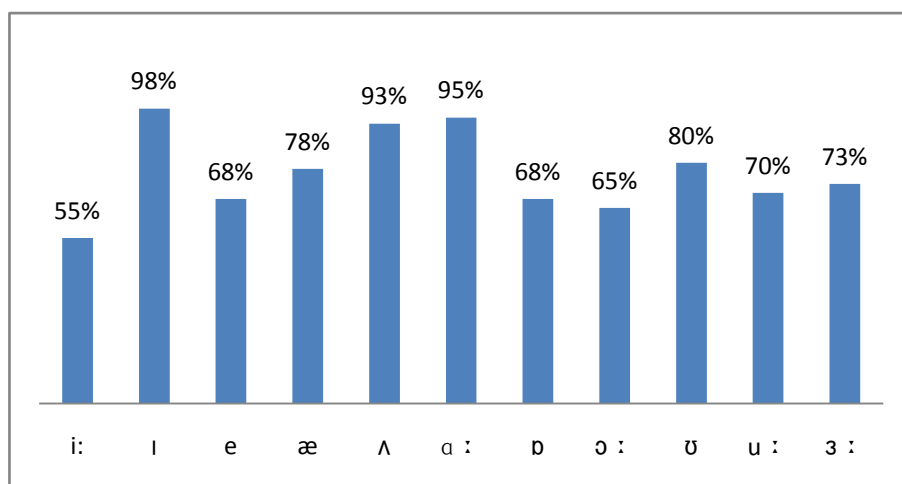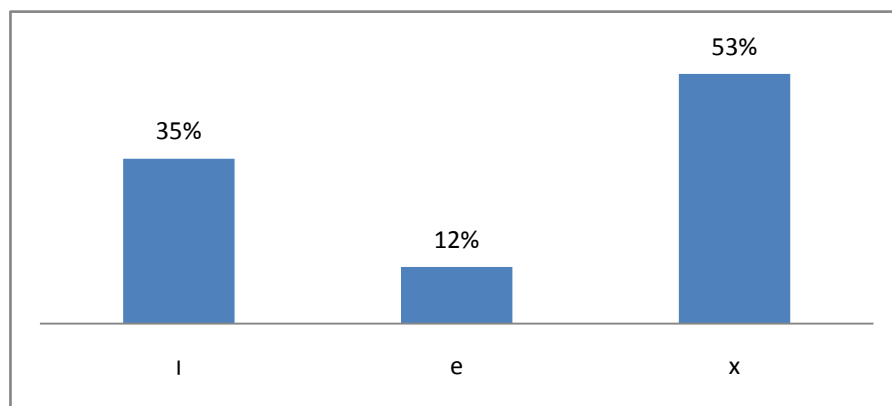

Figure 4.17: Percentage of Correct Determinations in Experiment Three

From the figure above, it can also be seen that the best determined pair of vowels is /ʌ/ and /ɑː/, where 94% of the Malay participants perceived them correctly, comparing with the worst pair /ɒ/ and /ɔː/ with a rate of 68%. For the /ɪ/ and /iː/ pair, a rate of 77% was obtained in the listeners' determination performance.

To explore further the misdetermined Omani Arabic speaker's vowel production of English, confusion matrixes and figures were created (averaged across gender differences of the twenty listeners) on the bases of the Malay listeners responses on some vowel monophthongs that present distinctive features. The monophthong /iː/ is discussed firstly in Figure 4.18. It is noted that the majority of the mistakes appear on the long vowel /iː/, and most of those listeners who failed to perceive it use the short vowel /ɪ/ instead (six out of seventeen mistakes), though there are more people leaving a blank at this question (nine out of seventeen mistakes). These all reveal the listeners do face difficulties in understanding the speaker's production of this pair of vowels, especially /iː/.

Note: x=blank in the listeners' answer for the perception of target vowel.

