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The Negative Influence of the Arabic Vowel Sounds System on the English One

a case study of the students in a private language institute in Damascus city

A dissertation submitted in partial fulfillment of the requirements for the Master Degree in Applied Linguistics

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2014-2015

Dedication

To my beloved family,

My father Noureddin and my mother Dounia

My brothers Nawras and Najeeb

My uncle Salman, Manar and little Sama

Thank you for your love and support.

Acknowledgments

I would like to express my gratitude to my supervisor Dr. Mounawar Alsayed for all her support, patience and all her valuable and rich comments. She has always been a source of optimism and hope for me each time we met in spite of all the difficult circumstances.

A very special thank-you goes to all the students who participated in this study.

A very big thank-you goes to my best friends; Samiha Shalati, Nouha Husain and Rami Abu Zarad for their love, support and all the sad and happy moments we have shared together.

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Abstract

This study highlights the errors that may be made by Syrian learners in pronouncing the English vowel sounds as a result of the negative impact of their mother tongue, Arabic.

A thorough explanation of the articulation process and the articulation organs is given, and this explanation shows the similarities between English and Arabic. An adequate description of both English and Arabic vowel sounds is given in order to compare and contrast the sound systems of the two languages. Referring to the differences between English and Arabic and depending on the predictive version of Contrastive Analysis Hypothesis, which depends mainly on the differences between the target language and the native language to predict learners' errors, it seems possible to make predictions or postulate hypotheses about reasons leading to the occurrence of Syrian learners' pronunciation errors. The research starts with the following hypotheses: Hypothesis 1 the differences between English and Arabic vowel sounds could cause difficulties in pronouncing the new vowels; hypothesis 2 the non-correspondence between spelling and pronunciation in English could cause problems for learners since they may rely on spelling to help them pronounce new words.

This study deals with these hypotheses and answers questions about Syrian learners' ability to pronounce English vowel sounds. The subjects of the study are Syrians learning English at a private language institute at five different linguistic levels. A list of nonsense words is designed so that each word represents an English vowel sound. The data is collected by asking the participants to record these words and it is analysed later by using Praat. The formant frequencies for the pronounced vowels are

measured and compared with standard English vowel formants. This is done in order to study the errors made with English vowels at each level and the impact of Arabic on pronouncing them. Data Analysis shows that at all the levels diphthongs and triphthongs cause more errors than monophthongs, which supports our first hypothesis. It also shows that learners depend on orthography to pronounce the nonsense words used. Nevertheless, depending on orthography helps learners in pronouncing the words, which refutes our second hypothesis. Suggestions for further studies and some pronunciation teaching activities are referred to in order to draw teachers' attention to the importance of teaching pronunciation.

Chapter 1: Identification of the Research

It has always been said to *err is human*; nonetheless, we -as language teachers- know that *to err you must be language learners* whether learners of your first native language or learners of second or foreign languages. Acquiring or learning a language has never been an easy task neither for native speakers nor for foreign learners. Native children make many errors until they acquire their language, and native adults may make spoken or written mistakes or errors out of carelessness, tiredness or other factors. So one may ask, if learning your own language can cause you too many difficulties, what about learning other tongues? And there is only one answer to this question; errors will occur and pose challenges for learners in their attempt to learn or master the target language. All language learners make different types of errors or mistakes throughout their learning process, and this displays the inevitability of errors.

During the process of learning a foreign language, learners may make many errors in various linguistic areas; syntax, morphology, phonology, etc. Arab and Syrian learners of a foreign language are no exception. They have difficulties in almost all the linguistic areas; nevertheless, the one and only feature this study focuses on is phonology. Most foreign language learners have difficulties with pronunciation when it comes to learning and speaking a foreign language (Al-Saidat, n.d.). Phonology which is "the study of the sound system of a language or of languages in general" (Collins Dictionary) is one of the most important and essential linguistic areas in learning a language due to the important role pronunciation plays in communication. Replacing a sound with another can cause embarrassment for the speaker, difficulties for the receiver or change the meaning of the message delivered altogether; and

with Syrian learners, the errors are not only limited to pronouncing individual sounds but they also affect their whole pronunciation (Awad, 2010).

Pronunciation errors have been investigated by many researchers with the purpose of revealing why they may happen, and various factors were realized as reasons of difficulties in learning pronunciation; nevertheless, the one reason most related to our study is mother tongue or native language influence. According to Contrastive Analysis (CA) Hypothesis, the theoretical background of the study, the reason for learners' errors is the divergence between the learners' native language (NL) and the target language (TL). Learners of foreign languages, influenced by their native language, create target language knowledge connected with their first language; therefore, they tend to transfer their native linguistic features to the target language; and if the transferred feature is not similar or not found in the target language, errors occur. This transfer of different linguistic features is called interference (Al-Saidat, n.d.). In the case of phonology and pronunciation, the sounds of the native language are transferred to the learned language in a way that cannot be ignored.

In this research, the effect of Arabic on BBC English pronunciation is studied in two areas; the different phonological systems and the differences in orthography. As for the phonological system of the two languages, especially the vowel sounds; the English system is more complicated than the Arabic system in relation to vowels, with twenty-five vowel sounds contrasted with six Modern Standard Arabic sounds. Some of the Arabic sounds are similar to the English ones, which could make pronouncing them correctly an easier task. Unlike them are the

different sounds whose pronunciation could cause difficulties for the students due to their unfamiliarity. In this case, Arab learners rely on their native phonological systems to fill in the gap caused by their lack of knowledge of English phonological system; and as a result, mispronunciation of the different sounds is likely to occur.

Errors in pronouncing English vowel sounds by Syrian learners can be traced back to Arabic transparent orthography. In Arabic, words are pronounced the same way they are written. For example, the word (door) in Arabic is written as (باب) and pronounced /ba:b/ which means there is correspondence between spelling and pronunciation; each grapheme presents a phoneme. When trying to pronounce new and unfamiliar English words, Arabs tend to apply the rules of their language. Thus a word like (sign) may be pronounced with a /**g**/ sound because in Arabic every written letter is pronounced. This kind of negative influence of Arabic will lead to learners' inability to recognize the sounds, thus mispronouncing them. This area is also focused on in this study in order to figure out how much it affects the pronunciation of English vowel sounds at various learning levels. In the next chapter, a thorough look into the Syrian context will be given in order to clarify the factors affecting learning English, in general, and pronunciation, in particular.

1.1. Background of the Study

This study was conducted in Syria, an Arabic-speaking country, where people interact with one another using several dialects of Arabic varying according to the geographical area. These dialects are all varieties of Standard Arabic resulting from influences of other languages. Damascus, the city where the study was applied, is a multidialectical community

where various dialects are spoken. In addition to the varieties of Arabic which Syrians use in their daily life, Modern Standard Arabic which is the modern counterpart of Classical Arabic is considered the official language of the country especially in academia and the media. In this study, vowel sound system of MSA and dialectical Arabic were focused on. Pure vowels of MSA, their allophones and some possible dialectical combinations of sounds were studied. More details about these vowels are given later in this paper.

Being a foreign language, English is not usually heard in the Syrian streets. It is restricted to the classroom or some work environments. The main source for learning it is language courses either at schools, as a part of the studied curricula, or at private language institutes. The Syrian Ministry of Education has recognized the importance of English as an international language since "it has become the language of diplomacy, trade, communication, technology and business," and has recognized the fact that learning it gives more opportunities for the person in today's world (Al-Saidat, n.d., p. 121). Therefore, in order to guarantee the best teaching results, the ministry adopted more communicative curricula for teaching English at schools. It also started to teach it from kindergarten instead of starting to teach it at the fifth grade as was the case for so many years. Nevertheless, results are not up to the required standard despite the new measures, and many difficulties still face the process of teaching and learning English. Some of these problems are related to our public schools and their incapacity of effectively adopting the new curricula. The large number of students at each class and the limited time for teaching sessions (forty-five minutes each) makes it difficult for teachers to do conversation or speaking exercises. Many of the new books are *supposed* to be provided with tapes or CDs to help learners become

familiar with native-like speeches or conversations; however, learners do not get them. Lack of technologies at schools is another problem; even if tapes or CDs are available for teachers, they will be of no significance since public schools are not provided with CD players.

All the above reasons force learners who are interested in learning English in a better way to turn to private language institutes. Conditions here are more encouraging for both teachers and learners. Less number of learners at each class, longer sessions, available technologies, more time granted for listening and speaking exercises are all examples of a better context for learning languages. In addition to the fact that language learners have the opportunity to participate more in conversation or speaking activities in order to exercise their own linguistic competence; they can produce not only receive. Nonetheless, it is unlikely that learners will stop making errors simply because errors are considered an inevitable part of the learning process.

As can be noticed, Syrian learners of English are exposed to it only during classes. Most of them deal with English as a part of the curriculum which they need to study in order to pass the exams without paying attention to its importance as an international language needed and heavily used nowadays. Others who are more interested in learning English can perform that through taking language courses, watching movies and English shows, making use of technology spread by depending on electronic dictionaries to help them pronounce words correctly or depending on language teaching software in addition to their classes (Awad, 2010).

Regardless of the sources learners of English may rely on to improve their learning of English, one should not think practicing it in

this context is a piece of cake simply because the best way to practice any language is by using it daily and speaking it in different situations and occasions. Through conversation, learners listen to other speakers and are encouraged to talk to keep the conversation going. By listening to others, learners receive input. Input is defined as "the language that the learner receives from those who communicate with him," and produce output, "the language that the learner himself produces" (Johnson, 2001, p. 78). The more learners receive, the more they produce; and this leads to "interaction" which guarantees better acquisition of the target language (Johnson, 2001, p. 95). This shows the significance of conversation or interaction which is limited in our context to interaction with other learners or sometimes only the teacher. This again can be considered as one factor in negatively affecting acquisition since other learners and the teacher are Syrians, non-native speakers of English. Thus, their output, which is the learners' input and source of information, can include many errors or mistakes, and this influences their language learning negatively. The erroneous output of the teachers can be the only input for the learners thus affecting the learning of pronunciation (Awad, 2010).

The role teachers play in influencing learners' learning is not only restricted to their incorrect output. Arabic teachers of English do not pay much attention to pronunciation, either because of their lack of "adequate phonetic training" or due to lack of interest in speaking and pronunciation material in curricula. Grammar and vocabulary are the most -if not the only- language features focused on during class time and the only ones graded in the exam which makes learners pay more attention to them than pronunciation or speaking skills (Awad, 2010, p. 1).

Other factors related to the learners themselves affect learning pronunciation. Age of the learners may affect their ability to acquire or learn a native-like pronunciation. Motivation also plays an important role. Some learners may not be interested in pronunciation or in communication so they wouldn't pay much attention to this linguistic feature. Introvert learners may have more difficulties in acquiring pronunciation since they are shy and may not interact with others.

Many factors related to the context, teachers and learners can influence acquiring or learning the pronunciation of a foreign language. These factors are not considered in this study. The main focus is on the role the phonological system of the native language, Arabic, plays in negatively influencing Syrian learners' pronunciation of English vowel sounds. Two areas are contrasted between the systems of the two languages; different vowel sounds and different levels of grapheme-phoneme correspondence. The next chapters will be devoted to explain the purpose, the rationale and the scientific background of the study, which is the Contrastive Analysis Hypothesis.

1.2. Rationale and Aims of the Study

English and Arabic differ in many areas; syntax, semantics, phonology, etc. Due to these differences, Arab learners of English face many difficulties in learning English and acquiring or learning the correct pronunciation of the English sounds. Many studies were done on the differences between the two languages and the difficulties speakers of one language face when learning the other. Regardless of the fact that "good pronunciation is the foundation of effective spoken communication," none of the researchers had addressed this critical

problem before (Awad, 2010, p. 6). This directs our attention to this area and the difficulties it causes for Arabic learners of English. But why is the focus of this study on vowel sounds? The answer is very simple. In English there are five vowel letters in the alphabet (a, e, i, o & u) which make up to twenty-five vowel sounds in contrast with three Arabic vowel letters (أ، و، ي) which make six MSA vowel sounds. Almost all English vowel sounds are new to Arab learners, and relying on CAH, they will definitely cause difficulties and result in mispronunciation of the vowel sounds.

So, the negligence of this area by linguists encourages us to study and understand more about it. Moreover, knowing the reasons for errors in pronouncing English vowel sounds will make finding out solutions easier since the more one knows about the causes of a problem, the easier one can find effective solutions for it. This study also aims at revealing how serious and negative the effect of Arabic vowels on English vowels' pronunciation is and drawing teachers' attention to the importance of understanding the two languages and their similarities and differences and how to make use of this knowledge in their classrooms. It provides English language teachers with an explanation of the errors that their Syrian learners, negatively influenced by their native language, may make in relation to vowel sounds' pronunciation. Therefore, it can be considered a solid theoretical background, which teachers can rely on when dealing with errors of their students and help them use or even invent new ways to teach phonology or to make acquisition of pronunciation easier. In addition, this study can be the starting point for studies to be done by other researchers aiming at understanding other reasons for learners' pronunciation errors and creating new teaching methods to deal with pronunciation difficulties.

1.3. Statement of the Problem

Syrian learners of English, just like other learners of foreign languages, do face many difficulties during the learning process due to the various differences/divergences between their native language, the Arabic language, and the English language. These difficulties are demonstrated by students making many errors in various linguistic areas. Phonology, a linguistic domain which studies sounds of languages and how they are produced, is one of the linguistic fields most affected by the native language. English vowel sounds are exposed to the negative influence of the native language, which causes many difficulties and errors leading sometimes to serious misunderstanding.

This study aims at answering these questions: How negative can the influence of Arabic language, as a native language, be on the pronunciation of English vowel sounds? Is it easier for Syrian learners to pronounce the similar vowels than the different ones which are supposed to cause difficulties for the learners as the Contrastive Analysis Hypothesis being the theoretical background of the study suggests? Do they tend to pronounce and read out every grapheme of the written words? Do Learners' various linguistic levels affect their pronunciation? For example, are learners at the elementary level more influenced by their native language than learners at higher levels? All these points are studied and discussed in details with the aim of proving or refuting them.

1.4. Research Hypotheses and Questions

Depending on the strong version of Contrastive Analysis Hypothesis, the differences between English and Arabic vowel systems, which will be

discussed in details below, would cause many difficulties for Syrian learners of English. *Two hypotheses* were formed accordingly:

1. New English vowels would cause difficulties for Syrian learners. Diphthongs and triphthongs are expected to cause more difficulties than pure vowels or monophthongs.
2. Since Arab speakers rely much on spelling to help them read or pronounce Arabic words, they may tend to rely on spelling to help them pronounce new English words. This will cause many difficulties for Syrian learners since there is no 100% correspondence between English spelling and pronunciation.

In order to confirm or refute the above-mentioned hypotheses, the following research questions are addressed:

1. Do Syrian learners make more errors with English diphthongs and triphthongs than monophthongs?
2. Is there a relation between the difficulties in pronouncing new vowel sounds and the learners' levels? For instance, do elementary learners make errors in pronouncing new vowel sounds more than upper-intermediate learners?
3. Is Syrian learners' tendency to depend on spelling in pronouncing English words affected by their level? Do learners at the lower levels depend on orthography more than learners at the higher levels?
4. How far does the inconsistency between English orthography and pronunciation impede correct pronunciation?

1.5. Operational Definitions

Here are some of the most important terms used in this study and understanding them is the starting point to understanding the study.

Diphthong: a vowel sound, occupying a single syllable, during the articulation of which the tongue moves from one position to another, causing a continual change in vowel quality.

Interlingual error: it's a type of error that results from interference of the mother tongue.

Intralingual error: it's an error that reflects the general characteristics of rule learning, such as faulty generalization, incomplete application of rules and ignorance of rule restrictions.

Interlanguage: it's the second/foreign language learner's system which goes through intermediate stages between the L1 and L2.

Monophthong: a simple or pure vowel.

Triphthong: a composite vowel sound during the articulation of which the vocal organs move from one position through a second, ending in a third.

Chapter 2: Literature Review

2.1. Contrastive Analysis Hypothesis

Odlin (1989) said commenting on native language influence on second language pronunciation "there is no little doubt that native language phonetics and phonology are powerful influences on second language pronunciation" (as cited in Al-Saidat, n.d., p. 123). The same can be said about native language and the inevitable influence of its phonology on foreign language pronunciation.

The linguistic hypothesis, which explains the influence of the native language on the target language, whether negative or positive, is Contrastive Analysis Hypothesis abbreviated as CAH. Contrastive Analysis Hypothesis has its roots within Behaviorism and its concepts about language learning and errors. Behaviorists elucidate all learning in terms of conditioning and habit formation; a language is learned by "acquiring a set of […] habits" (Williams & Burden, 1997, pp. 8, 10) of which the old affect learning the new. This is known in psychology as the *transfer theory*. Transfer has two types, positive and negative. Positive transfer takes place when similar aspects are shared between the two habits and learning the new habit will be easier. Nevertheless, when the two habits have different aspects, learning will be more difficult and here negative transfer or interference occurs (Johnson, 2001).

"Perhaps the most stubborn issue that refuses to go away in second language learning is the influence of the first language on the acquisition of a new language" (Awad, 2010, p. 12). Many linguists have tried to explain language learning and language errors in terms of CAH. In his studies, Robert Lado (1957) was interested in understanding why some

linguistic aspects are easier for learners and others are not. He noticed that “in the comparison between native and foreign language lies the key to ease all difficulties in foreign language learning” (as cited in Maicusi, T., Maicusi, P., & Lopez, 2000, p. 169) and that "Individuals tend to transfer the forms and meanings and the distribution of forms and meanings of their native language and culture to the foreign language and culture" (as cited in Asma, 2010, p. 10). From these words, it is understood that native language of learners of a new language will have influence on the new learned language. This happens simply because of learners’ lack of knowledge of the target language (TL), so they tend to depend on their native language to fill in the gap. If the lacked linguistic area is different from the native language, errors will occur. These errors are known as interlingual errors as they are the result of both native language interference and target language linguistic input (Vergun, 2006).

Robert Lado claimed that the grammatical structures of the NL transfer to the TL either making learning easier if these structures are similar or causing errors if they are different (Bada, 2001). In addition to grammar, other linguistic areas do actually experience transfer such as phonology. When learning an FL, learners encounter both similar and different foreign sound patterns from their NL. On the one hand, foreign learners may mispronounce different sounds since “no comparable sound exists in the phonemic inventory of their native language” (Flege & Port, 1981, p. 125), thus they tend to rely on their NL and apply the rules they are familiar with. This technique is known as “negative transfer” or “interference,” and it results in mispronunciation and foreign accents (Awad, 2010, p. 12). On the other hand, learners of a foreign language will have no problem in correctly pronouncing similar sounds of the foreign language. Thus, learning similar sounds is easier than learning the

ones absent from the learners' NL (Flege & Port, 1981). Therefore and according to CAH, NL of the learners plays the main role in making the learning process difficult or easy depending on the differences between the NL and the TL. Nevertheless, CAH has two versions according to Wardhaugh (1974); the CA strong or predictive version "a priori"; (known to be true independently of or in advance of experience of the subject matter; requiring no evidence for its validation or support) and the CA weak or explanatory version "a posteriori"; (derived from or requiring evidence for its validation or support; empirical; open to revision) (Collins Dictionary) (Asma, 2010, p.10).

2.1.1. The Strong Version of Contrastive Analysis Hypothesis

Also known as the predictive version, the strong CA version -called so by Wardhaugh (1974)- claimed that by comparing the linguistic structures of the native language and the target language and recognizing their differences, learners' errors can be predicted. According to the CA strong version, native or first language interference is considered the only and sole reason of foreign language learners' errors. In its early days, the strong version even claimed that authors of foreign language teaching courses should depend on the differences between the two languages in developing these courses or programs. Robert Lado (1957), the pioneer of CAH, claimed that teachers of foreign languages should study the differences between their learners' NL and the language they teach in order to know more about the learning problems and predict them. According to him, by making such comparisons, teachers can teach the points which cause difficulties for their learners in a better way (Johnson, 2001). Fries who supported the strong version of CA as well put it in his own words "the most effective [teaching] materials are those that are

based upon a scientific description of the language to be learned, are fully compared with parallel description of the native language of the learner" (Kopecná, 2008, p. 5). Moreover, learners should focus on the differences between the two languages to learn them, as they will facilitate learning (Asma, 2010). The strong version of CAH received many criticisms due to its focus on the predictability of errors which made it "unrealistic and impracticable" to some linguists like Wardhaugh (Kopecná, 2008, p. 5).

2.1.2. Contrastive Analysis Criticisms

After being the only and the most effective hypothesis dealing with and analyzing foreign and second language learners' errors, time came when CA is extremely criticized for its concepts.

CA Hypothesis is criticized for focusing on the differences between the native language and the target language and considering them the source of difficulty and errors for learners. Corder (1973) found through observation that there is not necessarily a connection between difference and difficulty and so it is really hard to predict which linguistic areas are difficult for learners and which are not. Corder (1973) also criticized the CA strong version for asking learners to focus on the differences between the languages as a way for learning and trying to learn the similarities between the two languages too (Asma, 2010). Thus, CA is criticized for focusing only on interlingual errors; the errors, which occur due to native language interference, while ignoring other factors. Richards (1971) was interested in the errors which occur out of the language's structures or the way it is taught. He called these non-contrastive errors *intralingual* or *developmental* errors. Richards defined four main types of intralingual errors which are; over-generalization, ignorance of rule restrictions,

incomplete application of rules and false concepts hypothesized. All of these errors have nothing to do with NL of the learners. Rather they are related to the TL itself.

Other linguists also underestimated the role of transfer in language learning. Dulay and Burt, for example, argued in their studies against native language transfer. Dulay, Burt and Krashen (1982) presented through their studies few points against Contrastive Analysis. Some of these points are;

1. Not all the grammatical errors made by children or adults are the result of native language interference.
2. Some grammatical errors made by learners should not occur if "positive transfer" were taking place.
3. Native language interference occurs more with phonological features than grammatical ones; nevertheless, not all phonological errors are traceable to this interference but only a small part of them (Bada, 2001).

These points and the ones mentioned before refer to many weak points in Contrastive Analysis Hypothesis and diminish its power as the most dominant hypothesis in error analysis field.

2.1.3. The Weak Version of Contrastive Analysis Hypothesis

The weak version of CAH is offered by Wardhaugh as a reaction to the unrealistic strong version. This version of CAH explains the errors and their reasons rather than predicts them; that is why it is also known as the explanatory version. The weak version of CAH is considered more reasonable than the predictive one; therefore, it says that some of the

learners' errors, not all of them, can be explained in terms of native language interference. In this sense, the CA weak version believes that foreign learners' errors occur out of different sources not only native language influence; however, it analyses the interlingual errors only and ignores others.

In the above four chapters, CAH was discussed in details along with its versions and criticisms; regardless of which, native language interference is still considered one of the most effective factors in causing foreign learners' errors. This could be mostly recognized by teachers, especially those who are native speakers of their learners' native language.

2.1.4 The Effect of Arabic on English Vowel Sounds Pronunciation - Studies based on CAH

As mentioned above, only few studies tackled the interference of Arabic language as a native language on pronunciation of English vowel sounds. In this chapter, few linguistic studies that show the difficulties Arab learners face when pronouncing English vowel sounds are referred to.

Kharma and Hajjaj (1989) studied the difficulties which Arab learners of English face early in their learning process and identified two areas of difficulty in relation to vowel sounds. Diphthongs cause many difficulties for Arab learners simply because MSA (Modern Standard Arabic) does not include diphthongs. The difficulty is apparent in the shape of replacing the diphthongs with other sounds, for example,

1. /**eə**/ is replaced by /**eɪ**/,
2. /**ʊə**/ by /**u:**/,
3. /**ɪə**/ by /**ɪ:**/ and
4. /**əʊ**/ by /**ɔ:**/.

In addition, Arab learners have difficulties when it comes to distinguishing certain pairs of vowels. For example, they have problems in distinguishing the vowel sounds;

1. /**ɪ/** and **/e/** as in (sit) and (set),
2. /**ʌ/** and **/ɒ/** as in (luck) and (lock) and
3. /**əʊ**/ and /**ɔ:**/ as in (coat) and (caught) (Al-Saidat, n.d.).

Another study was carried out by two researchers: Abduallah Hassan Al Saqqaf and Maruthi Kumari Vaddapalli. It was entitled *Teaching English Vowels to Arab Students: A Search for a Model and Pedagogical Implications*. They tried to provide a model for teaching English vowels to Arabic students by contrasting the vowel systems of Arabic and English. The participants in the study were eight Arabic speakers of English from different countries in the Middle East. The effect of their dialects was ignored. The only effect considered was that of Modern Standard Arabic. Moreover, the linguistic level or levels of the participants were not referred to in the study. The data was collected by recording the pronunciation of the participants for a list of common words representing the monophthongs and diphthongs of English. The pronunciation of the participants was recorded after they were given some time to go through the list of the words. The researchers then transcribed their collected data and contrasted it with English vowel sounds. Many participants showed difficulty in distinguishing the two English vowel sounds /**æ/** and **/ɑ:/** in minimal pairs like (ant) and (aunt) though both vowels exist in Arabic /**æ/** as a vowel and [**ɑ:]** as an allophone of the vowel sound **/a/,** as the following examples illustrate;

1. /**æ**/ in /s**æ**m/ (poisonous)
2. [**ɑ:**] in /s**ɑ:**m/ (he fasted)

Similarly, they had difficulties in distinguishing /**ɪ**/ and /**e**/ in (sit) and (set) though again both vowels exist in Arabic as the vowel sound /**i**/ (similar to /**ɪ**/ sound) and an allophone [**e**] as in;

1. /**ɪ**/ in /b**ɪ**nt/ (girl)
2. [**e**] in /q**e**f/ (stand up!)

These results illustrate that, even though the four English vowel sounds exist as either main vowels or allophones of Arabic vowel sounds, learners were not able to pronounce them correctly simply because of their Arabic "restricted phonetic environment" and their lack of knowledge of the similarities between the two phonological systems.

Data analysis also showed that all the participants had no difficulty in pronouncing the vowel /i:/ due to the fact that it is very close to the Arabic vowel /i:/. Some other errors made by the participants were explained by the researchers in terms of spelling negative effect on pronunciation. Pronouncing (stood) with /u:/ instead of /ʊ/ after (food) is one example of this effect. The majority of errors with diphthongs were by replacing them with monophthongs. (Al Saqqaf & Vaddapalli, 2012, pp. 36-37). As for errors that Arabic learners may make with English triphthongs, this study didn't refer to them. Other studies also dealt with errors with monophthongs and diphthongs ignoring triphthongs. Ezzeldin Ali's *Pronunciation problems: Acoustic analysis of the English vowels produced by Sudanese learners of English* is one of these studies.

In this study, the researcher tried to find out if pronunciation of vowels sounds is more difficult than consonants and consonant clusters to Sudanese learners of English. He also tried to understand the linguistic causes of pronunciation errors. Is it the difference between the NL of the learners and the TL? Or is it the insufficient knowledge of the English sound system on the part of EFL learners. In order to answer these

questions, among others related to errors with consonants and consonant clusters, he conducted a study at Gadarif University in Sudan. The participants were ten Sudanese speakers of English studying at the university to get a bachelor degree in English teaching. The students had a considerable level of English since they were semi-final learners. So, they were supposed to achieve better performance. The linguistic level of the participants was not clearly defined. The researcher collected data for his study by asking the participants to read a list of monosyllabic English words that represented all the target English vowels (monophthongs and diphthongs but not triphthongs). The participants showed a poor performance in pronouncing most of the pure vowels; nonetheless, /i:/ caused few errors. According to the researcher this happened due to the equivalence between Arabic /i:/ and English /i:/. Other errors occurred with /e/ which was mispronounced as /ɪ/ and /eɪ/ substituted by or reduced to /e/ due to lack of phonemic knowledge of the TL sound system. Generally, data analysis of this study proved that vowels were the most difficult for the participants to be pronounced. Moreover, NL interference, lack of TL phonemic knowledge and transfer of NL orthography were the main causes of errors according to the researcher (Ali, 2011).

Pronunciation errors of Sudanese learners of English were studied by another researcher, Hassan (2014) in his study *Pronunciation Problems: A Case Study of English Language Students at Sudan University of Science and Technology*. Errors of participants were explained according to him in terms of the inconsistency between spelling and pronunciation of English vowels. Participants, who were fifty students at their first year at College of Education, confused the different pronunciations of each of the vowels (Hassan, 2014). In the studies

mentioned, the negative effect of NL was considered the main reason for errors made by participants. The NL sound system considered was that of MSA and dialectical Arabic spoken by the participants. In the next study that was done in Jordan, the sound system of the dialect was totally ignored which affected the results of the study in one way or another.

Mohammed Al-Badawi and Jamal Salim focused in their study *The Perception of English Vowels by Arab EFL Learners: A Case Study of University Students at Zarqa University* on the perception of English vowels by learners of English at Zarqa University in Jordan. The participants, thirty-six Jordanian students at English Language and Literature and translation Department, were divided into experimental group and control group. The experimental group was provided with pronunciation classes through which the subjects were introduced to the vowel systems of Arabic and English. After the instruction stage, thirty different words were given to the subjects to record their pronunciation. The words were grouped into five groups contrasting certain vowels so the focus was on some vowels only: /ɪ, e, ɑː, ɜː, ʊ, ɔ and iː/ and two diphthongs /eɪ and ɪə/.

Data analysis showed that the vowels /i: and ɪ/ almost caused no problems to the subjects because they both exist in Arabic. The phoneme /e/ was generally replaced with /ɪ/. The researchers claimed this happened because /e/ has no equivalent in Arabic which is not true. /e/ exists in Arabic as an allophonic variant of the Arabic vowel /i/ (Al-Badawi & Salim, 2014). The subjects' unawareness of Arabic sound system is because of their teachers and the researcher's unawareness. The subjects were introduced to the sound systems of the two languages as mentioned before, yet the knowledge that they were provided with was not sufficient. This error on the part of the researchers affected the results.

These errors were attributed to the differences between the two languages when they should be attributed to the lack of or the insufficient knowledge of NL sound system.

The last study to be mentioned in this chapter is an important study, entitled *The Impact of English Orthography On Arab EFL learners' pronunciation of English*, conducted by Ashraf Awad (2010) to understand the effect of the inconsistency between graphemes and phonemes on pronunciation. The researcher observed his students while reading and noticed how much they relied on spelling when pronouncing unfamiliar words. Thus he was interested in studying this phenomenon, its reasons and its effect on pronunciation. The subjects of the study were twenty Palestinian students at secondary school who studied English for seven years, yet showed low-level proficiency in pronunciation.

The subjects were asked to read a set of forty-seven monosyllabic and multisyllabic words and a set of sentences. Most of the words used were familiar to the participants, while others were new to "provide evidence about how English pronunciation is problematic and challenging." Some of the words were "fully-transparent words, i.e. words with a one-to-one mapping between graphemes and phonemes," and the others were opaque with a little or no correspondence between graphemes and phonemes. This was done by the researcher to find out how positively or negatively these different types may affect pronunciation. Participants' pronunciation of these words was recorded and transcribed. Data analysis proved that regularly-spelled words facilitate pronunciation, while irregularly-spelled words hinder it.

Another important area was focused on in this study and that was the role the teachers paly in transferring some of their errors to their students. Ten teachers who teach the subjects of the study were

interviewed to check how much phonetically trained they were and how much knowledge they had in relation to the sound systems of the two languages. The results showed that the teachers themselves tend to rely on spelling when pronouncing new unfamiliar words (Awad, 2010). This would add a new reason of errors in this context since teachers' output is considered a trusted input source by the students. And this is why phonetic training for teachers is considered very important.

Now and after explaining the theoretical background of the study in details and giving examples of studies similar to ours, the focus in the next chapter will be on the mechanisms of articulation in both studied languages and how pronunciation happens. Later on, the two vowel sound systems will be explained along with similarities and differences and correspondence between spelling and pronunciation and its effect on recognizing and thus pronouncing the vowel sounds will be discussed.

2.2. Mechanisms of Articulation in English and Arabic

Languages of the world differ in many aspects, in their sound systems, consonants and vowels and in number of sounds. Nevertheless, they share one thing, which is the main factor in the pronunciation process, the air. Speech sounds can be produced by inhaled or exhaled air and "articulation happens when the airstream is interrupted, shaped, restricted and diverted" (Kelly, 2000, p. 12).

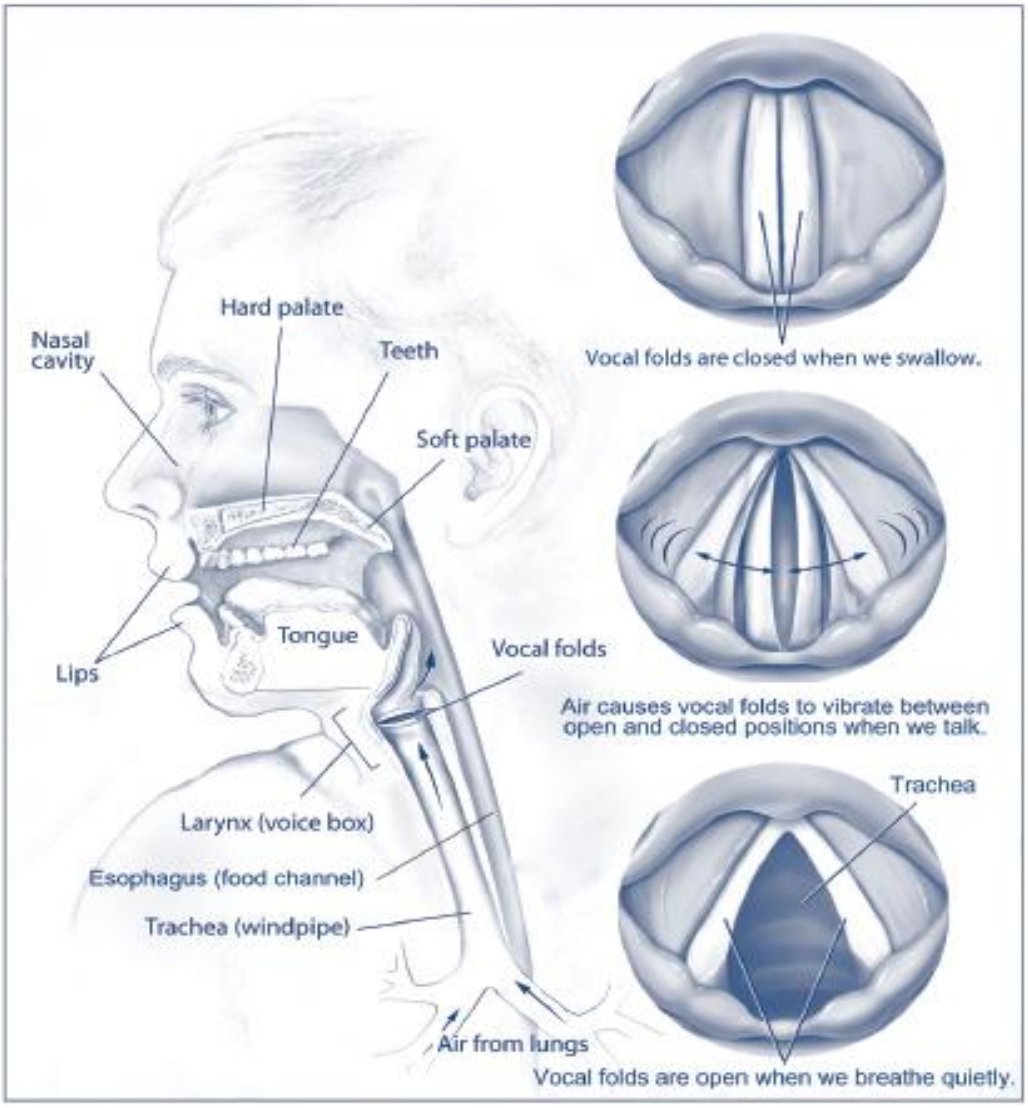
English and Arabic languages differ in the number of consonants and vowels, yet they share the same mechanisms of articulation. Both English and Arabic sounds are produced by exhaled air which flows from lungs out through different organs till it gets out of the speaker's mouth or nostrils. This air flow moving out of the lungs is known as *egressive*

pulmonic airstream, and speech sounds of most languages of the world are made with it (Roach, 2000). The process of producing sounds begins with it, the egressive pulmonic airstream.

During exhalation, muscles of the lungs push air out of them, and then it moves freely until it gets out of nostrils. It passes through the pharynx and up to either the mouth or the nasal cavity. Throughout this short passage, various modifications have effect on airflow creating different sounds. The tract which air passes through from above the larynx outside is called the *vocal tract*. The vocal tract "determines, in general, the phonetic quality of speech sounds" because it includes many organs which affect the airflow causing articulation; therefore, these organs are called the *articulators* (Clark & Yallop, 1990, p. 14). The articulators are different parts of the vocal tract, which primarily affect the airflow and produce speech sounds (Roach, 2000). Nevertheless, there are other parts of the body which also play an important role in pronunciation though less effective than the articulators. These parts are called *organs of speech* and they are defined as "all those parts of the human body which are concerned in various ways with the production of speech" like providing airflow for articulation (Clark & Yallop, 1990, p. 13). Articulators play a major role in defining the qualities of each speech sound like where and how it is articulated. *Organs of speech* is a wider term; all articulators are organs of speech, not vice versa. The next section talks about speech organs and articulators and the roles they play in producing speech sounds.

2.2.1. Organs of Speech and Articulators

Figure (1) Organs of Speech



The above figure shows most of the organs of speech and articulators involved in producing sounds. As one can see lungs are considered the starting point of the vocal tract since they provide the main energy source or factor in making speech sounds, namely egressive pulmonic airstream.

1) The lungs: They play the main role in the process of breathing as a part of the respiratory system since they take (O2) –the gas needed

for nutrition of the human body- out from the air inhaled. Oxygen is carried by the blood stream to be delivered to each and every part of the human body and then replaced by carbon dioxide (Co2) which is got rid of by body cells and carried back to the lungs. They clean the blood by drawing (Co2) out of it into the air exhaled, out of the human body. This process is the main function lungs perform as a part of the respiratory system. Nonetheless, they play another non-respiratory -yet not less important- function in the process of pronouncing speech sounds. The lungs provide air flow needed for creating vocal sounds. They could be compared to two balloons, made up of elastic tissue, which allow air in and out by stretching and constricting. The exhaled airflow is the main factor for producing speech sounds in both English and Arabic languages.

2) **The larynx:** Air pushed out of the lungs in the process of articulation passes through the larynx, which is also called the *voice box*. The larynx has this name because it includes the *vocal folds*, also known as the *vocal cords*, /æl hıbæl ælsæwtıyæh/ or /ælæwtær ælsæwtıyæh/ in Arabic (Al-Sa'aran, n.d.). The vocal folds play the main role in classifying speech sounds (Roach, 2000).

3) **The vocal folds** are "two thick flaps of muscle rather like a pair of lips." They are joined together at one side and open apart at the other side forming the *glottis*, /fʊthæt ælmızmær/ in Arabic (Anis, n.d.) between them. Thus, when the vocal folds are pressed together the glottis is closed, and when they are apart the glottis is open (Roach, 2000, p. 28). This movement of the vocal folds is of great importance since it helps pronounce various types of sounds.

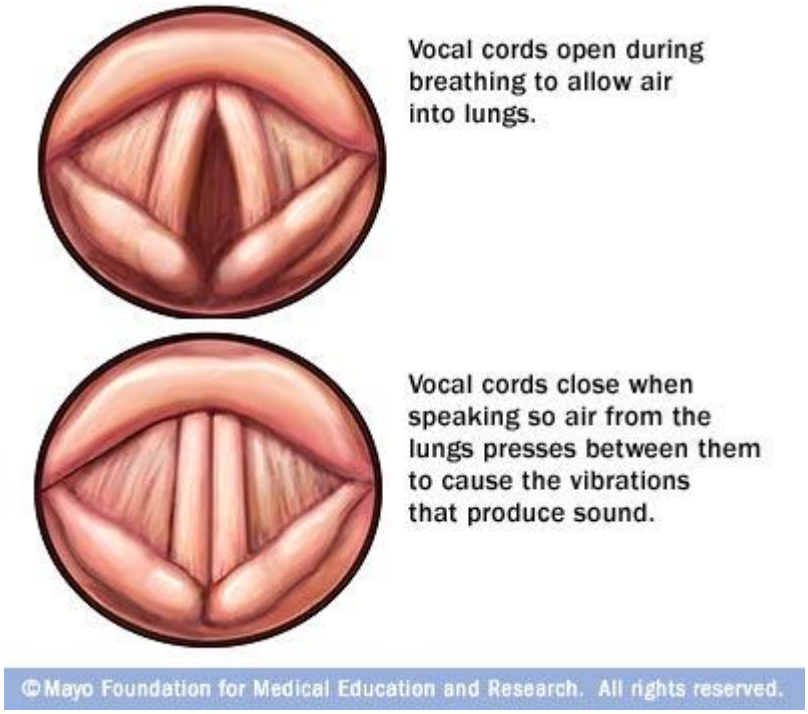
2.2.2. Voiceless vs. Voiced Sounds

Vocal folds can move in four different positions producing different classifications of sounds. Two positions are the most important for our study and they are;

a) The vocal folds are wide apart, so the glottis is open to let air pass freely through it without vibration. This happens when breathing or when producing voiceless sounds, /æswæt mæhmu:sæh/ (Anis, n.d.), e.g. /t/ and /f/ (as in ba**t**, **f**at).

b) "The edges of the vocal folds are touching each other or nearly touching" (Roach, 2000, p. 29). In such a case, the air flow pushes the vocal folds to pass, so they open and then close quickly after the release of air causing vibration. This process of vocal folds vibration is called *phonation* (Clark & Yallop, 1990) and the sounds produced are called voiced sounds, /æswæt mæʒhu:ræh/ (Anis, n.d.). Some consonants in English are voiced, e.g. /g/ and /v/ sounds (as in ba**g**, **v**an). On the other hand, all vowel sounds are voiced. The figure below shows the two positions of the vocal folds. "And the sound occurs when the air, rushing out of the lungs, enters the throat where the vocal cords are. If the vocal cords are close, the air pushes them causing vibration. If they are open, the air passes through them without vibration" (Al-Matlabi, 1984, p. 23).

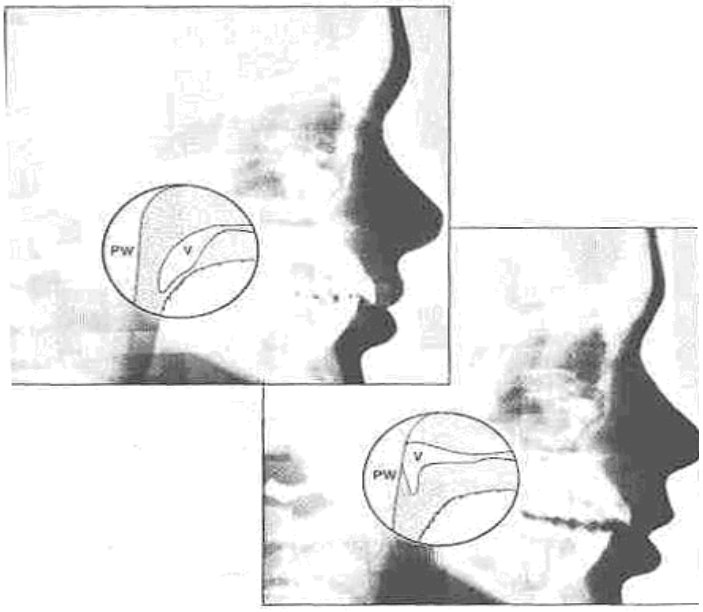
Figure (2) Positions of the Vocal Folds



4) **The pharynx** is a tube which begins above the larynx. It is considered the beginning of the vocal tract and ends into either the back of the mouth or the back of the nasal cavity (Roach, 2000).

5) **The velum or the soft palate /ælhænæk ælæjen/:** Some articulators move while others are steady, and the velum is one of the moving articulators. It normally allows air to flow through the nose and the mouth; nevertheless, it stops air from passing through the nose when producing *oral sounds* by raising up. When producing *nasal sounds* it lowers to block air from passing through the mouth, instead the air passes through the nostrils. While oral sounds are produced with airflow passing out through the mouth, nasal sounds are produced with air passing through the nostrils outside. The figure below shows the velum in its normal position (top) and the raised velum when pronouncing oral sounds (bottom). Sounds produced with the velum are called *velar* sounds.

Figure (3) Positions of the Velum

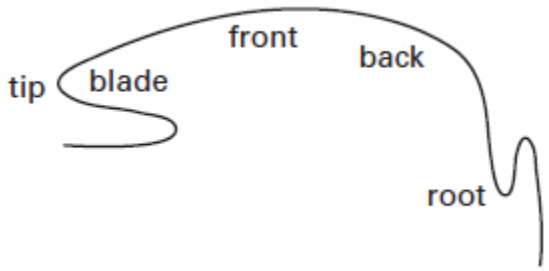


6) **The hard palate or the roof of the mouth /ælhænæk ælsælb/:** is a steady articulator, which does not move. Sounds produced with the hard palate involved are known as *palatal*.

7) **The alveolar ridge /æl-leϴæh/** is between the hard palate and the front top teeth, and just like the hard palate, it is a steady articulator. Sounds produced with it are called *alveolar*.

8) **The tongue** is one of the most important articulators since most of the sounds pronounced with the tongue touching other articulators because it can move into different places and take different shapes. The tongue is usually divided into different parts as the figure below shows. The parts are the *tip*, the *blade*, the *front*, the *back* and the *root*.

Figure (4) Sub-divisions of the Tongue

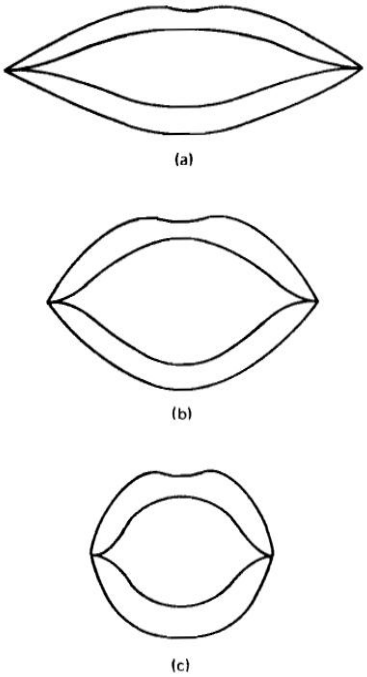


The tongue can move into different positions touching other articulators with these parts to produce different speech sounds. For example, the dental sound /ð/ (as in the word **th**at) is pronounced with the tip of the tongue touching the upper teeth and the velar sound /k/ (as in the word **c**at) is pronounced with the back of the tongue touching the velum. The tongue is a very essential articulator in pronunciation and it plays even a more important role when it comes to pronouncing and classifying vowel sounds as will be explained in the next sections.

9) **The upper and lower teeth,** as can be seen in figure (1), are immediately situated behind the lips. The *dental* sounds /Θ/ and /ð/ (as in **th**in and **th**ose) are the sounds produced with the tongue touching the upper teeth.

10) **The lips** can move, take various shapes and touch other articulators to make different sounds. When the lips are in contact with each other, they produce *bilabial* sounds like /m/ and /b/ (as in **m**outh, **b**ed). Moreover, when they touch the lower teeth, *labiodental* sounds (/f/ and /v/) are produced. The lips can have many shapes but the three main ones are the ones in the figure below;

Figure (5) Lips Positions



(a) *Spread*: with the corners of the lips moved away from each other, as for a smile.

(b) *Neutral*: where the lips are not noticeably rounded or spread.