Figure 4.18: Percentage of Misdeterminations for /iː/

Figure 4.19 shows the results generated for vowel /e/. An interesting finding is that there is a huge deviance in the correct determination for the two questions tested for this vowel. In Question 6, where the targeted word "met" was perceived as "make" up to seven times; and it was also misheard as "meet" and "need", where the vowel /iː/ is the indicated answer, five times. Whereas, in Question 12, it was surprising to see all listeners able to determine the target perfectly. This might show an interference of context. For Question 12, there is a possibility that the Malay respondents identified the word based on the meaning and coherence of the sentence given. Altogether for the questions for the vowel /e/, there were thirteen misdeterminations out of forty answers. Whilst, for its counterpart /æ/, the answers of the misdeterminations vary: out of nine errors, there were two listeners who replaced the target vowel with /ɑː/, two with /e/, three with /ei/ and one with /iː/. The results for the vowel pair indicate that there is a tendency for the Omani speaker participating in this study to produce the quality of the pair is closer to that of the diphthong /ei/.
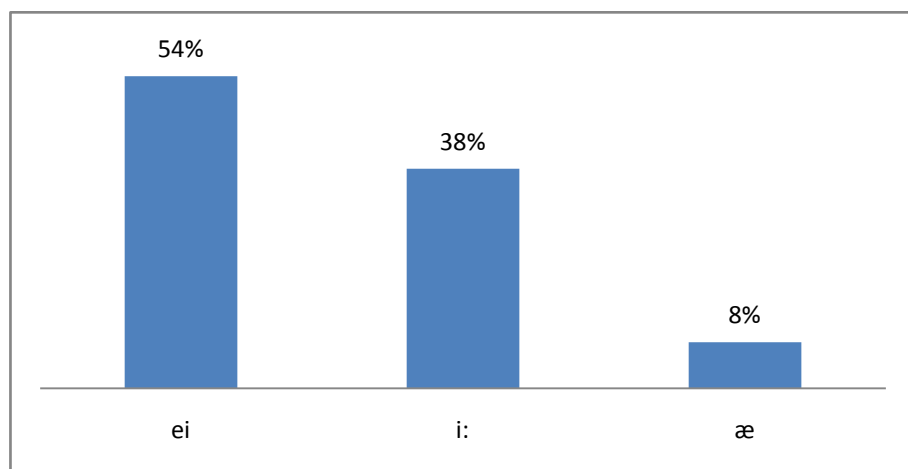

Figure 4.19: Percentage of Misdeterminations for /e/

For the second well-determined vowel /ɑː/, there were altogether two mistakes made by the listeners, who left blanks for the questions designed. And for /ʌ/, the third well-identified target, similar findings were observed, except there was one more blank for its corresponding questions.

For the vowel pair /ɒ/ and /ɔː/, which were the worst determined pair of vowels in this experiment, it is implicit that the Arabic speaker did not pronounce them in a native-like way. It can be seen from the figures below, the majority of those listeners who failed the determinations misperceived them as the dipthong /əʊ/ at an error rate of 54%. However, for the former, a considerable number of /uː/s were found in the participants' answers.
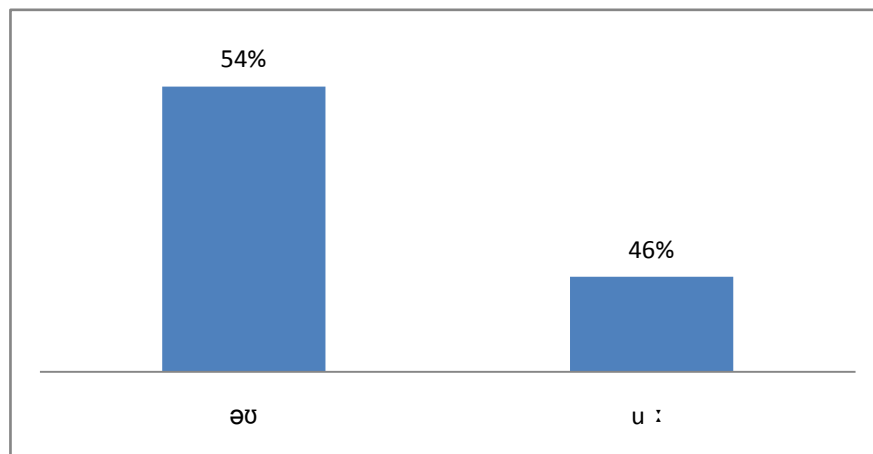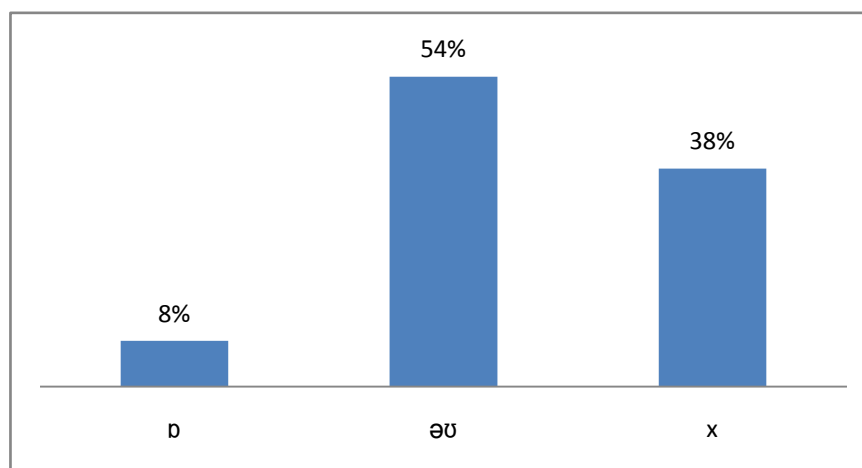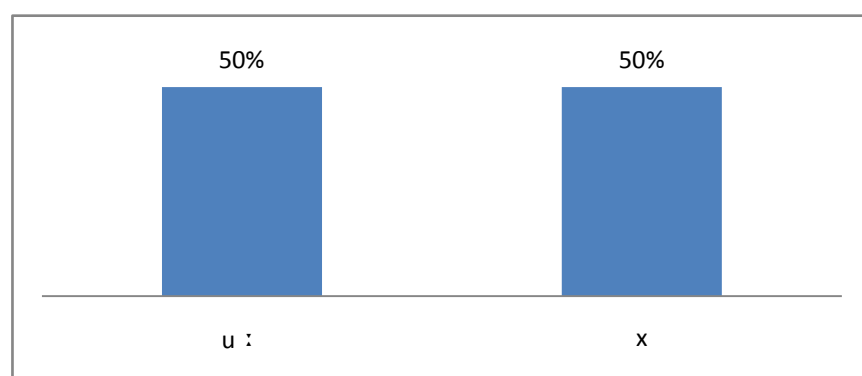