(c) *Rounded*: where the corners of the lips are brought towards each other and the lips pushed forward" (Roach, 2000, p. 15).

These three shapes help to classify vowel sounds as will be described in the next section which gives a sufficient description of vowel sounds, the focus of the study, after describing the organs of speech involved in the process of producing speech sounds.

2.2.3. Classification of Vowel Sounds

In this part of the paper a full description of vowel sounds, their definition, how they are pronounced and classified will be given. The start will be with defining vowels /æswæt ælmæd/ or /ælılæl/ and

contrasting them with consonants /ælsæwæken/ (Omar, 1997). Again the talk here is about both languages, English and Arabic.

It is commonly known that vowel sounds are the sounds made with no obstruction to the airflow or the egressive pulmonic airstream when passing from the larynx to the lips (Roach, 2000). The only obstruction for vowel sounds is in the larynx itself as the vocal folds are closed and for the air to pass it pushes them apart causing vibration. As mentioned above, this is the case with all voiced sounds, vowels involved. Nonetheless, after this obstruction of the vocal folds, the air makes its way outside without any more stop from other articulators. This means that all vowels are the result of an unstoppable air flow but the question is, how could they be distinguished from one another?

In order to differentiate vowel sounds from each other, two articulators are concerned: the tongue and the lips. As described above, the tongue is a moving articulator which can move into various positions and touch the other articulators. When it comes to classifying vowel sounds, two points are dealt with. **The first point** is "the part of the tongue, between front and back, which is raised highest." **The second point** is "the vertical distance between the upper surface of the tongue and the palate," and according to it, vowels vary between *open* and *close* (Roach, 2000, p. 12). The same factors are used in differentiating Arabic vowels (Al-Matlabi, 1984).

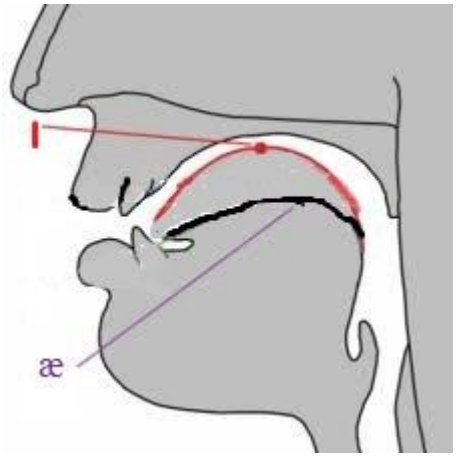
Here are two examples to clarify the two points mentioned and how they help distinguish vowels:

1) The vowel sound /ɪ/ (as in the words p**i**n, h**i**d) is described as a *retracted front*, *half-close close* vowel. This means that the highest

part of the tongue when pronouncing the vowel /ɪ/ is the front yet near central part of the tongue, and the distance between the surface of the tongue and the hard palate is small so the mouth is nearly closed.

2) The vowel sound /æ/ (as in f**a**t, m**a**n) is a *front, half-open open* vowel. The highest part of the tongue is its front and the mouth is almost fully open. The figure below illustrates the difference between /ɪ/ and /æ/.

Figure (6) Tongue Positions for ɪ and æ



This simple diagram was drawn to illustrate the differences between them.

Figure (7) The Differences between ɪ and æ

	Front vowels
Half-close close	ɪ
Half-open open	æ

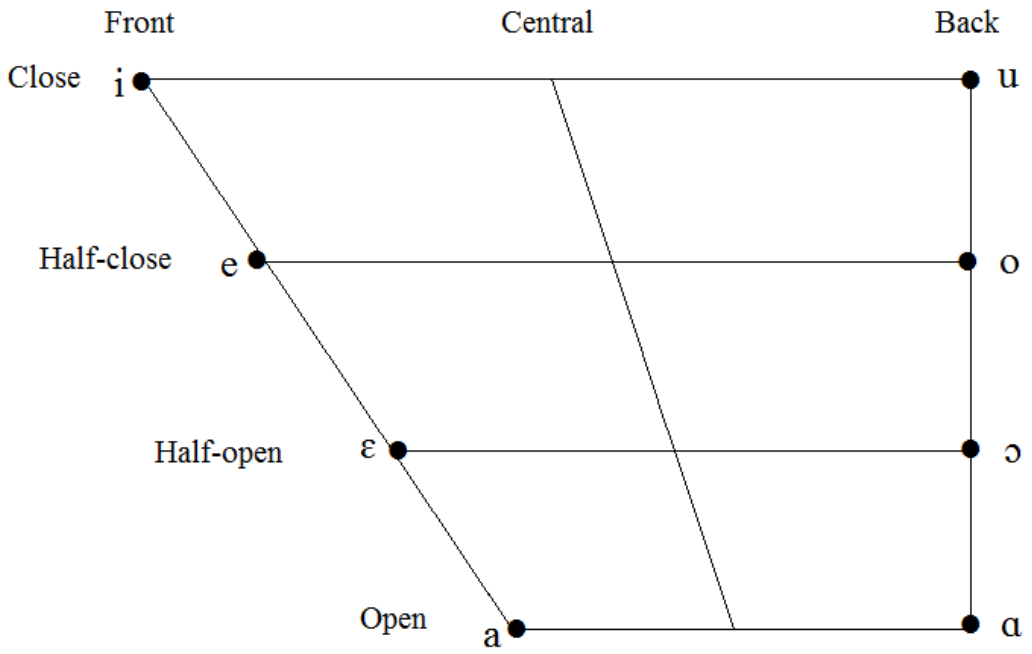
The two vowels are front vowels yet the distance between the tongue and the palate distinguishes them. Another factor makes them different; the lips position. As said before, the lips have three main positions or shapes; spread, neutral and rounded. The other minor shapes are all variations of these main ones. Back to our examples, the /ɪ/ vowel sound is pronounced with the lips *slightly spread* while the /æ/ sound is pronounced with the lips *neutrally open*. Other minor shapes will be mentioned later on when classifying English and Arabic vowels.

In this section, the two main articulators used in classifying vowel sounds namely the lips and the tongue were explained. As for the lips, it is their shape which matters. The other two factors are related to the tongue; the part of it raised highest and its vertical distance from the roof of the mouth. Depending on these two tongue-related factors; phoneticians, being in urgent need to classify vowel sounds of all languages in a very accurate way, developed the *cardinal vowels*. Meaning of the cardinal vowels, description of them and why they are referred to in this study will be described in the next section.

2.2.4. The Cardinal Vowels

In their attempt to understand and classify vowel sounds, phoneticians "developed a set of vowels, arranged in a close-open, front-back diagram" similar to the simple diagram drawn to show the differences between ɪ and æ. These vowels are not the vowels of any language, so learning them does not mean learning a language but rather learning about the "range of vowels" humans can produce and about describing and classifying vowels. Thus, the cardinal vowels are "a standard reference system" against which vowel sounds of the world languages can be compared and contrasted (Roach, 2000, p. 13). Figure (8) shows the main cardinal vowels in a simple diagram or a quadrilateral. In this quadrilateral; the terms front, central and back refer to the part of the tongue which is raised highest when a certain vowel is uttered. The other four terms; close, half-close, half-open and open refer to the distance between the surface of the tongue and the hard palate. As can be noticed, the vowels in this diagram are presented as extreme points. For instance, /i/ is fully close and fully front and /o/ is close-mid and fully back.

Figure (8) the Cardinal Vowels



The reason for mentioning the cardinal vowels is to use them as the starting point for describing English and Arabic vowels. English and Arabic vowel sounds will be discussed in the next two chapters in comparison with the cardinal vowels.

2.2.5. BBC English Vowel Sounds

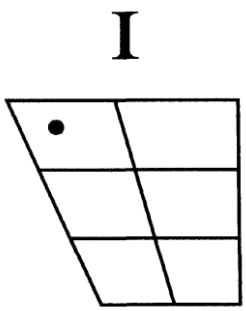
English has five vowel letters (a, e, i, o, u), yet it has **twenty-five** vowel sounds divided into: pure vowels or monophthongs, diphthongs and triphthongs. The start will be with examining short pure vowels (see the list of symbols used for presenting the English phonemes in the appendices section).

A. BBC English Monophthongs (Pure Vowels):

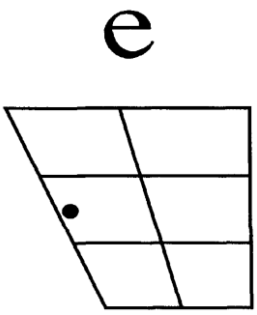
a. BBC English Short Monophthongs:

BBC English short monophthongs or pure vowels are seven in number, (ɪ, e, æ, ʌ, ɒ, ʊ, ə). The figure under each sound shows its position compared to that of similar cardinal vowels.

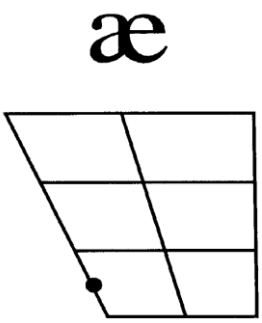
ɪ (as in bit, rid, fish) is a retracted front (compared to cardinal i), half-close close vowel. The lips are slightly spread.



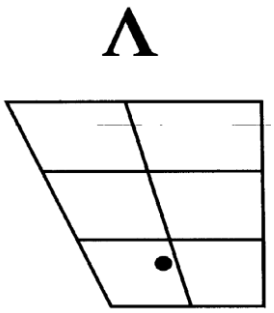
e (as in bet, red, flesh) is a fully front, half-close half-open vowel. The lips are neutrally spread.



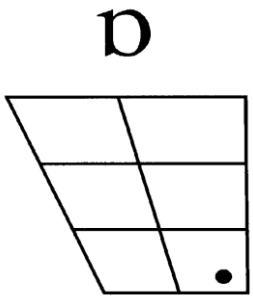
æ (as in bat, bad, flat) is a fully front, half-open open vowel. The lips are neutrally open.



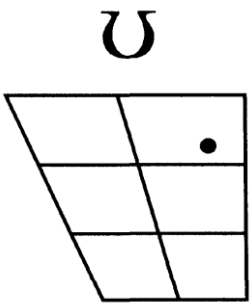
ʌ (as in but, nut, some) is a central, half-open open vowel. The lips are neutrally open.



ɒ (as in not, rod, cross). This vowel is not quite fully back, and between half-open and open in tongue height. The lips are slightly rounded.

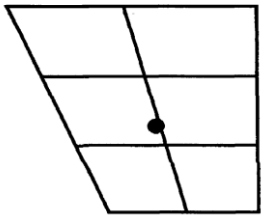


ʊ (as in put, pull, push) is an advanced back, half-close close vowel. The lips are loosely rounded.



ə (as in *a*bout, bett*er*, the weak form of than) is a central, half-close half-open vowel. The lip position is neutral. This vowel is called schwa.

ə

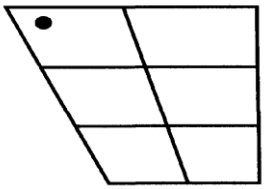


b. BBC English Long Monophthongs:

They are five in number; **iː**, **ɜː**, **ɑː**, **ɔː** and **uː**. The length of these vowels changes according to their context (the type of sound that follows them) and whether they are stressed or not.

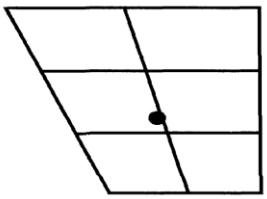
iː (as in *e*ve, clean, squ*ee*ze) is a nearly front, nearly close vowel. The lips are slightly spread.

iː

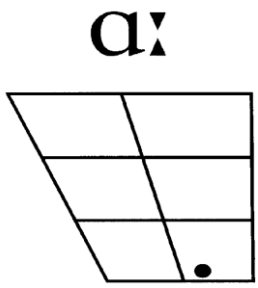


ɜː (as in bird, n*e*rve, third) is a central, half-close half-open vowel. The lips are neutral.

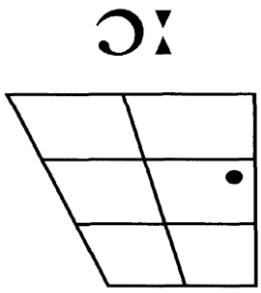
ɜː



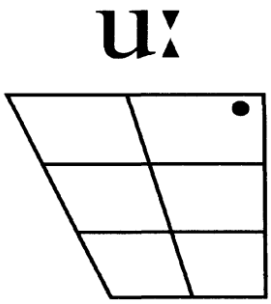
ɑː (as in ask, cart, palm). This vowel is advanced back and fully open. The lips are neutral.



ɔ: (as in saw, cord, store). This vowel is almost fully back, half-close half-open. The lips are fully rounded.

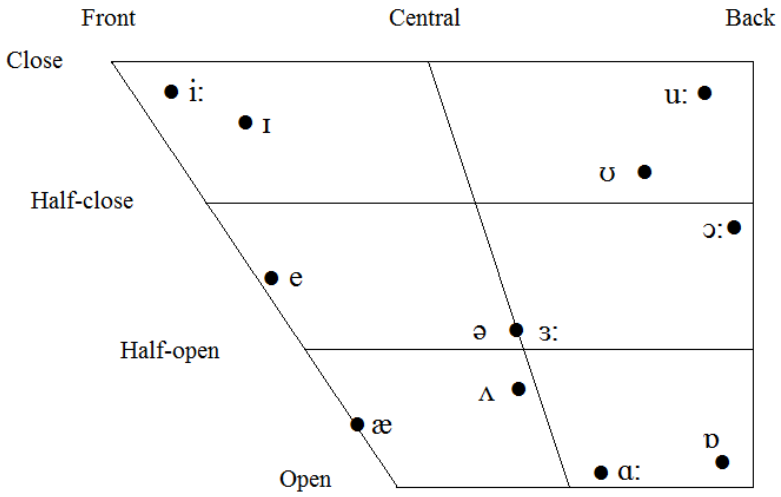


u: (as in tool, rule, grew) is a slightly advanced back, nearly close vowel. The lips are closely rounded.



The figure below shows a diagram which includes BBC English monophthongs or pure vowels both short and long;

Figure (9) BBC English Pure Vowels

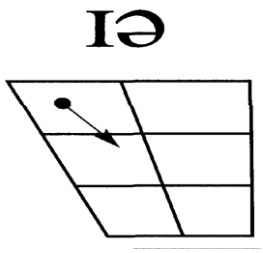


B. BBC English Diphthongs:

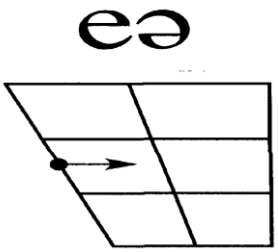
Diphthongs are defined as "sounds which consist of a movement or glide from one vowel to another" (Roach, 2000, p. 21). The first segment of the diphthong is known as the nucleus or the on glide, the second as the off glide. The on glide or the first element is more prominent, "longer and louder than the second" the off glide (Kelly, 2000, p. 42). BBC English diphthong vowels are **eight** in number and they are divided into *centring* and *closing* diphthongs.

a. **The centring diphthongs** glide towards and end in **ə** (schwa) and they are three sounds; **ɪə**, **eə**, **ʊə**.

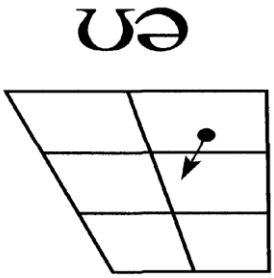
ɪə (as in hear, cheer, sph*e*re). The starting point is a little closer than **ɪ** in (bit, fish).



eə (as in air, c*a*re, th*e*re). The starting point is the same vowel sound as the **e** of (red, flesh).



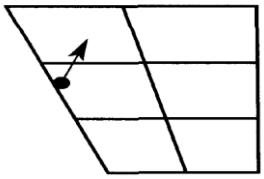
ʊə (as in man*ua*l, c*u*re, ann*ua*l). The starting point is slightly closer than **ʊ** in (put, push).



b. **The closing diphthongs** glide towards a closer vowel and they are classified into two groups. The vowel at which the glide ends determines to which group the diphthong belongs, either ***ɪ*** *group* or ***ʊ*** *group*. Three diphthongs glide towards **ɪ** and they are;

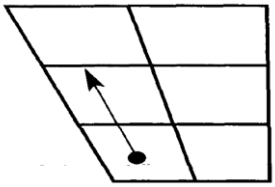
eɪ (as in l*a*te, c*a*me, p*ai*d) which starts at the **e** of (red, flesh).

eɪ



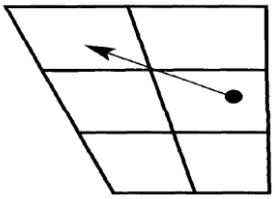
aɪ (as in eye, find, might). The starting point is quite similar to the **ʌ** of (but, just).

aɪ



ɔɪ (as in oil, joy, toy) starts with **ɔ:** as in (saw, born).

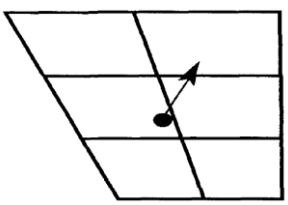
ɔɪ



The diphthongs which end in **ʊ** are two in number;

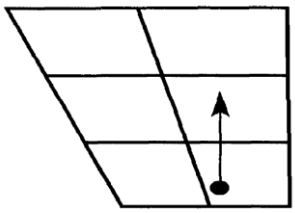
əʊ (as in home, cold, so). The starting point is the same as schwa. The lips may be slightly rounded since the sound ends in **ʊ**.

əʊ



aʊ (as in how, loud, proud) starts with a vowel similar to **ɑ:**, glides towards **ʊ** but the glide is not completed since **ɑ:** is an open vowel and the glide needs a large movement. The end of **aʊ** would be between half-close half-open in tongue height. The lip position is slightly rounded.

aʊ



C. BBC English Triphthongs:

Triphthongs are the most complex and difficult English vowel sounds either to pronounce or recognise. A triphthong is "a glide from one vowel to another and then to a third, all produced rapidly and without interruption" (Roach, 2000, p. 24). Triphthongs are composed of the five closing diphthongs described before with **ə** (schwa) added to the end;

eɪ + **ə** = **eɪə** (as in payer, player)

aɪ + **ə** = **aɪə** (as in fire, dial)

ɔɪ + **ə** = **ɔɪə** (as in loyal, lawyer)

əʊ + **ə** = **əʊə** (as in grower, thrower)

aʊ + **ə** = **aʊə** (as in our, towel)

In this part of the study, a thorough description and classification of BBC vowel sounds was given. As noticed, English language has only five vowel letters, yet these letters can represent twenty-five vowel sounds, monophthongs, diphthongs and triphthongs. For both monophthongs and

diphthongs, simple figures were added to explain them in comparison with cardinal vowels. In the next chapter, Modern Standard Arabic (MSA) and dialectical vowel sounds will be described in details.

2.2.6. Modern Standard Arabic and Dialectical Vowel Sounds

The reason for choosing Modern Standard Arabic in this study was mentioned above and it is the fact that MSA is the language taught at schools, used in the media yet not used in everyday life. Dialectical language was also taken into consideration due to the fact that it is used by Syrians in everyday life. In Damascus city, the context of this study, Syrians are exposed to different dialects during their day at home, at school, at work and anywhere they move. As children, they acquire the dialect that is spoken at their homes by their parents. Later at school, they are exposed to various dialects as they start interacting with other children speaking other dialects and they start learning Standard Arabic Language. Thus, the effect of the dialectical sound system cannot be ignored in this context. Vowel sounds of MSA and dialectical Arabic will be discussed in this chapter.

Arabic language is a Semitic language, which means it has a limited vocalic system and a rich consonantal system (Watson, 2002). Arabic language shares the same mechanisms of articulation with English language as discussed before.

Modern Standard Arabic has six monophthongs or pure vowels divided into three short vowels and their three long counterparts. The long vowels are represented by three Arabic letters, and the short vowels are represented by diacritics or as called in Arabic, /hærəkæt/. The symbols

used below to refer to Arabic vowels are taken from (Kopczyński & Meliani, 1993).

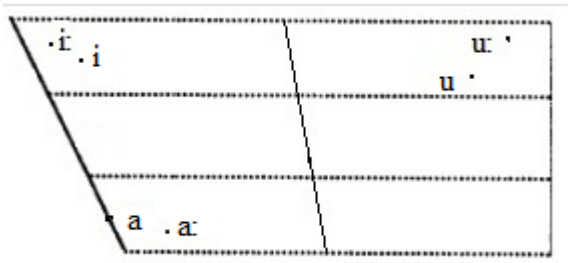
1. **i** (as in the word /mɪn/ "مِن" meaning "from") is a high, front, short vowel represented in Arabic by the /kæsræh/, a small diagonal line placed below a letter, e.g. (لِ) pronounced as /lɪ/. The lips are neutrally spread when pronouncing this sound.
2. **a** (as in the word /sæd/ with a shorter æ, "سَد" meaning "dam") is a low, front, short vowel represented by the /fæthæh/, a small diagonal line placed above a letter, e.g. (لَ) pronounced as /læ/. The lips are neutral.
3. **u** (as in the word /hʊm/ "هُم" meaning "they") is a high, back, short vowel represented by the /dæmmæh/, a small curl-like diacritic placed above a letter, e.g. (لُ) pronounced as /lʊ/. The lips are loosely rounded.

The three Arabic long vowels are;

1. **i:** (as in the words /ʒi:l/ "جيل" meaning "generation" and /fi:/ "في" meaning "in") is a high, front, long vowel represented in Arabic by the letter (ي) /yæ'æ/. The lips are slightly spread.
2. **a:** (as in the words /la:/ (**a:** is pronounced longer than the English **æ**) "لا" meaning "no" and /ma:l/ "مال" meaning "money") is a low, front, long vowel represented in Arabic by the letter (ا) /ælɪf/. The lips are neutrally open.
3. **u:** (as in the word /nu:n/ "نون" meaning "letter n in Arabic") is a high, back, long vowel represented in Arabic by the letter (و) /waʊ/. The lips are closely rounded (Kopczyński & Meliani, 1993).

The figure below shows both the short and the long Arabic vowels:

Figure (10) MSA Vowels



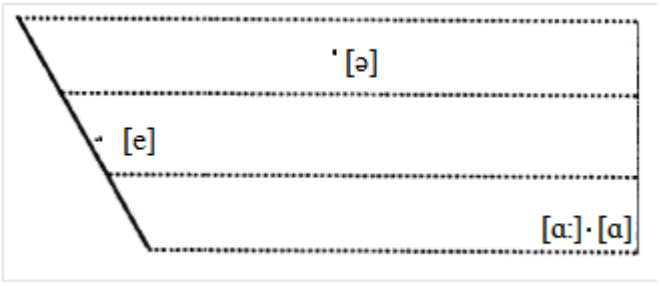
Modern Standard Arabic vowels are only six in number as discussed above; nevertheless, some combinations of vowels which are allowed in some dialects can be considered diphthongs. These two combinations or diphthongs are;

1. **au** a combination of **a** /fæthæh/ and **u** /dæmmæh/ as in the word /naum/ "نَوم" meaning "sleep". As noticed, the /waʊ/ "و" is written yet pronounced more like a /dæmmæh/.
2. **ai** a combination of **a** /fæthæh/ and **i** /kæsræh/ as in the word /bait/ "بَيت" meaning "home". Again, the /yæ'æ/ here is shortened and pronounced as a /kæsræh/ (Dickins, Heselwood & Watson, 1996).

In addition to the six vowels and since the focus of the study is on the influence of the Arabic system on pronouncing English vowels, it would be helpful to refer to certain allophones of Arabic vowels which are similar to English vowels. Being similar to some English vowels, these allophonic variants could make pronouncing these same vowels an easier task. First of all, allophonic variants or allophones are defined as "any of several speech sounds that are regarded as contextual or environmental variants of the same phoneme" (Collins Dictionary). These are allophones of the vowels **a** /fæthæh/, **a:** /ælıf/ and **i** /kæsræh/;

1. **[ɑ]**: sometimes, **a** is retracted and lowered so it becomes [**ɑ**] in words like /tɑbl/ "drum" and /qɑSr/ "palace". In this case, **a** is pronounced as **ʌ** in English.
2. **[ə]**: a central vowel like **ə** (schwa) could be heard in unstressed syllables as an allophone of **a**. For example, the word "كَوكَب" "planet" is pronounced /kaukəb/ (notice that the word also includes the Classical Arabic diphthong au).
3. **[ɑ:]**: the /ælɪf/ **a:** is retracted and lowered and pronounced **[ɑ:]** which is similar to the English vowel **ɑ:** (as in father). Notice that **[ɑ:]** is the long counterpart of [**ɑ**]. For instance, the word "فاضل" in Arabic, meaning "virtuous", is pronounced /fɑ:dil/ (Kopczyński & Meliani, 1993).
4. [**e**]: is an allophone of the /kæsræh/ sound **i** as in the word "قِف" which means "stand up": /qef/ (Al Saqqaf & Vaddapalli, 2012).

Figure (11) Allophones of the Arabic Vowels a, a: and i

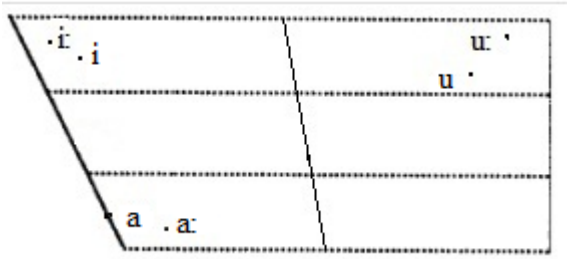


2.2.7. Differences between English and Arabic vowels

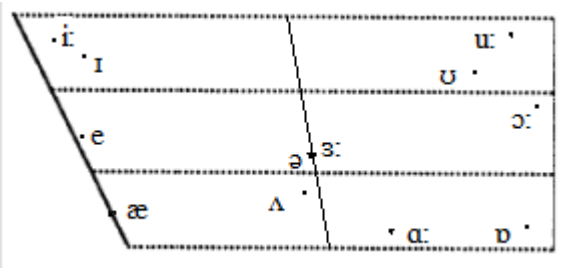
Since the focus of this study is on Arabic vowels influence on English vowels pronunciation, it would be helpful to refer to few different aspects between the two languages as being an important element in the

interference process. The first point is the differences between the vowels of the two languages. After the description of the vocalic systems of both languages, it is easily noticed that the English system is more complex than the Arabic system especially in central and back areas (Kopczyński & Meliani, 1993). English vowel sounds are twenty-five in number (monophthongs, diphthongs and triphthongs) but Arabic vowels are six monophthongs in addition to two diphthongs and four allophones, this means that most of the British English vowels are new to Syrian learners and may cause many pronunciation difficulties. The figures below show the vowels of the two languages and the similarities and differences between them.

MSA Pure Vowels



BBC English Pure Vowels



A table of similar and different (not found in Arabic) vowels between BBC and Arabic (including short and long monophthongs, diphthongs, triphthongs and Arabic allophones) can be drawn to facilitate the task of comparing and contrasting the two systems:

Table (1) Similar and Different Vowels (Arabic vs. English)

	Similar		Different	
	Arabic	BBC	Arabic	BBC
Monophthongs / short	/i/	/ɪ/	-	/ɒ/
	/a/	/æ/		
	/u/	/ʊ/		
Monophthongs / long	/iː/	/iː/	-	/ɔː/
	/aː/	long /æ/	-	/ɜː/
	/uː/	/uː/		
Diphthongs	/au/	/aʊ/	-	/əʊ/
	/ai/	/eɪ/	-	/ʊə/
			-	/eə/
			-	/ɪə/
			-	/ɔɪ/
			-	/aɪ/
Triphthongs			-	/aʊə/
			-	/əʊə/
			-	/ɔɪə/
			-	/aɪə/
			-	/eɪə/
Arabic Allophones	[ɑ]	/ʌ/		
	[ə]	/ə/		
	[ɑː]	/ɑː/		
	[e]	/e/		

In addition to the different vowels between the two languages, another difference can be one of the reasons for Arabic learners' pronunciation errors. As noticed, MSA vowels are six sounds represented by three letters and three diacritics in the written form. Unfortunately, this is not the case in English where twenty-five vowel sounds are represented by five letters only. This non-correspondence between pronunciation and spelling causes many difficulties for learners of English. In the next chapter, the case of Arabic learners and the influence their native language has on pronouncing the English vowels is analysed in details.

2.2.8. Correspondence between Spelling and Pronunciation

The word "broke" in Arabic is pronounced /kæsæræ/ and written as (كَسَرَ); six letters or graphemes (one of a set of orthographic symbols -letters or combinations of letters- in a given language that serve to distinguish one word from another and usually correspond to or represent phonemes) represent six phonemes (one of the set of speech sounds in any given language that serve to distinguish one word from another) (Collins Dictionary). Accordingly, in Arabic, speakers usually pronounce what they see or what is written (Abushihab, 2010, P. 16). In academic terms, spelling in Arabic is regular since there is correspondence between graphemes and phonemes. Thus, Arabic orthography can be described as *shallow* or *transparent* orthography, which is defined as "a type of orthography in which there is high correspondence between sounds and letters" (Awad, 2010, p. 12). One exception to this is the case of the two demonstratives (هذا) /ha:ðə/ and (ذَلِك) /ða:lık/ which are pronounced with the long vowel /**a:**/ but written with the diacritic /fæthæh/ (Awad, 2010). As a result, it can be said that in Arabic there is one-to-one correspondence between the phonemes and the graphemes. Each

phoneme is represented by a grapheme, a letter or a diacritic. The graphemes correspond to the phonemes of the spoken word in a direct and unequivocal manner (Awad, 2010).

Unlike Arabic, English spelling is not phonetic; there is no one-to-one correspondence between the sounds and the letters. George Bernard Shaw, the famous Irish writer, created the word "ghoti" suggesting it should be pronounced as the word (fish). He claimed that (gh) combination is pronounced /f/ as in (tough) /tʌf/, (o) is pronounced /ɪ/ as in (women) /wɪmɪn/ and (ti) combination is pronounced /ʃ/ as in (notion) /nəʊʃən/ (Kelly, 2000). Through this funny example, Shaw referred to the *opaque* or *deep* orthography of English spelling. Opaque or deep orthography is "a type of orthography in which there is no or little correspondence between sounds and letters" (Awad, 2010, p. 12). Thus, in English one cannot depend on the written form to detect the pronunciation. For example, the word (asthma) /æsmə/ is pronounced without the sound /θ/ or /ð/ however (th) is written.

O'Grady (1993) refers to some problems with English orthography which show the arbitrary link between symbols and sounds. Some of the points mentioned in his study relate to vowel sounds;

1. Some graphemes or letters do not represent any phoneme or sound as in the word (care) (e) letter is silent and does not correspond to any sound.
2. A group of two vowels can represent a single vowel sound. The phoneme /i:/ is represented in the word (receive) by two letters (ei).
3. The same letter can represent different phonemes in different words. The letter (o) is pronounced /**ɒ**/, /**əʊ**/, /**ɔ:**/ in (on), (bone) and (corn) respectively.

4. The same phoneme can be represented by different graphemes in different words. The vowel sound /**u:**/ is represented by different letters in the words (rude), (loop) and (soup) (Awad, 2010).

Another researcher, Bell (2008), refers to the same matter of opaque orthography of English and lists in her study more than four thousand common words showing the inconsistency between graphemes and phonemes. The following points show several factors causing difficulties in recognizing English sounds, especially if depending on spelling;

1. The graphemes (o, ou, ow) are pronounced differently in the words; (worn) /w**ɔ**:n/, (worth) /w**ɜ:**θ/, (worry) /w**ʌ**ri/, (tomb) /t**u:**m/, (wolf) /w**ʊ**lf/ and (only) /**əʊ**nli/
2. The letter (a) is pronounced differently in words like; (famous) /f**eɪ**məs/, (famished) /f**æ**mɪʃt/, (ball) /b**ɔ**:l/ and (wallet) /w**ɒ**lɪt/
3. A few words in English have "surplus letters" and these can be classified as;
    a. Words with double consonants which are "non-phonically doubled" which means the consonant sound is pronounced once, such as (dessert, suppose, arrange, etc.)
    b. Words with surplus consonant letters, which are not pronounced altogether, such as (half, answer, doubt, etc.)
4. In English, some words are written the same but pronounced differently and have different meanings. These words are known as *Homographs*. Examples of homographs include "read /r**i:**d/, /r**e**d/ and lead /l**i:**d/, /l**e**d/"
5. Words like (ewe) /ju:/, (oasis) /əʊeɪsɪs/, (amoeba) /əmiːbə/ are examples of some words in English which show no consistency between graphemes and phonemes (Awad, 2010).

Nevertheless, before going on with listing the points Bell's study referred to it will be helpful to talk first about what is known as the *phonic patterns* since some points she mentioned are related to these patterns. Phonic patterns have their roots in phonics, a teaching method which depends on connecting phonemes to spelling patterns to help learners develop their reading and writing skills. This method tends to associate sounds with certain letters or letter groups –clusters- in a way that facilitates pronunciation. Phonics is one teaching technique mainly used to overcome many English learners' pronunciation and spelling difficulties triggered by the previously-referred-to non-correspondence matter between English spelling and pronunciation. This method is used with both consonants and vowels. For example, the consonant sound /**ʃ**/ has the letter clusters (sh) in the word (shark) as one of many phonic patterns, which students can learn and relate with this sound; so whenever they come across these two letters, they can decode the pronunciation. Another example is the vowel sound /**i:**/ can be represented by many letter clusters (ea, ee, ie) as in (seat, seed, piece). Nevertheless, there are always exceptions. Some letter clusters can represent two different sounds. The word (bread) is written with (ea) yet it is pronounced /br**e**d/ not /br**i:**d/. Another example is the letter (u) pronounced differently in (pull) and (dull). As can be noticed, the two words are written the same, yet the vowel sounds are unlike; /**ʊ**/ and /**ʌ**/ respectively. Anyways, this does not change the fact that using phonic patterns is a very helpful technique to help learners with reading and writing. These phonic patterns are not only referred to as in relation to Bell's study but as will be noticed later some are used to help designing the nonsense words used as an instrument to collect data from the learners.

Bell's study includes the following few points, which are considered as exceptions to the phonic patterns discussed above;

1. The (ea) cluster is usually pronounced /**i:**/ like in (tea, meat, seat); nevertheless, words like (head) /h**e**d/, (earth) /**ɜ**:θ/, (break) /br**eɪ**k/ are exceptions to the rule.
2. The (oo) cluster is either pronounced /**u:**/ like in (school, food, spook) or /**ʊ**/ like in (cook, good, wool); nevertheless words like (flood) /fl**ʌ**d/ and (door) /d**ɔ**:/ are exceptions to the rule.
3. The (u) letter is often pronounced /**ʌ**/ according to phonic patterns as in (gull, butter, cut); but in words like (truth) /tr**u**:θ/, (butcher, pull) /b**ʊ**ʧə/, /p**ʊ**l/, the (u) is pronounced differently (Awad, 2010).

These points show the lack of correspondence between spelling and pronunciation in English, which causes problems for English language learners especially those whose native language is highly regular and transparent like Arabic. Depending on the linguistic rules of their native language, Arab learners tend to "transfer the native language symbolization to the foreign language" (Awad, 2010, p. 26). In other words, they tend to pronounce every letter they see. Many Arab learners of English might pronounce (womb) with a /b/ sound or (sign) with a /g/ sound, for instance. This will affect pronunciation and cause many problems for learners in learning English and in communicating with others.

In the above sections, the mechanisms of articulation in English and Arabic were analysed. Organs of speech and articulators were described in details and in relation to their role in classifying sounds. Both English and Arabic vowels were classified and differentiated from one another depending on the part of the tongue involved in pronouncing

them, the tongue's vertical distance from the roof of the mouth and the position of the lips. Another area, which affects Arabic learners' pronunciation or rather recognition of English vowels, is the correspondence matter between graphemes and phonemes. Arabic learners, Syrians in our study, influenced by the transparent orthography of their native language tend to read every letter in English words unfamiliar with its opaque orthography. In the next sections the research methodology of the study will be explained in details.

Chapter 3: Research Methodology

The research methodology section of the paper is a discussion of the context and participants. The method used in collecting data for the research is also discussed in details. A pronunciation test of nonsense words was designed to be read by the participants in order to record their pronunciation of the English vowel sounds, compare it to the native English pronunciation and discover how their native tongue -Arabic- influenced their pronunciation of the vowel sounds. The participants' pronunciation was analysed by comparing the pronounced vowel formants, measured by Praat, with native English vowel formants. A detailed description of Praat and how it is used in measuring the vowel formants was given in the data analysis section below.

In addition to the above, an adequate description of the research context and subjects was given to shed light on the setting and the circumstances of the study. Syrian students from five different linguistic levels (elementary, pre-intermediate, intermediate, upper-intermediate and advanced) were asked to read a list of nonsense words. The pronunciation was recorded and contrasted with the native pronunciation of the vowel sounds. Then the differences in pronunciation throughout the five levels were studied to discover any changes that may occur during the students' linguistic progress. Recording nonsense words instead of the students' speeches during their lessons was because the focus is on the words themselves. Moreover, the nonsense words used were the same for all the levels, since they were similarly unfamiliar to all the students.

3.1. Context of the study

The study took place at a private institute in Damascus city. The curriculum taught at the institute is face2face and it is based on the communicative approach. The teaching plan of the institute focuses on the four linguistic skills both receptive and productive (listening, speaking, reading and writing). The curriculum allows much speaking practice through various conversation and role-playing activities. The number of sessions are the same for all levels and the duration of each session is two hours. Teachers at the institute are Arabs, non-native speakers of English, and this affects the learners one way or another. English non-native teachers may make more mistakes than native ones, which may negatively affect their students' learning, since the teachers are a main source of language input especially in our Syrian context.

3.2. Subjects of the Study

The subjects of this study were Syrian learners of English of different ages and educational backgrounds who were studying English for various purposes; improving their English, finding a job, getting a promotion or just passing the exams. These learners spoke different dialects or informal forms of standard Arabic, which affects their pronunciation differently. In addition to this, they learned Standard Arabic at school and were exposed to it through the books and the media.

The focus of this study was on the effect of MSA and dialectical Arabic on Syrian learners pronunciation of English vowels. The effect of learners' gender, age or motivation on error occurrence was not taken into consideration as referred to in the introduction.

The learners involved in the study were divided into five levels: elementary, pre-intermediate, intermediate, upper-intermediate and advanced. At the institute where the study was applied, each one of these levels is divided into three sub-levels. The pronunciation test being the instrument of collecting data was applied at the third sub-level of each one of the main levels to guarantee students completion of the material at each level. The number of the subjects in mind at the beginning was 100 students, 20 at each level. But due to the current security situations and the deteriorating economic conditions, the number of learners enrolling in language courses dropped significantly which consequently affected the number of subjects involved in this study. Thus at certain levels the participants were less than twenty in number. In addition, some of the data was discarded because of the bad quality of few recordings. The final number for subjects was sixty-three divided into (elementary 14, pre-intermediate 15, intermediate 16, upper-intermediate 9, advanced 9).

3.3. Data Collection

3.3.1. Instrument

The instrument for collecting data was a pronunciation test including nonsense words read by the students, recorded and analysed using Praat. The nonsense words included English vowel sounds monoph-, diph- and triphthongs.

The data required for the research was collected by administering a pronunciation test consisting of nonsense words. The test was designed by the researcher in a way that helped record the subjects' pronunciation of English vowel sounds as a first step towards their analysis. The analysis process of the pronounced vowel sounds started with measuring

their formants, comparing them to the native English sounds and consequently illustrating the effect of the Arabic vowel sound system on pronouncing the English vowel sounds. More details on this analysis process will be given later. However, the focus of this section is on the data collection instrument and the importance and significance of using nonsense words, instead of meaningful words, in the pronunciation test.

3.3.2. The Significance of Nonsense Words

The subjects of the research are learners of English at different levels as pointed out in the subjects-of-the-study section, which means that they differ in their linguistic knowledge and in the amount of English words they have learned and acquired. Consequently, higher-level learners are familiar with many words way more than lower-level learners, since they have been more exposed to English input through the books, their teachers' speech or any other source of language, at least in their classrooms. This very fact will cause a dilemma when it comes to the use of meaningful words because while few words might be a piece of cake to higher-level learners -since they may be familiar with them- they would definitely be very difficult for lower-level learners. Thus, using meaningful words in our pronunciation test when subjects of the study are of various levels is inadequate and will have a negative influence on the results. Therefore, and in relation to what was mentioned above, a plan B should be used to overcome this problem. Our alternative plan can be described in two words "***nonsense words***", yet it should be properly described in order to be understood.

Nonsense words, as the name indicates, are meaningless words or simply "by definition, unfamiliar". These "unfamiliar" words are used by teachers to assess their students' pronunciation and word-reading skills.

As nonsense words are meaningless, learners cannot depend on words "meaning or visual memory" to pronounce them, which is exactly why they were used in this study that involves learners from various linguistic levels.

3.3.3. Designing the Pronunciation Test

As mentioned above, nonsense words are meaningless, unfamiliar words which learners can depend neither on meaning nor on visual memory to read or "decode" them, or rather by applying "an understanding of phonic patterns of letters or letter clusters" (Farrell, Osenga & Hunter, 2010, p. 1).

Phonic patterns are used to facilitate English language reading and writing. Nevertheless, this technique was mentioned and used in this research as part of the criteria relied on for designing adequate nonsense words for the pronunciation test. Depending on the most common vowel patterns, the words in the list of nonsense words were designed to be used in collecting data. The patterns which represent more than one vowel were kept in mind. Using the same pattern in two words was avoided. Therefore, the less common patterns were used to design words when the depended-on phonic patterns are similar in order to avoid repeating the patterns, help learners pronounce the sounds and measure how much they were able to recognize the pronunciation. The list consists of 25 words, divided into four groups representing monophthongs, diphthongs, triphthongs and each word represents a vowel sound.

The list of nonsense words used in the pronunciation test:

A. Monophthongs:

a. Five long vowel sounds:

1. **iː** heest: after vowel pattern (ee) as in (sleep)

2. **ɜː** gur: after (fur)

3. **ɑː** marve: after (starve)

4. **ɔː** salk: after vowel pattern (a) as in (talk)

5. **uː**, hupe: after vowel pattern (u-e) as in (rule)

b. Seven short vowel sounds:

1. **ɪ** fim: after vowel pattern (i) as in (fin)

2. **e** ped: after vowel pattern (e) as in (red)

3. **æ** chab: after vowel pattern (a) as in (cab)

4. **ʌ** phum: after vowel pattern (u) as in (bum)

5. **ɒ** glog: after vowel pattern (o) as in (clock)

6. **ʊ** sould: after vowel pattern (ou) as in (would)

7. **ə** cyter: after (cyber) (and the focus here is on the schwa **/ə/** sound which occurs in unstressed syllables since the stressed syllable in this word is the first syllable)

B. Diphthongs:

Eight sounds:

1. **ɪə** mear: after (near)

2. **eə** bair: after (hair)

3. **ʊə** kure: after (lure)

4. **eɪ** shain: after vowel pattern (ai) as in (pain)

5. **aɪ** dright: after vowel pattern (igh) as in (light)

6. **ɔɪ** doit: after vowel pattern (oi) as in (join)

7. **əʊ** boad: after vowel pattern (oa) as in (boat)

8. **aʊ** spoud: after vowel pattern (ou) as in (shout)

C. Triphthongs:

1. **eɪə** flayer: after (player)

2. **aɪə** pire: after (mire)

3. **ɔɪə** moyal: after (royal)

4. **əʊə** boer: after (grower)

5. **aʊə** mowel: after (towel)

The words organized as the following, each group of vowels together, in alphabetical order:

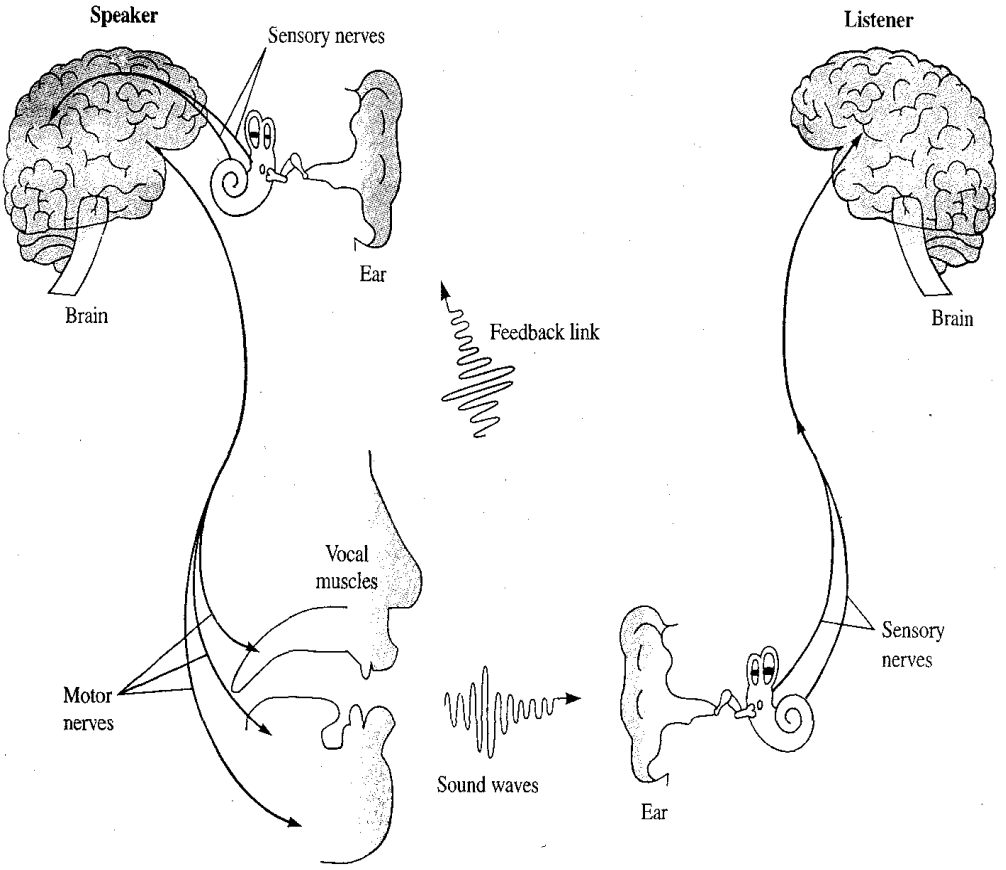
1. chab cyter fim glog ped phum sould
2. gur heest hupe marve salk
3. bair boad doit dright kure mear shain spoud
4. boer flayer mowel moyal pire

Chapter 4: Data Analysis

Data collection and analysis processes are very crucial since their quality affects the results in one way or another. In the following chapters a thorough explanation of data analysis process is given. The explanation covers acoustic phonetics, formant frequencies meaning and measurement, description of Praat and the steps followed in analysing the data collected.

4.1. Acoustic Phonetics

Figure (12) The Speech Chain



speaker’s brain → speaker’s vocal tract → transmission of sound through air → listener’s ear → listener’s brain

1	2	3	4	5
articulatory phonetic level	**-**	**acoustic phonetic level**	**-**	**auditory phonetic level**

The figure and the diagram above show the “**speech chain**”. They exemplify the steps or the route any utterance passes through; starting from the message in the speaker’s brain and ending in the listener's brain. The message in the speaker's mind turns to spoken sounds in the “articulatory phonetic level”. At this level, the articulators move according to orders from the brain in order to utter the meant sound. After being articulated, the sound flows as a “wave” or “signal” through air moving air molecules till it reaches the listener’s ear. This level is known as the “acoustic phonetic level”. What happens then to this sound and how it is handled and processed by the listener’s ear and then understood and interpreted by her/his brain happens at the “auditory phonetic level” (Fromkin, Rodman & Hyams, 2003, p. 398).