Figure 4.20: Percentage of Misdeterminations for /ɒ/

Figure 4.21: Percentage of Misdeterminations for /ɔː/

Results presented in Figure 4.22 and 4.23 indicated that the listeners faced difficulties in distinguishing the vowels /uː/ and /ʊ/. Most mistakes made for target /ʊ/ were that listeners misheard it as its counterparts /uː/; whilst the same was found for the target /uː/, though quite a number of listeners wrote "grow" for the target "grew", it is considered as an ignorance of the tense factor in sentence context, which is not well integrated within the current study.

Figure 4.22: Percentage of Misdeterminations for /ʊ/

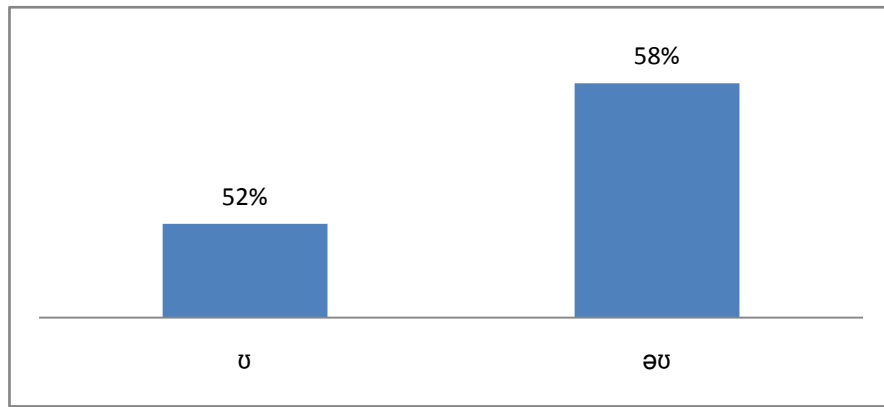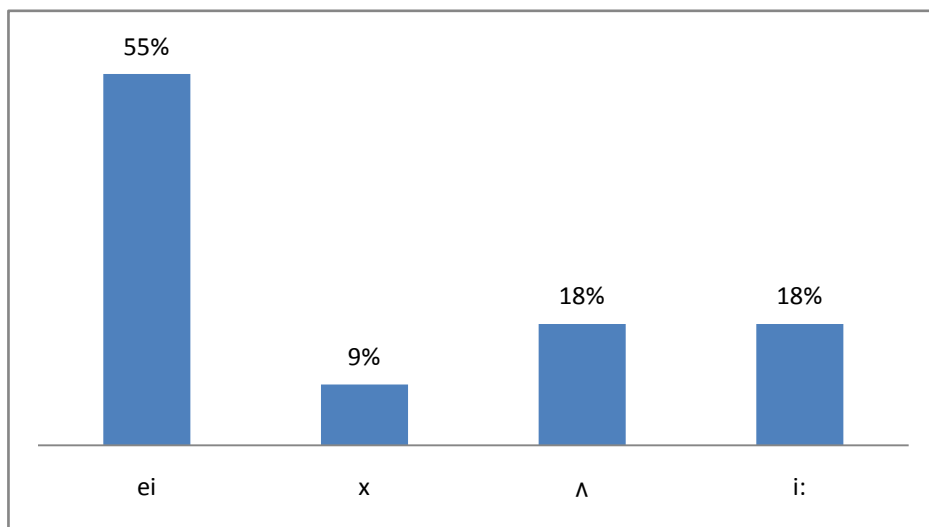**Figure 4.23: Percentage of Misdeterminations for /uː/**

The determination result for the vowel /ɜː/ is demonstrated in Figure 4.24, where most of the listeners tended to confuse it with the diphthong /ei/, though other alternatives were taken to replace it as well.