In the parts above, vowel sounds were analysed and classified at the articulatory level, depending on manner and place of articulation. For example, the vowel sound **ʌ** (as in but, nut, some) is a central, half-open open vowel pronounced with neutrally open lips. Nevertheless, at the acoustic phonetic level vowel sounds are dealt with differently. Acoustic phonetics studies and focuses on the physical characteristics of speech sounds or “signals” heard by the human ear. The sound, which is physically an air flow coming out of the speaker’s mouth causes “a disturbance in the position of air molecules,” consequently an “air pressure” which differs after the various sounds produced; and these “variations of the air pressure determine the frequency of the sounds"

(Fromkin, Rodman & Hyams, 2003, p. 400). Accordingly, each sound has a certain frequency which distinguishes it from other sounds. The components of the speech signal or sound frequency are known in acoustic phonetics as formants. In the next section, formants will be defined, how they are measured and how they are used to compare vowels will be also explained.

4.2. What are formants and how are they measured?

There are many definitions of formants, yet they can be defined as the "concentration of acoustic energy around a particular frequency in the speech wave" (Wood, 2005) or simply the meaningful frequency components of human speech. In order to distinguish sounds –vowels in our case-, formants should be measured first. Each vowel consists of a number of formants or frequency components determined by the amount of air pressure which is controlled by the shape of the vocal tract.

The first formant (F1), with the lowest frequency, determines whether the vowel is open or close because it is related to the "jaw opening;" the wider the jaw, the higher the frequency. Thus, open vowels like /**æ**/ have a higher F1 than close vowels like /**ʊ**/. The second formant (F2), with a higher frequency than (F1), changes with the part of the tongue touching other articulators to produce the vowel. (F2) has a higher frequency for a front vowel like /**ɪ**/ and a lower frequency for a back vowel like /**ʊ**/. Acoustic studies show that (F1) and (F2) are enough to distinguish vowels and that front vowels have a great distance between (F1) and (F2), while (F1) and (F2) in back vowels almost touch because they are very close.

Nevertheless, measuring formants is not an easy task, thus in order to perform this task certain computer programmes are designed by

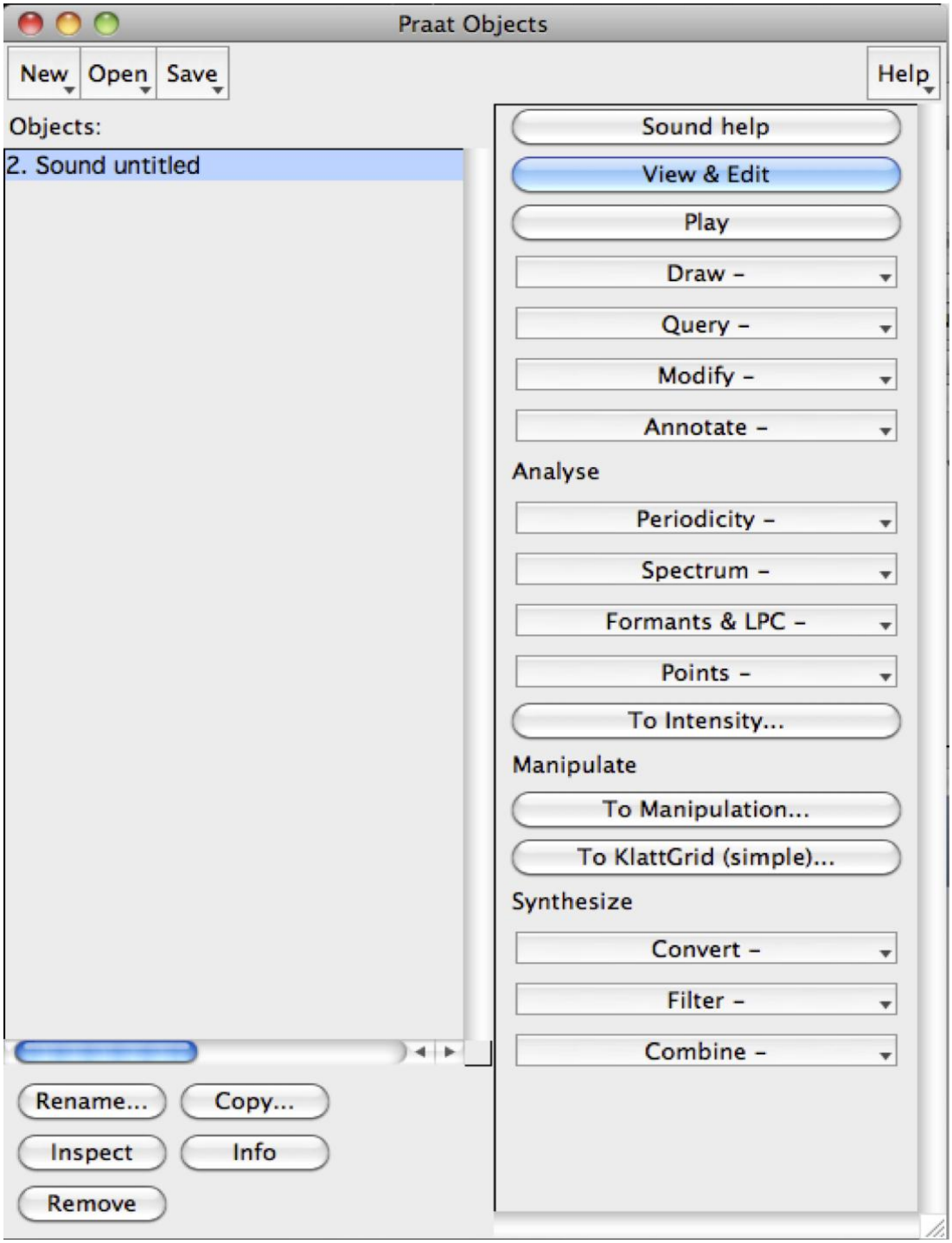
programmers and used by us. These programmes produce visualization of the speech signals called "spectrograms". The higher the frequency, the darker the spectrogram (Fromkin, Rodman & Hyams, 2003, p. 400). These programmes also show formants with one click and according to the researcher's preference. In the following chapters, a brief description of Praat and how it is used to measure formants is provided.

4.3. Description of Praat

Praat is not an acronym as some may think. Rather, it is a Dutch word which means "talk". The programme got its name from the native language of the programmers who designed it, Paul Boersma and David Weenink of the University of Amsterdam. It is a free open-source software used for acoustic analysis of speech. It can be downloaded for free from the website http://www.praat.org for various operating systems. Praat can be easily used by researchers, teachers and even students as a "teaching tool and a pronunciation aid in phonetics and pronunciation" (Wilson, n.d.).

Praat starts with three windows: a title window, a picture window and the main objects window. The first and the second windows are not of much importance to our work, the third window is our work zone where most of the work is done.

Figure (13) Praat Objects Window



Sounds can either be recorded from: *Objects → New → Record Mono*, or opened from: *Objects → New → Read from File* for already recorded sounds. The sounds recorded are shown in the list of objects in the main window from which they can be easily saved:

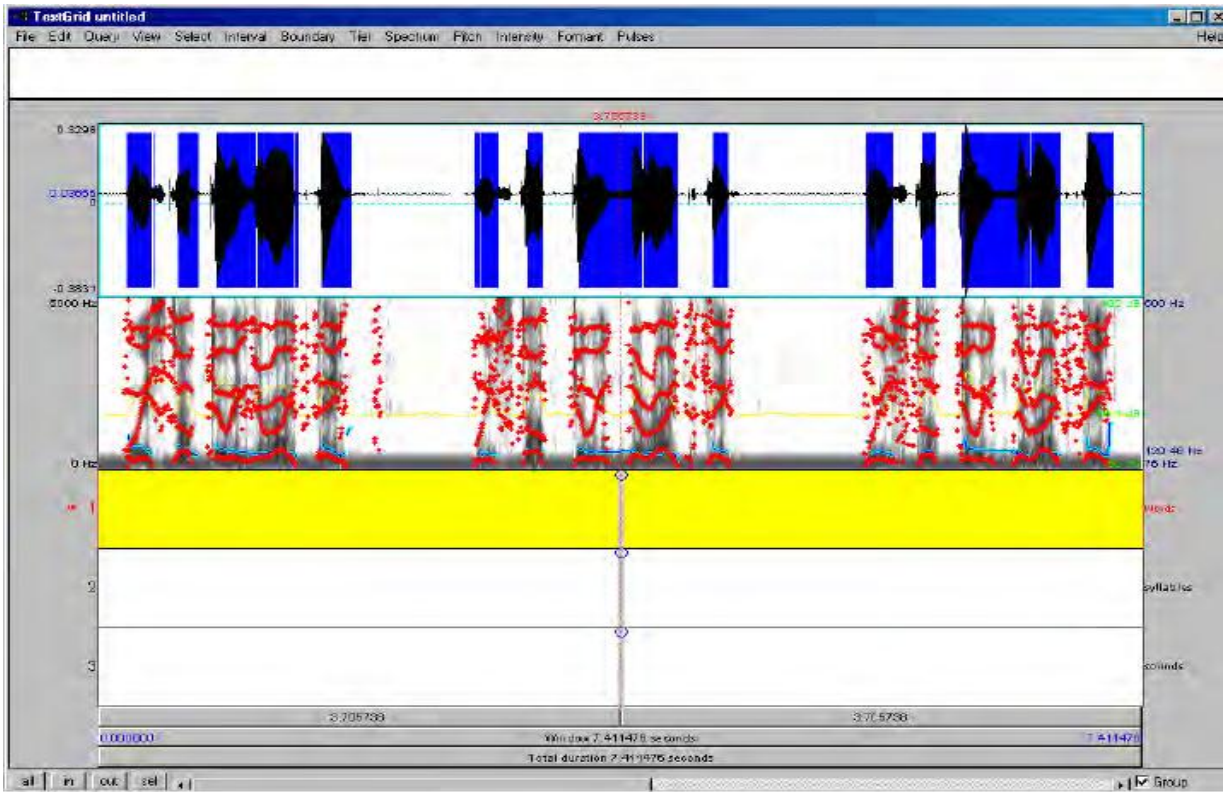
Objects → Save → Save as WAV file or write as WAV file.

To facilitate the process of dealing with recorded sounds, TextGrids can be created for the sounds saved now as wave files in Praat objects. A TextGrid is defined as "a type of object in Praat that is used for annotating the wave file i.e. segmenting and labelling the points or periods of interest in the speech signal" (Balusu & Gafos, 2010, p.1). In the Praat objects window and from the right hand list, one can click the button

Annotate → To TextGrid

This will open a *Sound: To TextGrid* box which is used to identify the "segmentation categories" for the wave file studied (Lieshout, 2005, p. 9). To open the TextGrid, click on the *TextGrid object* then click on the *Sound object* (with the same name of the TextGrid) while holding the *Ctrl* button on the keyboard. Figure (14) below shows the waveform of a recorded speech signal (the top portion with waves), the spectrogram (the middle portion with red dots) and the TextGrid (the bottom portion, divided in this display into three tiers; words, syllables and sounds).

Figure (14) TextGrid



In Figure (14) above three scrollbars could be seen; the bottom bar lets us move the visible part of the spectrogram forward and backward in time and play the entire sound, the middle bar allows us to play only the part of the sound whose spectrogram is in the window now and the top bar allows us to play various parts of the visible sound. In the lower left corner of the figure, these small buttons help us "zoom the spectrogram in and out to cover shorter and longer periods of time." The "sel" button will zoom in on the part of the spectrogram selected according to the sound under analysis.

Before moving on to working with the speech signal, another step is really preferable since it facilitates the measuring process, and this step contains segmenting the speech signal after the targets of the study. To do this, the beginning of the target is defined by moving the cursor to the

point needed, clicking on it in either the waveform or the spectrogram portions (the top or the middle portions) of the display and then pressing *enter* button. In the TextGrid portion, a vertical bar will appear showing the beginning of our target object. Identifying the end of the target is done the same way. To name this target object or TextGrid segment just identified, one can click at any point between the two bars created in the TextGrid part and type the name; and at the top of this segment its duration can be seen. Other segments in the TextGrid are selected in the same way. To save this segmented speech signal

File → Write TextGrid to text file or *save TextGrid as text file* is choosen from the editing window.

This labeled or segmented TextGrid can be used now easily any time needed by opening it along with its sound file without having to segment it again.

4.4. Measuring Formants with Praat

In order to measure vowel formants, firstly, it is recommended to adjust the *Maximum formant* from formant settings to 5500Hz for adult females and 5000Hz for adult males. Secondly, the best way is to select the needed vowel sound and identify "steady state periods" which are points of time usually close to the centre of the vowel and in which formants are "relatively stable" (Weisser, 2005). The formants are easily revealed by clicking the button:

Formants → Show formants

or by clicking F1 on the keyboard for the first formant. The formant will be shown in a pop-up window with the point of time chosen. The formant

or frequency can be written down to the nearest Hertz; for example, the frequency "260.10046322" can be written down as "260". The same can be done to get the second format by clicking F2 on the keyboard. Another way can be used depending on the TextGrids one creates for speech signals. When segmenting the speech signals, one identifies the sounds interested in measuring their formants and gets the formants for each segment. In this case, one does not have a certain point of time, rather a duration, that of the segment. This way is the one used in this study and the results will be written in a certain form, which includes the following:

1. the IPA symbol of the vowel
2. the nonsense word representing the vowel
3. the frequency of the first formant F1
4. the frequency of the second formant F2

As for diphthongs and triphthongs, their formants are measured by measuring the formants of their parts, the monophthongs. The glide or movement of diphthongs starts at about 30% or 40% of the vowel duration till the end. The diphthong nucleus, the vowel from which the diphthong glides, is represented by the 20% point of the diphthong. Thus the nucleus or the on glide formants are measured at this point. On the other hand, the formants of the diphthong off glide, the vowel to which the diphthong glides, are measured at the 80% point which represents the off glide (Wright & Nichols, 2009). The same process is used with triphthongs by measuring the three components or segments of each triphthong.

4.5. Data Analysis Steps

After introducing Praat and its mechanisms in measuring formants, the steps followed in our data analysis process will be explained to the reader as the most crucial stage in our study. Our collected data is to be analysed following these levels:

1. Measuring formants of the vowel sounds which were recorded by the participants with Praat. By this, the researcher is going to find out if the participants were able to recognize the vowels and pronounce them correctly. The formants measured are to be compared to John Wells' table of BBC main formant values. The table below shows an adapted version of Wells' table;

Table (2) Vowel Formants (adapted from John Wells' table)

The vowel sound	First formant F1	Second formant F2
/iː/ heed	285 Hz	2373 Hz
/ɪ/ hid	356 Hz	2098 Hz
/e/ head	569 Hz	1965 Hz
/æ/ had	748 Hz	1746 Hz
/ɑː/ hard	677 Hz	1083 Hz
/ɒ/ hod	599 Hz	891 Hz
/ɔː/ haw'd	449 Hz	737 Hz
/ʊ/ hood	376 Hz	950 Hz
/uː/ who'd	309 Hz	939 Hz
/ʌ/ Hud	722 Hz	1236 Hz
/ɜː/ heard	581 Hz	1381 Hz
/ə/ (schwa)	500 Hz	1500 Hz

As for diphthongs and triphthongs, their BBC pronunciation was downloaded from the Internet in order to measure the formants, and here are two lists showing the formants of these vowels measured following the same steps discussed above in "Measuring Formants with Praat" chapter;

The diphthong vowel sound	Type	Nucleus F1	Nucleus F2	Off glide F1	Off glide F2
ɪə/ hear/	Centring	404 Hz	1955 Hz	472 Hz	1841 Hz
/eə/ air	Centring	604 Hz	1725 Hz	662 Hz	1673 Hz
ʊə/ cure/	Centring	405 Hz	1257 Hz	525 Hz	1415 Hz
/eɪ/ late	Closing	531 Hz	2067 Hz	390 Hz	2069 Hz
/aɪ/ eye	Closing	751 Hz	1350 Hz	585 Hz	1780 Hz
/ɔɪ/ oil	Closing	578 Hz	1235 Hz	455 Hz	1398 Hz
/əʊ/ so	Closing	482 Hz	1441 Hz	404 Hz	1256 Hz
/aʊ/ how	Closing	657 Hz	1272 Hz	640 Hz	1280 Hz

The triphthong vowel sound	Nucleus F1	Nucleus F2	Off glide F1	Off glide F2	Schwa F1	Schwa F2
/eɪə/ payer	621 Hz	1389 Hz	534 Hz	1900 Hz	755 Hz	1591 Hz
/aɪə/ fire	915 Hz	1104 Hz	868 Hz	1057 Hz	825 Hz	1601 Hz
/ɔɪə/ loyal	465 Hz	895 Hz	458 Hz	1490 Hz	511 Hz	1052 Hz
/əʊə/ grower	631 Hz	1332 Hz	477 Hz	1085 Hz	698 Hz	1373 Hz
/aʊə/ our	880 Hz	1004 Hz	542 Hz	1156 Hz	929 Hz	1551 Hz

2. After being compared to BBC vowel formants, the incorrectly pronounced vowels are studied in order to find out the negative influence of Arabic, the participants' first language, on their pronunciation and which vowels are incorrectly pronounced, the similar or the different ones?
3. Did students depend on the spelling of the nonsense words they were asked to record to recognize the sounds? If they did, was this effect positive or negative? Did it help them pronounce the words correctly or lead them to mispronounce them?

These three steps are to be considered when studying and analyzing the collected data at the five levels studied. Later on, results of the analysis will be compared among levels in order to come to the final results answering the research questions of this study.

Following the steps mentioned above, formant frequencies for participants' pronounced vowels were measured with Praat according to the method discussed above. At each level, the formants of the vowels pronounced by each participant were measured and listed as in the example below which shows the formant frequencies for vowels pronounced by one of the participants at the intermediate level.

1. Monophthongs (short and long)

The vowel sound	First formant F1		Second formant F2	
/æ/ chab	656 Hz		1265 Hz	
/ə/ cyter	423 Hz		1373 Hz	
/ɪ/ fim	329 Hz		2122 Hz	
/ɒ/ glog	450 Hz		877 Hz	
/e/ ped	431 Hz		1680 Hz	
/ʌ/ phum	736 Hz		1108 Hz	
/ʊ/ sould (incorrectly pronounced ɒ)	552 Hz		928 Hz	
/ɜː/ gur (incorrectly pronounced ɔː)	503 Hz		993 Hz	
/iː/ heest (incorrectly pronounced e)	488 Hz		1435 Hz	
/uː/ hupe (incorrectly pronounced ʌ)	663 Hz		1215 Hz	
/ɑː/ marve (incorrectly pronounced eɪ)	Nucleus F1	Nucleus F2	Off glide F1	Off glide F2
	612 Hz	1816 Hz	579 Hz	1645 Hz
/ɔː/ salk (incorrectly pronounced æ)	684 Hz		1293 Hz	

2. Diphthongs

/eə/ bair (incorrectly pronounced eɪ)	Nucleus F1	Nucleus F2	Off glide F1	Off glide F2
	415 Hz	1096 Hz	483 Hz	1058 Hz
/əʊ/ boad (incorrectly pronounced ɔ:)	452 Hz		948 Hz	
/ɔɪ/ doit	Nucleus F1	Nucleus F2	Off glide F1	Off glide F2
	563 Hz	1069 Hz	472 Hz	1639 Hz
/aɪ/ dright	Nucleus F1	Nucleus F2	Off glide F1	Off glide F2
	731 Hz	1271 Hz	537 Hz	1678 Hz
/ʊə/ kure (incorrectly pronounced eɪ)	Nucleus F1	Nucleus F2	Off glide F1	Off glide F2
	445 Hz	1485 Hz	483 Hz	1697 Hz
/ɪə/ mear (incorrectly pronounced i:)	360 Hz		1234 Hz	
/eɪ/ shain (incorrectly pronounced e)	572 Hz		1770 Hz	
/aʊ/ spoud (incorrectly pronounced ɔ:)	443 Hz		888 Hz	

3. Triphthongs

The vowel sound	First formant F1			Second formant F2		
/əʊə/ boer (incorrectly pronounced ɔ:)	436 Hz			865 Hz		
/eɪə/ flayer (incorrectly pronounced aɪə)	Nucleus F1	Nucleus F2	Off glide F1	Off glide F2	Schwa F1	Schwa F2
	739 Hz	1433 Hz	539 Hz	1570 Hz	475 Hz	1162 Hz
/aʊə/ mowel	Nucleus F1	Nucleus F2	Off glide F1	Off glide F2	Schwa F1	Schwa F2
	688 Hz	1085 Hz	426 Hz	965 Hz	444 Hz	1239 Hz
/ɔɪə/ moyal	Nucleus F1	Nucleus F2	Off glide F1	Off glide F2	Schwa F1	Schwa F2
	677 Hz	1335 Hz	541 Hz	717 Hz	490 Hz	1146 Hz
/aɪə/ pire (incorrectly pronounced i:)	362 Hz			1491 Hz		

By making such a detailed table for participants, the formants can be easily compared with their standard counterparts in order to find out if vowels were correctly pronounced. It is also important to mention that listening to the vowels also played a role in defining the vowels. Thus, by depending on listening to the vowels and comparing their formants to the standard formants, the results were determined. To illustrate the above

mentioned process, an example is discussed below. The following table shows the formant frequencies for the short monophthong /ɒ/ pronounced by participant no.1 at the advanced level compared to the standard formants. Again, by depending on listening to the vowel and comparing the first and the second formant it was noticed that the vowel was correctly pronounced.

The vowel	/ɒ/	
Formants	F1	F2
Participant	558 Hz	923 Hz
Standard	599 Hz	891 Hz

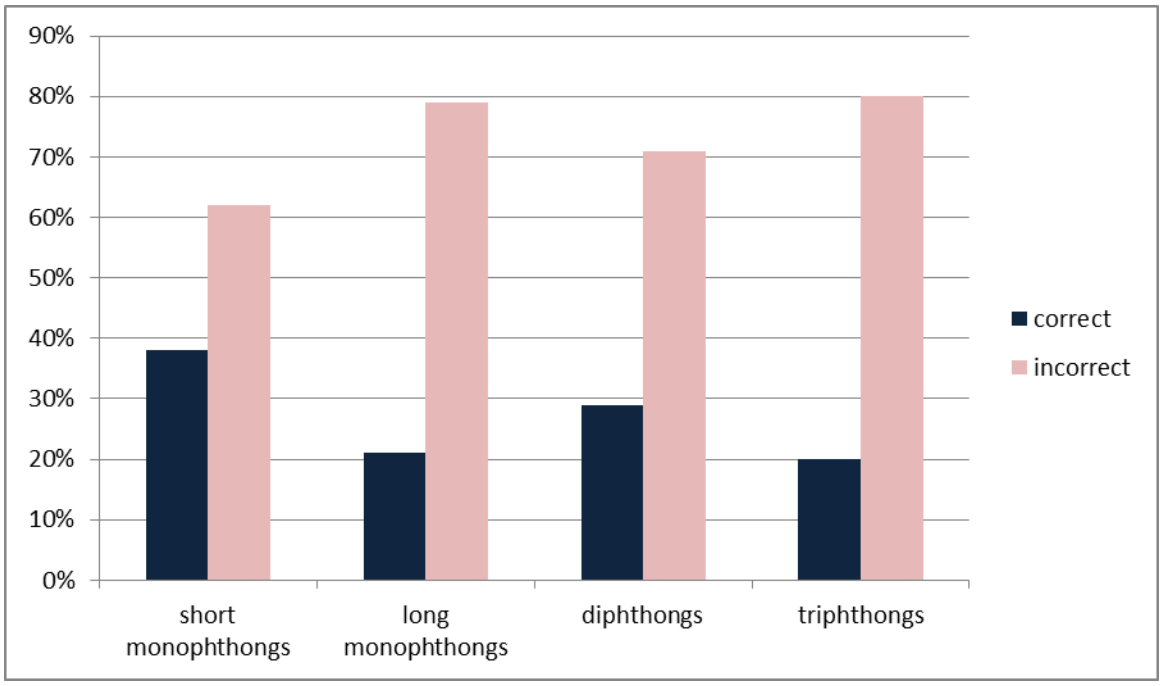
The next table shows that the long vowel /ɔ:/ was mispronounced as /ɑ:/.

The vowel	/ɔ:/ incorrectly pronounced as /ɑ:/	
Formants	F1	F2
Participant	633 Hz	987 Hz
Standard /ɔ:/	449 Hz	737 Hz
Standard /ɑ:/	677 Hz	1083 Hz

By using this process and making this comparison, the incorrectly pronounced vowels were distinguished from the correct ones. For more details of the vowel formants pronounced by the participants, check the tables in the appendices section, appendix 2. Diagrams with percentages of correctly and incorrectly pronounced vowels were drawn showing the differences among levels in relation to vowel pronunciation. These diagrams also show us the divergence among vowels.

The first diagram below displays that almost 62 % of the short monophthongs pronounced by the participants at the elementary level are incorrect. Other vowels show higher percentages of errors varying between 79 % for long monophthongs, 71 % for diphthongs and 80 % for triphthongs. Apparently, triphthongs cause more difficulties for the participants then long monophthongs and diphthongs respectively, and at the end come short monophthongs as the least to cause errors.

Diagram (1) percentages of the correct and incorrect vowels at the Elementary level



At the pre-intermediate level, as diagram 2 shows, the percentages of short monophthongs are 43 % incorrectly pronounced versus 57 % correctly pronounced. This means unlike at the elementary level, the short monophthongs caused less difficulty for the participants. Still with long monophthongs, diphthongs and triphthongs, the percentages of the

incorrect vowels are higher than the correct ones, yet the divergence between the correct and the incorrect vowels is less than at the elementary level.

Diagram (2) percentages of the correct and incorrect vowels at the Pre-intermediate level

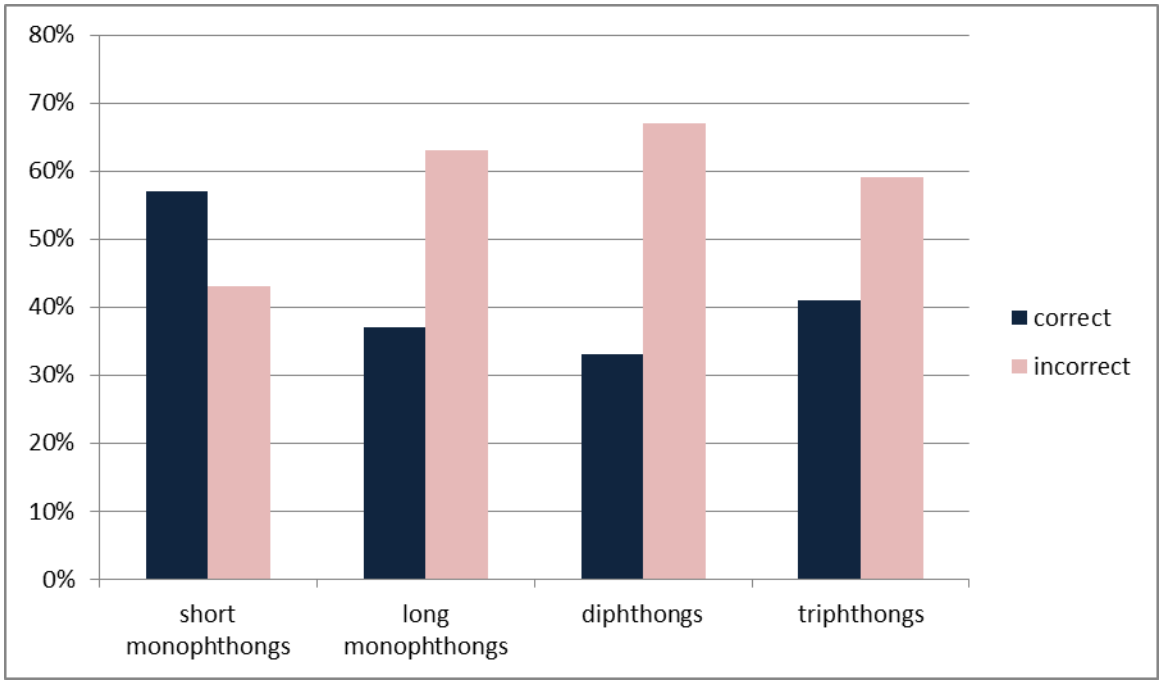
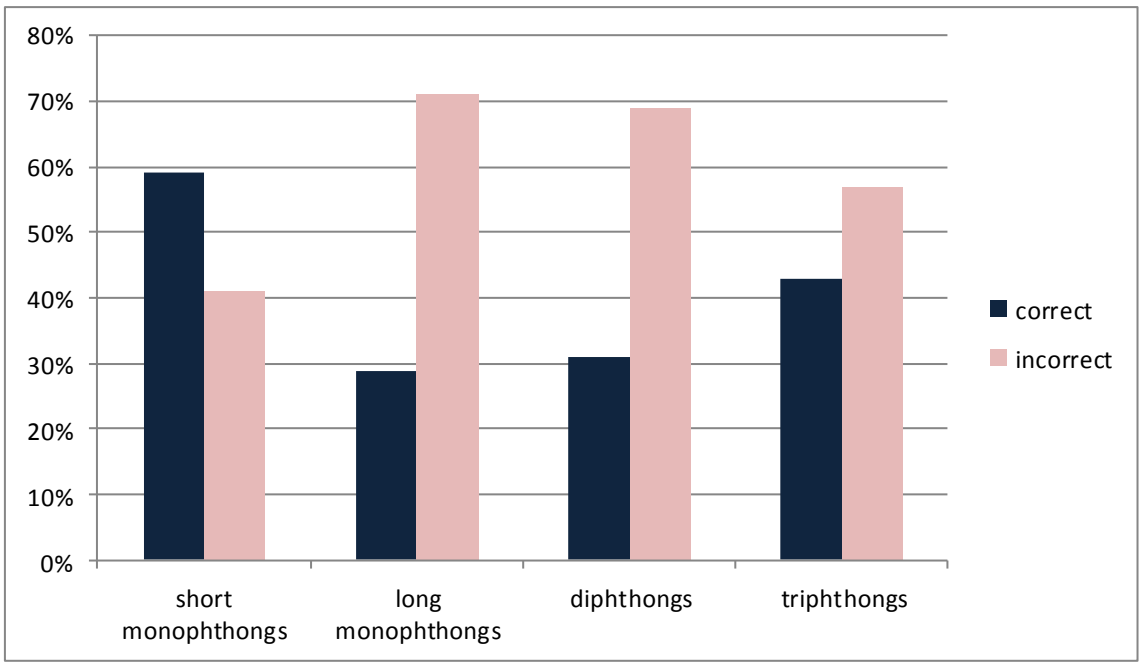


Diagram (3) percentages of the correct and incorrect vowels at the Intermediate level



The third diagram above illustrates that the percentages of errors with vowels at the intermediate level are very close to the percentages of errors at the pre-intermediate level. The table below shows the percentages of incorrectly pronounced vowels at pre-intermediate and intermediate levels.

Table (3) percentages of incorrectly pronounced vowels at pre-intermediate and intermediate levels

	Pre-intermediate	Intermediate
Short monophthongs	43%	41%
Long monophthongs	63%	71%
Diphthongs	67%	69%
Triphthongs	59%	57%

Moving on to the last two levels, one look at diagram 4 and diagram 5 below is enough to notice the difference between the percentages of errors at the upper-intermediate level and the advanced level respectively. The diagrams illustrate less errors with all vowels; monophthongs, diphthongs and triphthongs. 45% of monophthongs are correct at the upper-intermediate level whereas 71% are correct at the advanced level. The percentages of incorrectly pronounced diphthongs are higher than the correctly pronounced at both levels; nevertheless, there are fewer errors at the advanced level, as can be noticed.

Diagram (4) percentages of the correct and incorrect vowels at the Upper-intermediate level

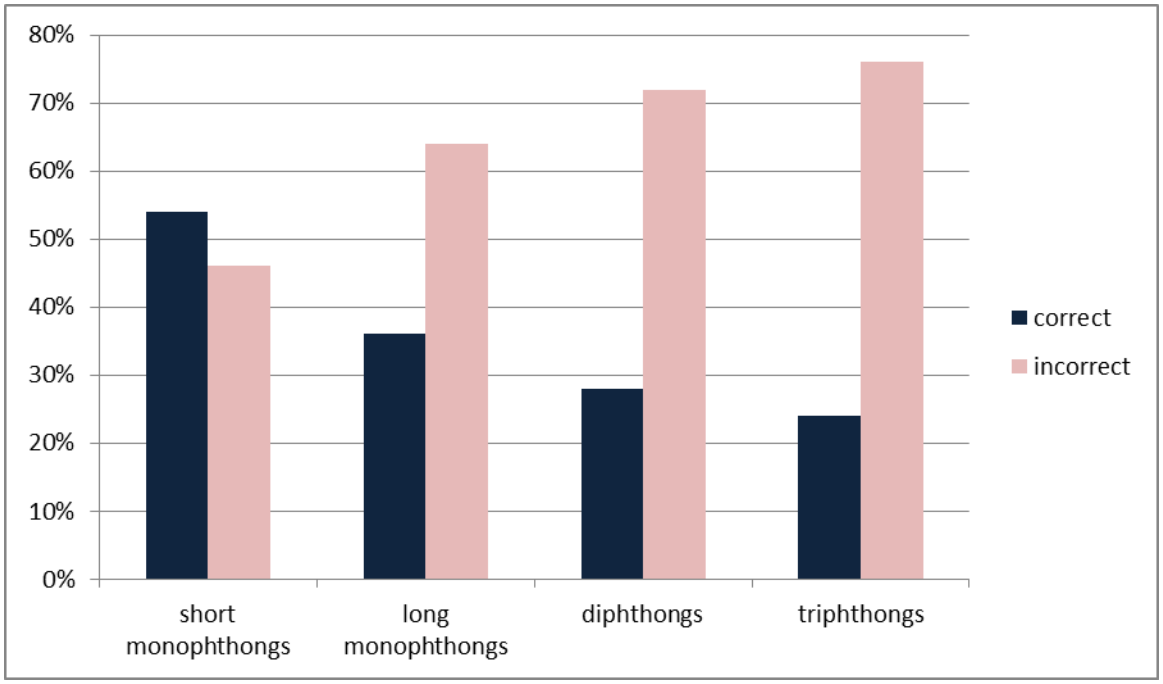
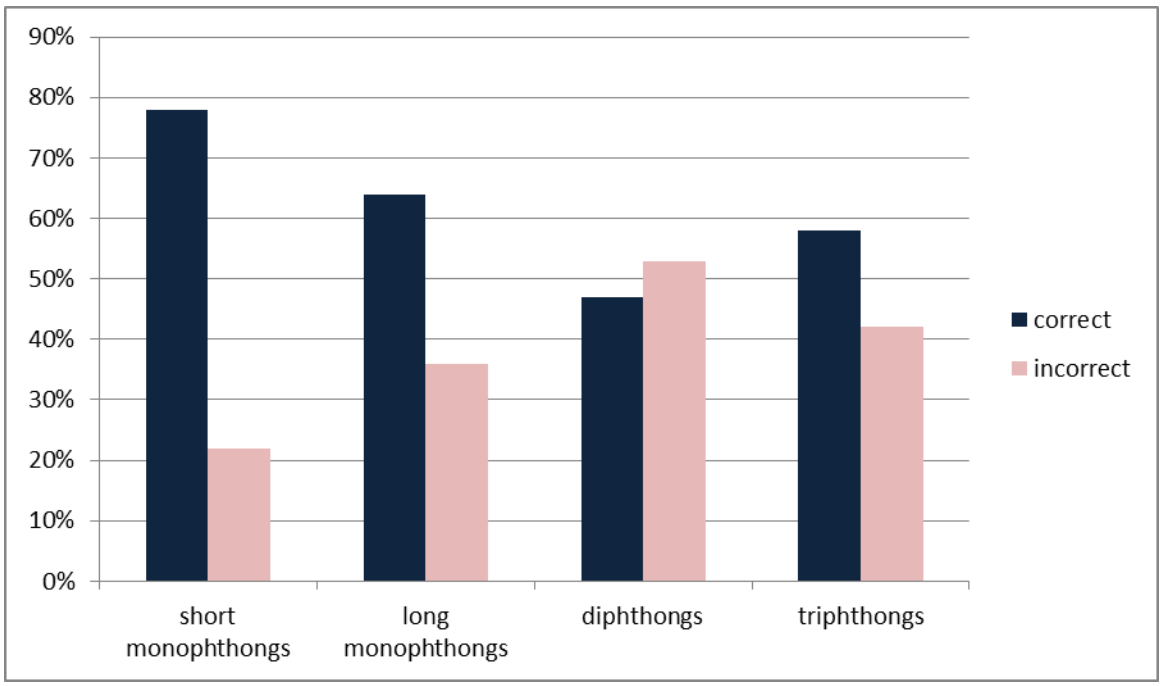
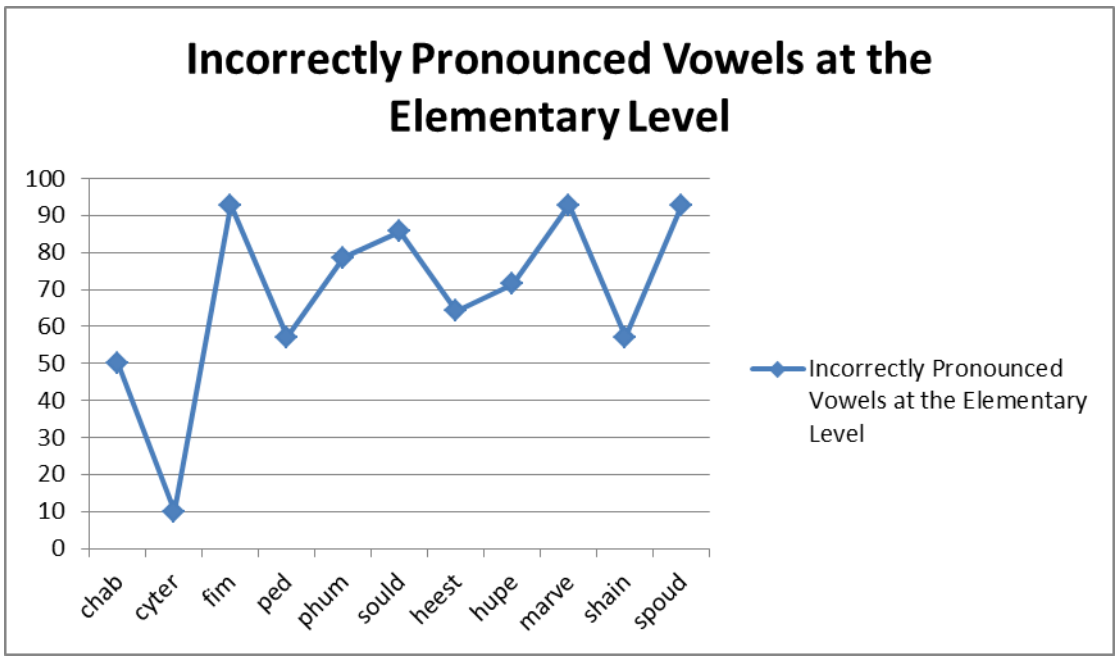


Diagram (5) percentages of the correct and incorrect vowels at the Advanced level



After displaying the percentages of correctly and incorrectly pronounced vowels in our collected data, the next step now is to focus on the incorrectly pronounced vowels and how they were pronounced. This step is done as a trial to answer the question of Arabic interference, thus the start is by studying Arabic-similar vowels, which were incorrectly pronounced.

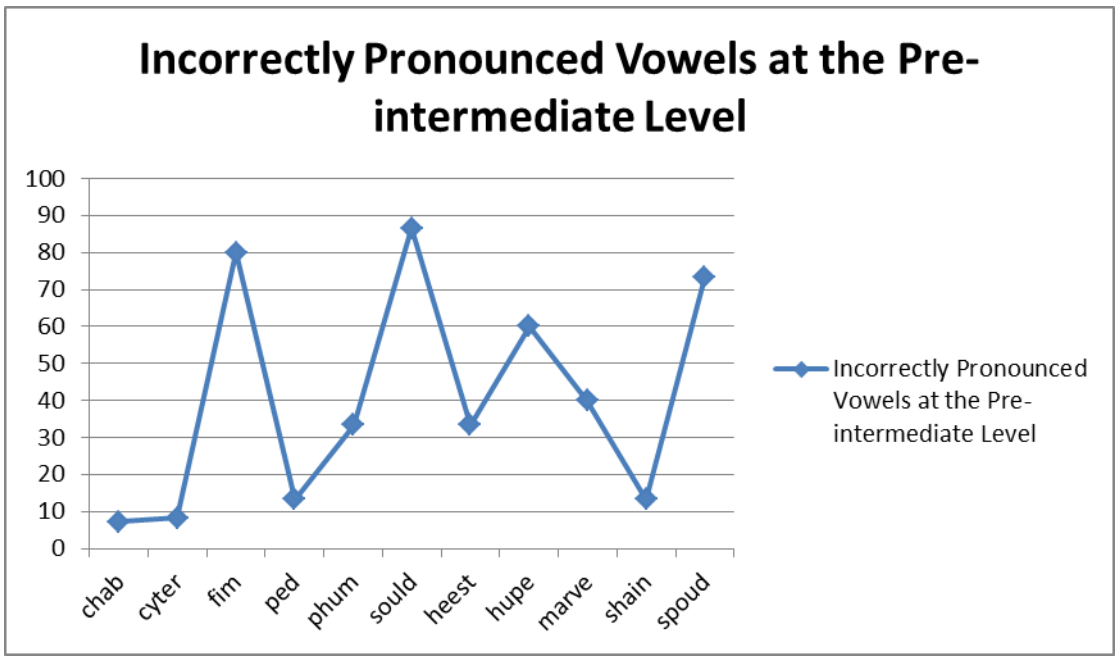
The diagram below displays the percentages of errors with nine Arabic-similar monophthongs (æ, ə, ɪ, e, ʌ, ʊ, iː, uː, ɑː) and two Arabic-similar diphthongs (eɪ and aʊ).



At the elementary level, as illustrated in the diagram above, the vowels causing more difficulties for participants are /ɪ/ (fim), /ɑː/ (marve) and /aʊ/ (spoud). /æ/ (chab) and schwa /ə/ (cyt**e**r) caused less errors than other vowels with (50%) and (10%) respectively. According to Contrastive Analysis Hypothesis, with similar vowels no errors should occur due to positive transfer. Learners depend on their native language knowledge in pronouncing the target language vowels, and when these vowels are similar to their native language vowels pronouncing them would be easier. Our data analysis didn't show this positive transfer with many vowels. For example, /ɪ/ vowel is similar to Arabic vowel /i/ yet about 90% of participants at this level made errors with it. Most participants pronounced it as /e/, in Arabic an allophone of /i/. Other participants pronounced it as /eɪ/ and /aɪ/. Pronouncing /ɪ/ as /aɪ/ could be due to the participants' relying on orthography to pronounce the letter (i) which name is /aɪ/. The vowels /ɑː/ and /aʊ/ also caused high percentages of errors for participants. These errors are more expected than errors with vowels similar to Arabic main vowels because one of the vowels is an

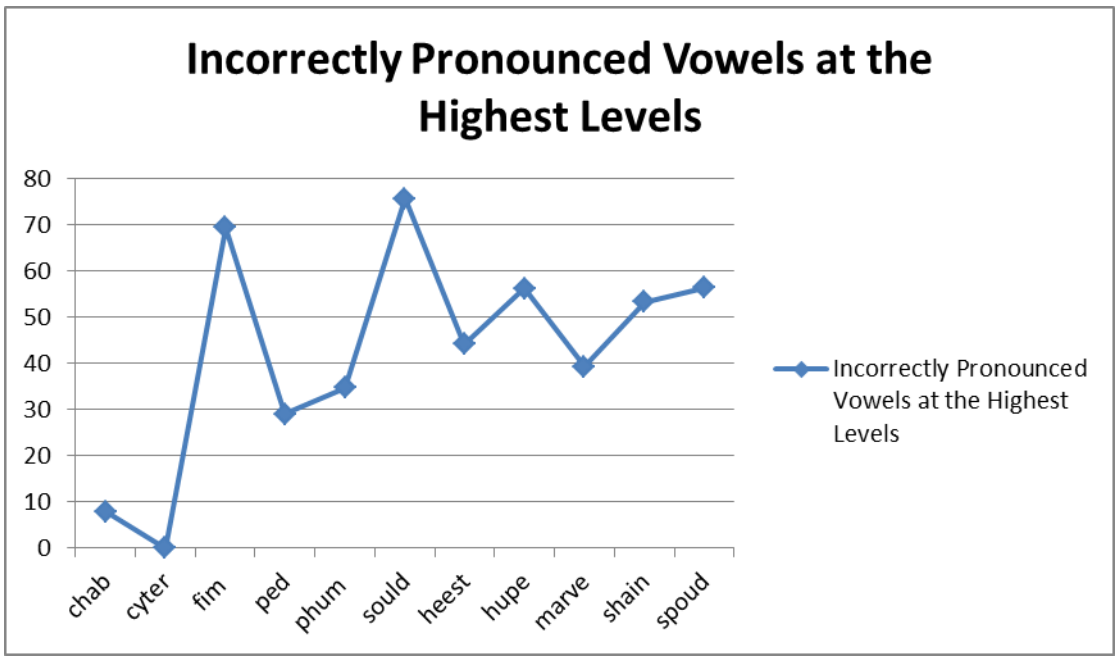
allophone of /a/ and the other is a diphthong. Participants used /æ/, /e/ and /eɪ/ instead of /ɑː/. The first alternative /æ/ is one of the six main vowels in Arabic and it is more commonly used in Arabic than the Arabic allophone [ɑː]. This fact is even apparent in our data with only (50%) of errors with this vowel /æ/ than others and most of the errors with /æ/ happened by replacing it with /eɪ/ vowel. The second alternative /e/ is again used here instead of /ɑː/. The third alternative is /eɪ/, the diphthong which caused less errors for participants than most of the other vowels with a percentage of (57%). Most of errors with /eɪ/ were by replacing it with /aɪ/, which could have happened because of depending on spelling by reading letters (ai) as /aɪ/.

Schwa caused the least number of errors with a percentage of (10%). Almost (57%) of participants got errors with /e/ vowel mostly by replacing it with /ɪ/ and /iː/. With the first alternative, Arabic interfered negatively by replacing an allophone with the main vowel. As for the second alternative, spelling or orthography had a negative effect by using the name of the letter (e) instead of the vowel.



At the pre-intermediate level, the highest percentage of errors occurred with vowel /ʊ/ (sould), about (87%). /ʊ/ was replaced by /ɔ:/, /u:/ and /aʊ/. The diphthong /aʊ/ caused less errors at this level than at the elementary level. The errors at this level are similar to those at the elementary. This diphthong was replaced by /ɔ:/ and /u:/. The vowel /u:/ also caused errors at this level but with a percentage of (60%) which means less than at the elementary level. /u:/ was replaced by /ɔ:/, /ʊ/ and /ʌ/.

The vowel /ʌ/ with a relatively lower percentage (33%) was mostly replaced by /u:/. Also /i:/ caused a lower percentage of errors by replacing it with vowels like /e/ and /ɪ/. The other vowels discussed at the elementary level caused the same errors for participants at the pre-intermediate level but with different percentages, mostly lower than at the elementary level.