Note: x=blank in the listeners' answer for the perception of target vowel

Figure 4.24: Percentage of Misdeterminations for /ɜː/

4.4 Comparison of Data from the Three Experiments

The recorded data c;early 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 4.25). Since the monophthong /ɜː/ was not examined in the second test, it is not included in the percentage of correctly perceived each vowels. The results of /ɜː/ of experiment one and three show that the mean correct percentage is 54%. The intelligibility of each vowel pair is, therefore, easily generated. The /iː/ and /ɪ/ pair gained the highest percentage (83%) following by the vowels /e/ and /æ/, and /ʌ/ and /ɑː/, and the generally less perceived vowel categories are the pairs of /ɒ/, /ɔː/ and /ʊ/, /uː/ (64%).
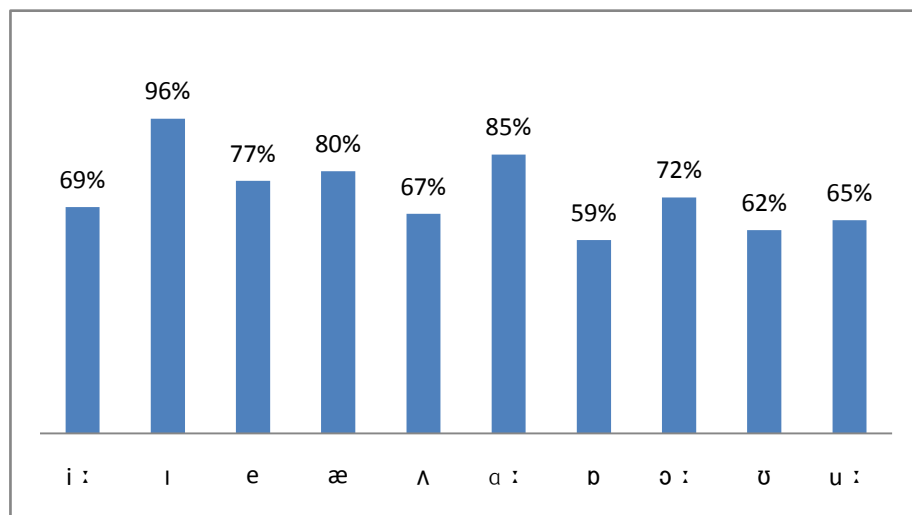

Figure 4.25: Overall Percentage of Correct Perception

4.4.1 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 4.5. The data suggests that there are no huge differences between genders for each experiment, though the individual performance varies. The best performance is from male respondent 4, whose mean correct perception is 88%, whilst the lowest percentage is from male respondent 10 (59%). It is interesting to note, after examining the data collected in "Leaner Profile", that male respondent 4 answered "very important" to the question concerning people's attitude towards the learning of knowledge of English pronunciation, though his average daily use of the English language (30%) is a bit below the average of all listeners' (34%) (cf. 3.1); whilst, the male respondent 10 thought it was not really necessary to learn English pronunciation, and he did not score high in the average usage of English (15%) either. This may count for their corresponding performances in perceiving the Arabic-accented English being evaluated.

Table 4.5

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

Table 4.5, continued

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.

4.4.2 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.

4.4.3 Comparison with Previous Findings on Arabic-accented English

As mentioned in 4.1, Munro (1993) in studies of Arabic speakers of English and Hubais (2009) 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 (2009) as mentioned in 4.1. 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 4.24, the vowel /ɒ/ is among the worst perceived vowels at a rate of 59%.

Munro (1993) and Hubais (2009) also investigated Arabic-accented English in terms of length and quality contrasts within vowel pairs. They found that not only the Arabic speakers of English distinguish between the /iː/ and /ɪ/ pair, they also tend to "exaggerate length contrast". As depicted in Figure 4.24, even the speakers of Malaysian English have difficulties differentiating the lengths of vowel pairs (cf. 2.3.2), they are still able to distinguish /iː/ and /ɪ/ in general.

Similar findings have been reported on /ʊ/ and /uː/, as length is contrasted between them (Hubais, 2009). However, it is surprising to see that the Malay listeners' performance on this pair of vowels is not quite satisfactory (Figure 4.24). 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 the Malay listeners have difficulties in perceiving these two vowels. This may support Hubais' statement (2009), that Omani speakers of English face difficulties in pronouncing the vowel pair /ɒ/ and /ɔː/.

4.5 Summary

The data extracted from the results of the three experiments suggest that the Malay speakers of English can understand the vowel monophthongs produced by the Omani speaker in general, though the individual performance on each vowel varies. And there is no obvious gender difference observed.