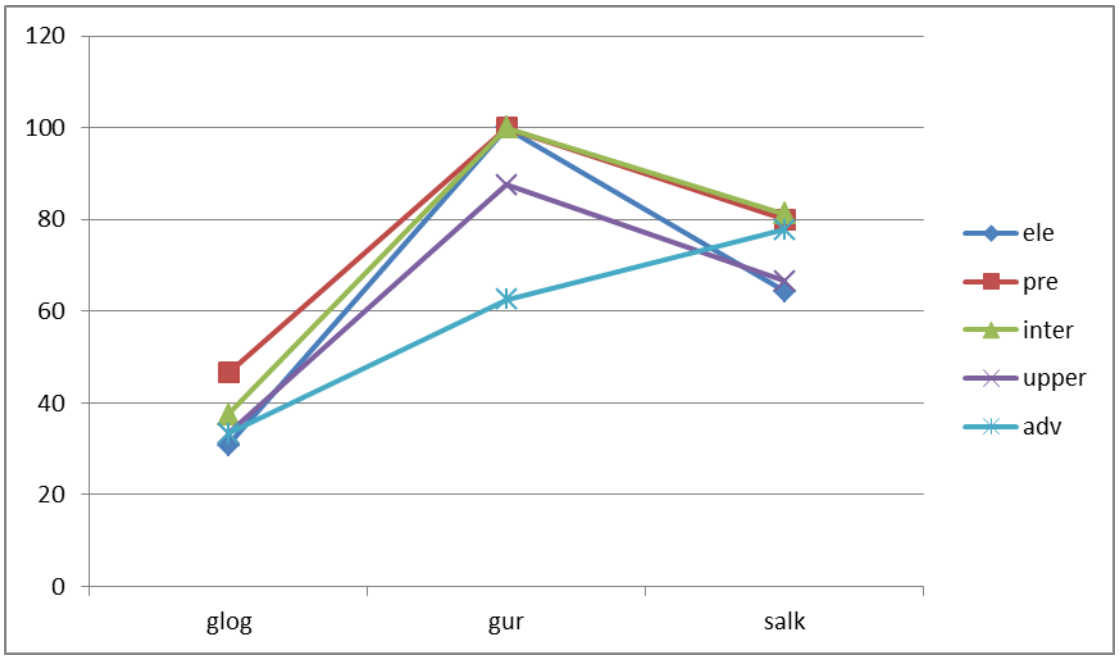


By comparing errors at elementary and pre-intermediate level with errors at the highest three levels; intermediate, upper-intermediate and advanced, it is easily noticed that at the highest three levels /ɪ/ and /ʊ/ caused the highest percentages of errors for participants while /æ/ and /ə/ caused the least. The errors are the same as the ones discussed at the elementary and pre-intermediate level but with different percentages.

All in all, /æ/ and /ə/ were the easiest vowels to be recognized and pronounced while /ɪ/, /ʊ/ and /aʊ/ were the most difficult. As for the other vowels, errors with them were between (30%) and (60%). The above explanation was given in relation to English vowels similar to the Arabic ones including nine monophthongs and two diphthongs.

As for the different monophthongs (/ɒ/, /ɜ:/ and /ɔ:/), the diagram below shows errors made with them and their percentages at the five levels.

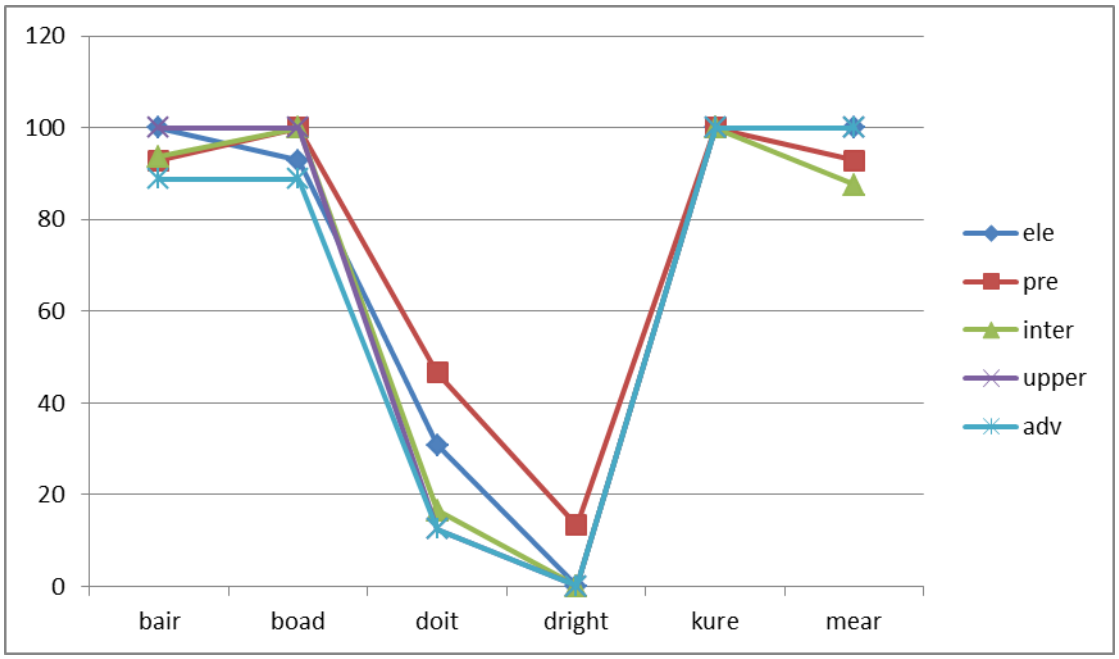
Diagram (6) percentages of errors with new monophthongs at five levels



English monophthongs (/ɒ/, /ɜ:/ and /ɔ:/), which don't have similar Arabic sounds, caused many errors especially /ɜ:/ and /ɔ:/, which caused the highest percentages of errors. (100%) was the percentage of errors with /ɜ:/ at three levels; elementary, pre-intermediate and intermediate. It decreased at the upper-intermediate and the advanced level ranging between (60%) and (90%). Most probably being affected by Arabic, the errors with /ɜ:/ in (gur) happened by replacing it with /ʌ/ and /u:/. /ɒ/, on the other hand, did not cause many problems even at the elementary level. The errors with this vowel at all levels, ranging between (30%) and (50%), happened by replacing it with /ɔ:/, /ʌ/ and /u:/. On the one hand, using /ʌ/ and /u:/ at the elementary and the pre-intermediate level can be explained in terms of Arabic interference. On the other hand, using /ɔ:/ at the higher levels could be due to the effect of orthography, being positive

in this case. Errors with /ɔ:/ in (salk) ranged between (60%) and (80%), which is a high percent.

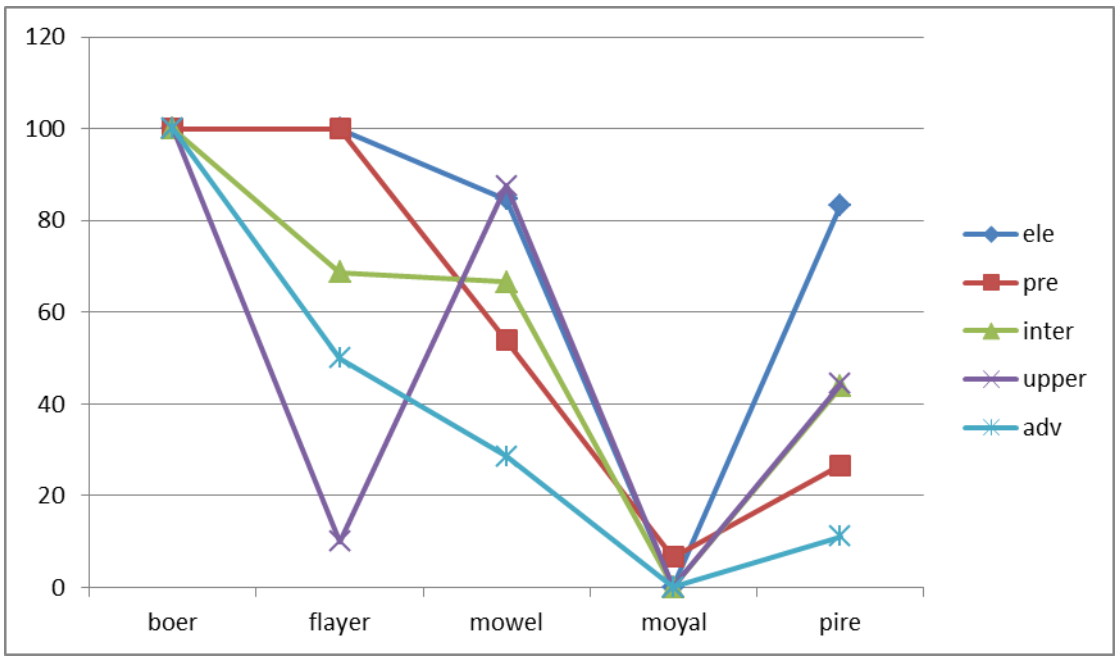
Diagram (7) percentages of errors with new diphthongs at five levels



It is noticed that diphthongs shared between English and Arabic caused few problems for the participants especially diphthong /aʊ/. As for the English diphthongs with no Arabic counterparts, two diphthongs (/ɔɪ/ and /aɪ/) caused quite low percentages of errors ranging between (0-50%). Most probably, this happened because of (doit) and (dright) spelling.

As expected, diphthongs caused higher percentages of errors with various types of errors. /ʊə/ in (kure) and /əʊ/ in (boad) caused more problems for participants in the study than the other diphthongs, as simply noticed in the diagram above.

Diagram (8) percentages of errors with triphthongs at five levels



As with diphthongs, it was expected that triphthongs would cause significant difficulties for participants. Unexpectedly, /ɔɪə/ in (moyal) did not cause many problems for participants. This particular example shows how much participants depend on spelling in pronouncing the nonsense words used in the study. /əʊə/ caused errors for all participants at all levels which makes it number-one-causing-error triphthong. This is expected especially that the diphthong /əʊ/ caused high percentages of errors.

Chapter 5: Results and Discussion

This chapter presents the findings of the experiment of this research. There are four research questions in this study and answers to them are given and discussed in light of the data analysed in the previous chapter. The data collected in this study by recording participants' pronunciation of nonsense words presenting English vowel sounds was analysed using Praat to measure the formant frequencies of the vowel sounds recorded. In the previous chapter, many diagrams were drawn representing the percentages of errors made by the participants at each level of the five levels studied. The analysis displayed, as in the diagram below, the changes in incorrect vowels percentages with each type at the five levels studied. It is clearly noticed that short monophthongs caused less errors for all participants in the study although with a different percentage at each level. At the elementary level, about (60%) of the participants made errors with short monophthongs whether similar to Arabic vowels or new. At both pre-intermediate and intermediate levels, the percentage of errors significantly decreased to range between (43%) and (40%). This percentage increased at the upper-intermediate level (about 46%) to decrease at the advanced level recording the least value among all vowels (about 22%).

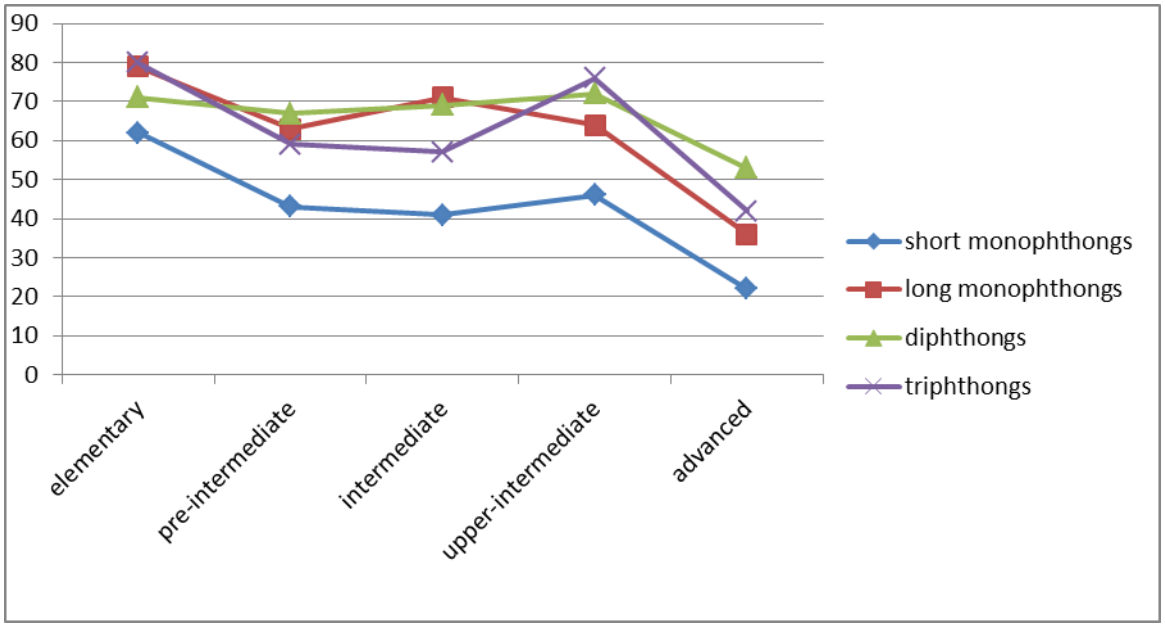
Most errors with long monophthongs can be detected at the elementary level (80%) then the intermediate level (70%). Almost the same percentage of errors at the pre-intermediate and the upper-intermediate levels (64%) was noticed. The least percentage of errors with long monophthongs, both similar to Arabic vowels and new ones, was recorded at the advanced level (about 36%). Nevertheless, it is still higher than short monophthongs percentage of errors at the same level.

As for diphthongs, the incorrectly pronounced vowels percentages were almost the same at the first four levels, ranging between (66%) and (73%). At the advanced level, the percentage clearly decreased (53%) to stay higher than percentages of other types of errors at that level.

The highest percentage of errors with triphthongs can be noticed at the elementary level (80%). At the upper-intermediate level, it decreases to (76%) and significantly drops at the advanced level to (42%).

It can also be noticed from the diagram that short monophthongs caused less errors at all the levels (42.8%), then long monophthongs (62.6%) followed by triphthongs with a very close percentage (62.8%) and finally diphthongs with the highest percentage (66.4%).

Diagram (9) percentages of errors throughout levels



5.1. Research Question One: Do Syrian learners make more errors with English diphthongs and triphthongs than monophthongs?

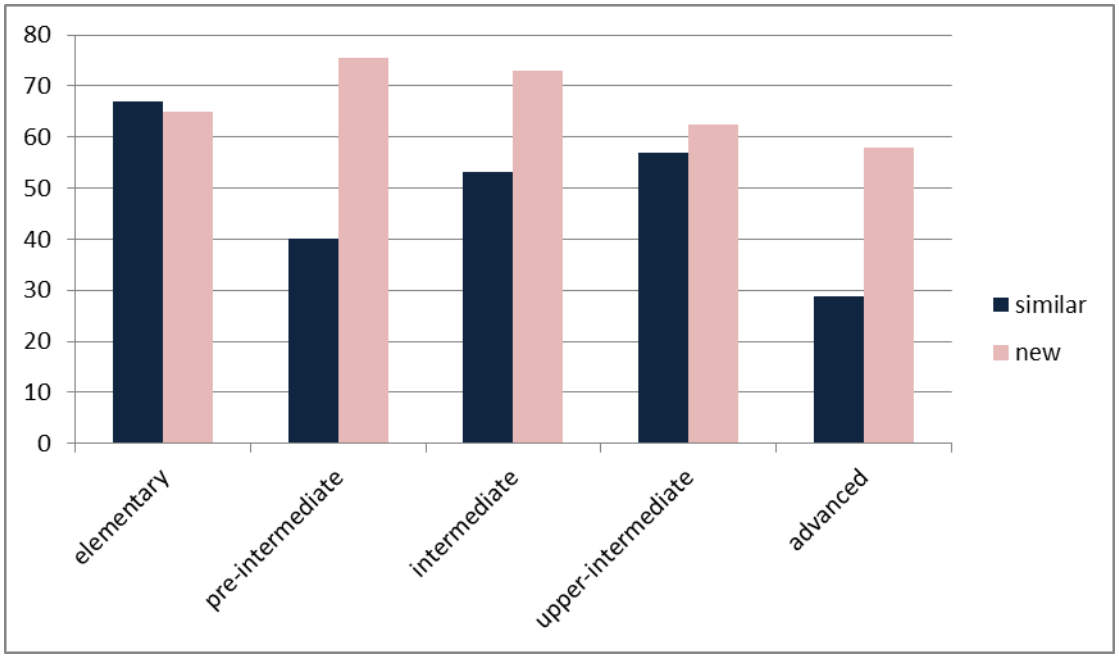
The results illustrated that diphthongs and triphthongs actually caused more challenges for the study participants. Nevertheless, long monophthongs caused a high percentage of errors very close to the percentage of errors with triphthongs. It is also noticed that diphthongs caused more errors than triphthongs although there are two English diphthongs similar to Arabic diphthongs. Data analysis also helped us define the number of errors made with similar and different vowels at the studied levels.

5.2. Research Question Two: Is there a relation between the difficulties in pronouncing new vowel sounds and the learners' levels?

It is logical that similar vowels cause less challenges and difficulties for learners than new vowels. In English there are nine monophthongs and two diphthongs similar to Arabic monophthongs and diphthongs. There are no triphthongs in Arabic so all the triphthongs are new to Arabic learners of English.

The diagram below shows a contrast between similar and new or different monophthongs in order to find out the difference in percentages of errors with these vowels at each of the levels.

Diagram (10) similar vs. new monophthongs



At the elementary level, errors with similar monophthongs are more than errors with new monophthongs both short and long. As for the other levels, similar sounds caused less difficulties than new ones yet with different percentages. At both the pre-intermediate and the advanced levels, the errors made with similar sounds was almost half the errors made with new sounds. The percentages are higher at both the intermediate and the upper-intermediate levels.

As for diphthongs, the similar caused more errors at the elementary and the upper-intermediate levels and less errors at the pre-intermediate, the intermediate and the advanced levels. At the advanced level, as can be noticed from the diagram below, similar diphthongs caused a very low percentage of errors (5%). As for percentages of new vowels, they recorded high and very close values at all the levels. Errors at the pre-intermediate level recorded a higher percentage of errors than at the other levels.

Diagram (11) similar vs. new diphthongs

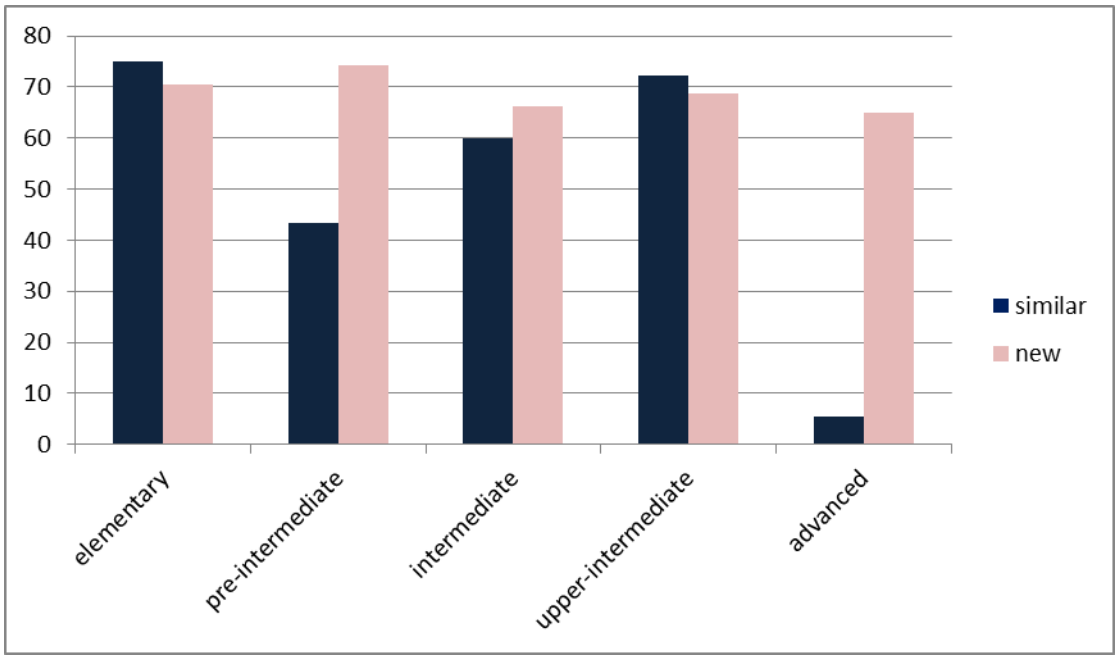
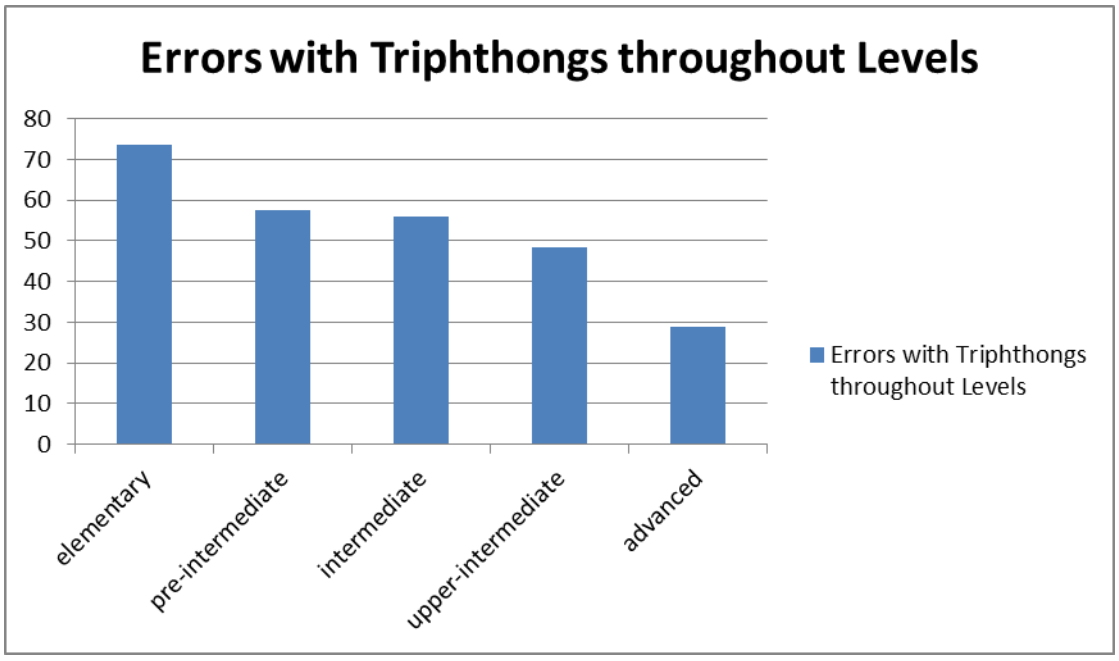
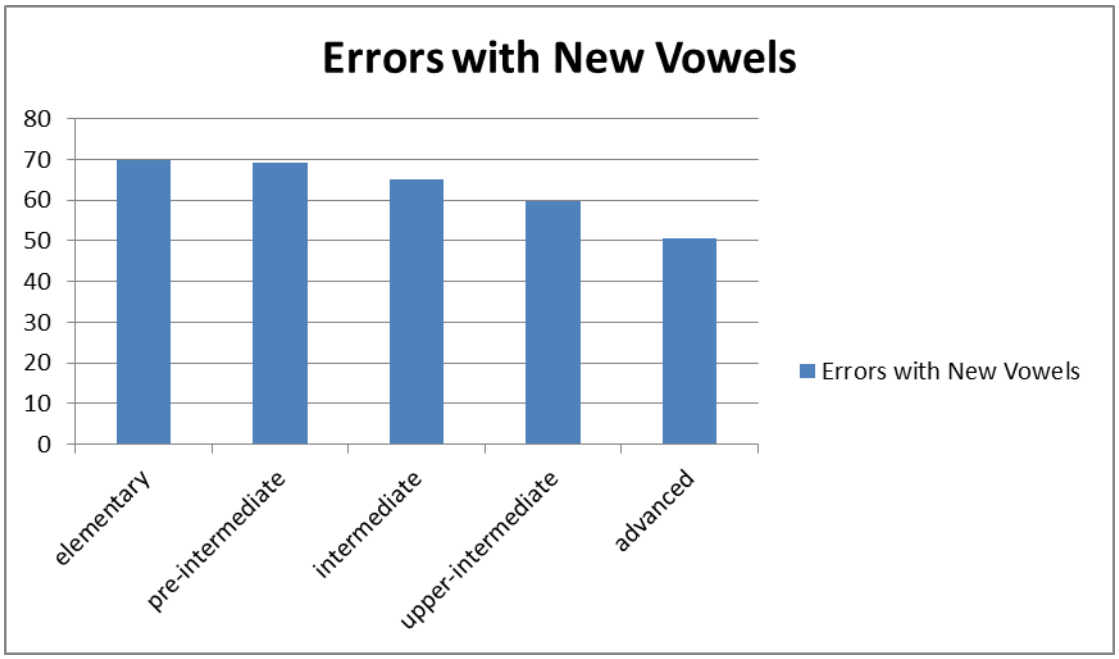


Diagram (12) differences in percentages of errors throughout levels



Triphthongs being new to learners caused high percentages of errors at all the levels. The diagram above shows that learners at the elementary

level had more difficulties with triphthongs than learners at the higher levels. Percentages of errors at the pre-intermediate level is clearly very close to the percentage at the intermediate level. While at the upper-intermediate and the advanced levels, this percentage decreased to lower values.



The above diagram illustrates the percentages of errors throughout the five levels studied. As can be noticed, learners made more errors at the elementary level than the other levels. It is also noticed that the difference between the percentages of errors between levels is not much significant. Nevertheless, the higher the level, the less the errors.

From all the discussion above, it is clearly noticed that;

1. With monophthongs, different or new vowel sounds caused the highest percentage of errors at the pre-intermediate level.
2. With diphthongs, new vowel sounds caused the highest percentage of errors at the pre-intermediate level.

3. With triphthongs, new vowel sounds caused the highest percentage of errors at the elementary level.
4. As for all the new vowels (monophthongs, diphthongs and triphthongs), the highest percentage of errors was at the elementary level.
5. New vowel sounds caused more errors and difficulties for learners at the lower levels (elementary and pre-intermediate) than at the higher levels.

5.3. Research Question Three: Is Syrian learners' tendency to depend on spelling in pronouncing English words affected by their level? Do learners at the lower levels depend on orthography more than learners at the higher levels?

In order to answer this question, the errors made by the participants are studied carefully to find how much they depended on spelling to pronounce the nonsense words used in the study. The diagrams below show the percentages of errors made and correct words pronounced depending on orthography at each level.

Diagram (13) the negative effect of orthography on pronunciation

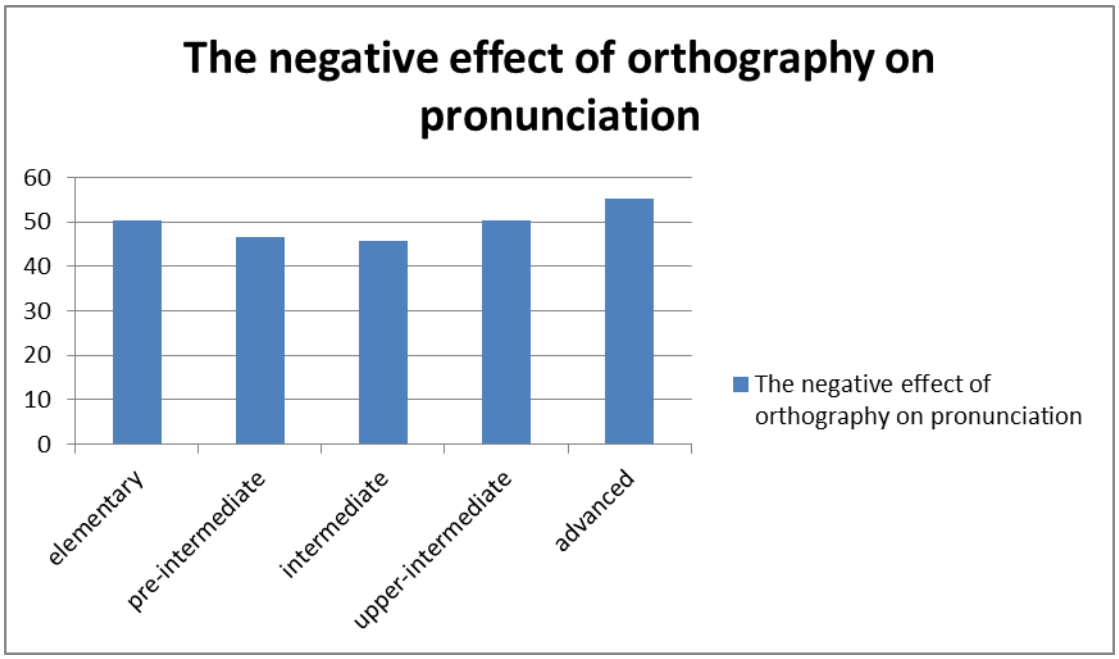
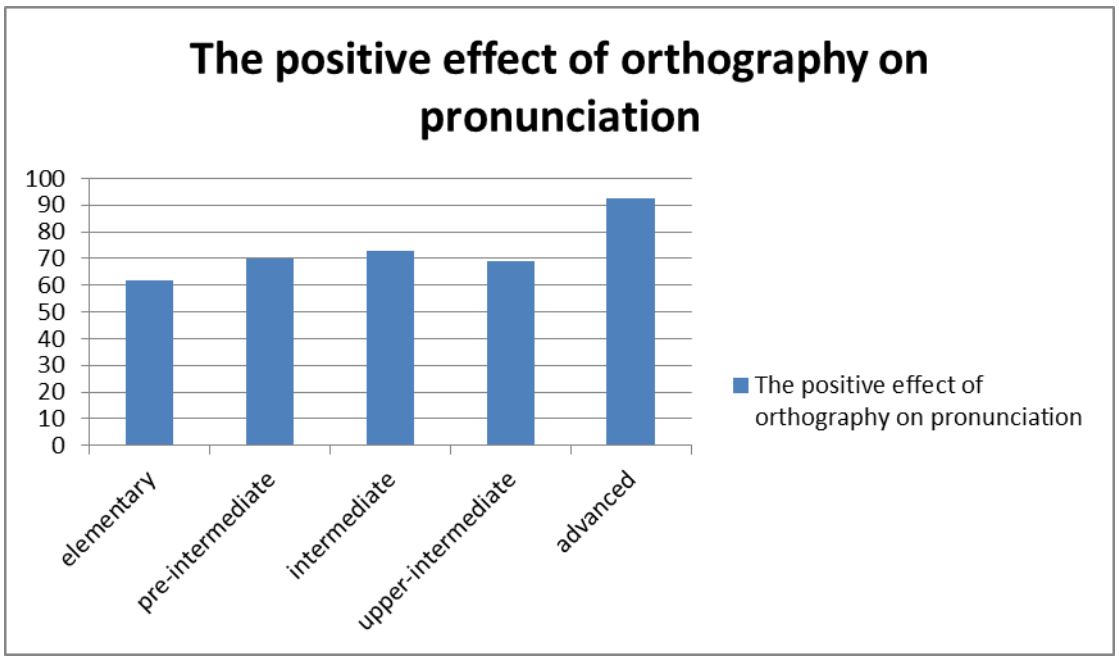


Diagram (14) the positive effect of orthography on pronunciation



The two diagrams above illustrate that participants at the advanced level depended on spelling of the nonsense words for pronouncing them

more than participants at the other levels. More than (50%) of the participants at this level depended on orthography to pronounce the words and this caused them difficulties rather than facilitating the pronunciation. Participants at the other levels also depended on spelling but with different percentages.

The second diagram also shows that depending on orthography affected pronunciation positively. At the advanced level, the percentage is also higher than the other levels being more than (90%). There is no clear relation between depending on spelling and the level of the learners although at the advanced level it is more significant than at the other levels.

5.4. Research Question Four: How far does the inconsistency between English spelling and orthography impede pronunciation?

Another result that may be deduced from data analysis is that orthography facilitated pronunciation more than impeding it or causing errors. A contrast between the two diagrams above displays the difference between the percentages of incorrectly pronounced words (diagram 13) and correctly pronounced words (diagram 14).

Examples of errors caused due to the effect of orthography are many. One of them is pronouncing the vowel /æ/ in (chab) as /eɪ/ after its name in the alphabet. Another example is incorrectly pronouncing the vowel /ɪ/ in (fim) as /aɪ/ also after its name. Nevertheless, in other cases, depending on orthography was positive, making pronouncing certain vowels easier. For instance, diphthongs /ɔɪ/ and /aɪ/ were correctly pronounced due to the spelling of (doit) and (dright) although diphthongs caused most of the errors for the participants. Triphthong /ɔɪə/ in (moyal)

were correctly pronounced and caused the least number of errors among English triphthongs.

These examples and many others show that depending on orthography in pronouncing new vowels is not always negative, it can also be positive. Learners at all levels tend to rely on the spelling of new words in pronouncing them, and the results showed that depending on spelling in pronouncing got a positive effect more than a negative one at all the levels studied as can be noticed from the diagrams (13 – 14) above.

Below is a table showing errors in pronouncing the vowels. In the first column, the sample word is put with the correct pronunciation of the vowel. In the second one, the most occurring errors made by the participants are included. A possible explanation of these errors in light of orthography effect is given in the third column.

Table (4) The Effect of Orthography on Pronouncing Vowels

The vowel	Incorrect pronunciation	Explanation in terms of orthography effect
/ɪ/ fim	/e/ /i:/ /aɪ/	/aɪ/ may be traced back to effect of orthography; the name of the letter
/e/ ped	/ɪ/ /i:/ /eɪ/	/i:/ may be traced back to effect of orthography; the name of the letter
/æ/ chab	/e/ /eɪ/	/eɪ/ may be traced back to effect of orthography; the name of the letter
/ə/ cyter	/æ/	
/ɒ/ glog	/ʌ/ /ɔ:/	/ ɔ:/ may be traced back to effect of orthography; the name of the letter
/ʌ/ phum	/ʊ/ /u:/	/u:/ may be traced back to effect of orthography; the name of the

		letter
/ʊ/ sould	/u:/ /ɔ:/ /aʊ/	/u:/ /ɔ:/ may be traced back to effect of orthography; the name of the letter
/ɜ:/ gur	/ʌ/ /ɔ:/ /u:/	/u:/ may be traced back to effect of orthography; the name of the letter
/i:/ heest	/e/ /ɪ/	
/u:/ hupe	/ʌ/ /ʊ/	Although orthography may have a positive effect more than a negative one, the percent of errors is relatively high at lower levels (60%-79%)
/ɑ:/ marve	/e/ /æ/ /eɪ/	/eɪ/ may be traced back to effect of orthography; the name of the letter
/ɔ:/ salk	/ʌ/ /æ/ /ɑ:/	
/eə/ bair	/aɪ/ /eɪ/	
/əʊ/ boad	/u:/ /ɔ:/ /aʊ/	
/ɔɪ/ doit	/u:/ /ɔ:/	The effect of orthography was more positive than negative with relatively low percent of errors at all levels (10%-50%) impeding (low percent)
/aɪ/ dright	/ɪ/ /e/	The effect of orthography was more positive than negative with relatively low percent of errors at all levels (0%-20%)
/ʊə/ kure	/ʊ/ /u:/	/u:/ may be traced back to effect of orthography; the name of the letter
/ɪə/ mear	/eɪ/ /i:/	
/eɪ/ shain	/aɪ/	Most probably due to the negative effect of orthography
/aʊ/ spoud	/u:/ /ɔ:/	
/əʊə/ boer	/ɔ:/ /ɔɪ/ /ɔɪə/ /aʊ/ /aʊə/	

/eɪə/ flayer	/aɪ/ /aɪə/	Less errors than the diphthong /eɪ/ at certain upper. and adv. levels (less than 50%)
/aʊə/ mowel	/ɔɪə/ /aʊ/ /ɔ:/	
/ɔɪə/ moyal	/ɔɪ/ /ɔ:/	-The effect of orthography was more positive than negative with low percent of errors at all levels (0%-10%) -Less errors than the diphthong /ɔɪ/ at all levels
/aɪə/ pire	/aɪ/ /i:/ /eɪ/	More errors than the diphthong /aɪ/ at all levels

In this chapter, the research questions of the study were answered and discussed in the light of data analysis. It was found that English diphthongs and triphthongs cause more difficulties for Arabic learners than monophthongs. It was also noticed that English vowel sounds similar to the Arabic ones cause less errors for the learners since they are more familiar to them.

This study also showed that many learners tend to depend on orthography or spelling of the pronounced words, and learners at the advanced level in this study depended on orthography more than learners at the other levels did. The results of depending on orthography can be both negative and positive. Nevertheless, the positive effect of orthography was more significant than the negative effect as the discussion above illustrated.

A comparison can be drawn between the above results and the results of the studies mentioned in the "The Effect of Arabic on English Vowel Sounds Pronunciation - Studies based on CAH" chapter. It is

important to refer first to certain points which make this study unique and differentiate it from the other studies.

1. Firstly, this study focused on all English vowels; monophthongs, diphthongs and triphthongs while the others merely focused on monophthongs and some diphthongs.

2. Secondly, in this study learners from different levels participated in order to focus on the effect of the various levels on pronunciation.

3. Thirdly, and as a result for studying learners at various levels, the words which were used in the test were nonsense words unlike other studies that used common words. For example, in Al Saqqaf and Vaddapalli's study, the participants' levels were not taken into consideration so the researchers used common words in their test. The same happened in Awad's study *The Impact of English Orthography On Arab EFL learners' pronunciation of English*. Most of the words he used were familiar to the participants, yet he also used unfamiliar words to prove how challenging the pronunciation of English is to Arabic learners.

4. Fourthly, the effect of orthography on pronouncing vowels was focused on in this study while ignored in most of the others, though in their results the effect of orthography was mentioned. This can also be related to the use of nonsense words in the pronunciation test, since participants were expected to rely on orthography in pronouncing words which they did not know, as CAH suggested.

The results of these studies were compared to the results of this study, and the following points were discovered:

1) Kharma & Hajjaj's study showed that more errors were made with diphthongs, although dialectical Arabic allows some combinations of vowels like /ei/ and au/ which can be considered diphthongs. Diphthongs were replaced by other vowels as the examples below show. Results of this study showed the same points. Percent of errors are given below to clarify the occurrence of these errors.

   a) /eə/ was replaced by /eɪ/ (81% of participants' errors with this vowel)

   b) /ʊə/ was replaced by /u:/ (80% of participants' errors with this vowel)

   c) /ɪə/ was replaced by /i:/ (66% of participants' errors with this vowel)

   d) /əʊ/ was replaced by /ɔ:/ (76% of participants' errors with this vowel)

2) Results of Kharma and Hajjaj's study showed that participants had problems in distinguishing certain pairs of vowels:

   a) /ɪ/ was pronounced instead of /e/ (50% of our participants' errors with this vowel)

   /e/ was pronounced instead of /ɪ/ (54% of our participants' errors with this vowel)

   b) /ʌ/ was pronounced instead of /ɒ/ (65% of our participants' errors with this vowel)

   /ɒ/ was pronounced instead of /ʌ/ (21% of our participants' errors with this vowel)

3) Al Saqqaf and Vaddapalli's study also showed that vowels like /ɑː/ and /ʌ/ which are similar to allophones of the Arabic vowel /a/ and are supposed to be easily pronounced by Arabic learners, caused difficulties for them due to their unawareness of them.
   a) /ɑː/ an allophone of /æ/ was replaced by it (41% of our participants' errors with this vowel)
   b) /ʌ/ an allophone of /æ/ was replaced by it (4% of our participants' errors with this vowel)

4) Similar vowels caused many errors to the participants in this study unlike the other studies. This can be due to the use of nonsense words in the pronunciation test. Spelling had a negative influence with most of the vowels.

By making this comparison with other studies, it was noticed that some of the results are similar while others are different due to the differences in the instrument used for collecting data. Numbers and percentages for each one of these errors were given to support these results.

Chapter 6: Conclusion

In this chapter, certain ideas are suggested for teachers of English in order to help them overcome many of their students' errors which are inevitable, but their negative effects can be reduced. This chapter also presents limitations of the study and recommendations for further studies.

6.1. Recommendations

The introduced recommendations and suggestions are divided into two sections:

1. **Recommendations for further studies:**

It is highly recommended that phonetic research is expanded to include studying the negative effect of Arabic on pronouncing English consonant sounds. By doing this, a thorough picture of Syrian learners' difficulties in pronouncing English sounds will be drawn in order to find effective solutions for pronunciation problems and difficulties. It would also be helpful to study the effect of other factors on learning English as a second language, such as the effect of learners' motivation and age.

2. **Recommendations for English language teachers**:

Errors are inevitable at any level throughout the learning process; nevertheless, it is our role as teachers to reduce the negative impact of these errors. Errors with pronunciation may cause many problems and difficulties for learners in their trial to build successful communication with other people especially native speakers. Learners who mispronounce words may not be able to deliver the intended message of their speech to listeners or receivers causing communication difficulties and

misunderstandings (Kelly, 2000). These reasons make it very important to give pronunciation more time and attention during the lesson by using certain techniques and activities to teach it. Drilling is one of the activities that could be used to encourage learners to practice English in the classroom. More importantly and in order to teach pronunciation more efficiently, teachers must be aware of the phonological system of both languages; Arabic and English. This awareness and knowledge performs a solid ground on which teachers can stand in drawing learners' attention to similarities and differences between the two languages in order to facilitate pronunciation (Al Saqqaf & Vaddapalli, 2012). Referring learners to similar and new or different sounds could be step number one on their way to overcome their pronunciation difficulties. Al Saqqaf and Vaddapalli (2012) suggested a list of Arabic words that teachers can refer learners to in order to "approximate the English pronunciation," for example, when teaching the English vowel /e/ teachers can refer learners to the allophonic variant of Arabic /i/ as in the word /qef/ (stand up) since it is similar to English /e/ (Al Saqqaf & Vaddapalli, 2012, pp. 43-44).

English teachers should also refer learners to the fact that English orthography is opaque unlike transparent Arabic orthography. This could be done by showing learners various English examples and contrasting them with Arabic. Homographs (words with the same spelling, but with different pronunciations) and homophones (words with the same pronunciation, but with different spellings) could be successfully used in certain activities to show learners the lack of correspondence between spelling and pronunciation in English.

Teachers can use many techniques to teach pronunciation; nevertheless, the most critical thing is teachers' knowledge of the phonological aspects of Arabic and English and how to use it in planning and creating successful activities to give learners the chance to practice English pronunciation during class time.

6.2. Limitations

Few factors caused limitations for this study. Lack of participants is one of them, and this caused shortage in the data collected. Moreover, the uncontrolled setting of recording also caused lack in data. Some of the data was missed by the participants and was lost due to the bad quality of the recording. In this case and since Praat couldn't show formant frequencies for these sounds, they were dismissed. This loss in data must have affected the results in one way or another.

Another limitation of this study is the fact that it only focused on interlingual errors. Other types of errors known as intralingual errors and their reasons were not taken into consideration. They were only referred to briefly in the body of the paper but not studied in details.

6.3. Summary

In this study, the researcher tried to answer the question of native language, Arabic, interference and its negative effect on Syrian learners' pronunciation of English vowel sounds. Two hypotheses were suggested depending on contrastive analysis theory and its ideas. The first hypothesis is that learners have more difficulties with diphthongs and triphthongs than monophthongs. The second one is that learners dependence on spelling to pronounce new uncommon words causes

pronunciation difficulties and problems because of the opaque nature of English orthography. The phonological systems of Arabic and English were discussed in details and a comparison was drawn between them in order to find out the similarities and differences, which play the main role in the interference process.

Participants in the study were divided into five levels: elementary, pre-intermediate, intermediate, upper-intermediate and advanced. They were asked to record nonsense words representing English monophthongs, diphthongs and triphthongs. The data collected was analysed with Praat to measure formant frequencies of the vowels to compare them with standard formants in order to figure out how many errors were made by the participants at each level and with each type of vowel sounds. The negative impact of Arabic was studied along with the effect of spelling on pronunciation. Results of data analysis showed that monophthongs caused less errors for learners than diphthongs and triphthongs at all the levels studied. New vowel sounds caused more errors than similar vowels which in turn caused a significant percentage of errors. Although errors with similar vowels were less than new vowels, their relatively high percentages showed that Arabic was not a very helpful factor in facilitating pronunciation. Data analysis also showed that learners at all levels tend to rely on the spelling of new words to pronounce them. Depending on these results and after understanding the effect of Arabic on English vowels pronunciation, certain ideas were suggested to help teachers with teaching pronunciation.

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Appendices:

Appendix 1: Symbols for Phonemes

ɪ as in 'pit'
e as in 'pet'
æ as in 'pat'
ʌ as in 'putt'
ɒ as in 'pot'
ʊ as in 'put'

i: as in 'key'
ɑ: as in 'car'
ɔ: as in 'core'
u: as in 'coo'
ɜ: as in 'cur'

ə as in 'about'

eɪ as in 'bay'
aɪ as in 'buy'
ɔɪ as in 'boy'

əʊ as in 'go'
aʊ as in 'cow'

ɪə as in 'peer'
eə as in 'pear'
ʊə as in 'poor'

p as in 'pea'
t as in 'toe'
k as in 'cap'
f as in 'fat'
θ as in 'thing'
s as in 'sea'
ʃ as in 'ship'

b as in 'bee'
d as in 'doe'
g as in 'gap'
v as in 'vat'
ð as in 'this'
z as in 'zip'
ʒ as in 'measure'

h as in 'hen'
m as in 'mat'

l as in 'led'

n as in 'nap'
ŋ as in 'hang'

r as in 'red'
j as in 'yet'

tʃ as in 'chin'

dʒ as in 'gin'

ملخص البحث

يتلخّص موضوع البحث بإلقائه الضوء على الأخطاء التي قد يرتكبها الطلاب السوريون في لفظ أحرف العلّة الإنكليزية نتيجةً للتأثير السلبي للغتهم الأم، اللغة العربية. نورد في هذه الدراسة شرحاً شاملاً لعملية وأجهزة اللفظ مظهرين من خلاله أوجه الشبه بين اللغتين العربية والإنكليزية، كما ونورد وصفاً دقيقاً للأحرف الصوتية الإنكليزية والعربية لنقوم بمقارنة المنظومتين الصوتيتين لكلا اللغتين. اعتماداً على النسخة التنبؤية لفرضية التباين التحليلي، والتي تعتمد أساساً على التباينات والاختلافات بين اللغتين المدروسة والأم للتنبؤ بأخطاء الطلاب، يبدو من الممكن التوصل إلى توقّعات أو فرضيات حول الأسباب التي تؤدي إلى ظهور الأخطاء اللفظية لدى الطلاب السوريين. تتلخّص هذه الفرضيات بنقطتين اثنتين وهما: الاختلافات بين أحرف العلّة العربية وأحرف العلّة الإنكليزية ما قد يؤدي إلى صعوبة لفظ الأحرف الجديدة المختلفة عن الأصوات العربية. بالإضافة إلى عدم التوافق بين الكتابة والنطق في اللغة الإنكليزية مما يسبب بعض الصعوبات، إذ قد يلجأ الطلاب إلى الاعتماد على اللغة المكتوبة لمساعدتهم في اللفظ.

ستسعى هذه الدراسة إلى التعامل مع هاتين الفرضيتين بالإضافة إلى توضيح اختلاف قدرة الطلاب على لفظ هذه الأصوات عبر دراسة وتحليل نطقهم لها خلال خمس مستويات تعليميّة مختلفة. سيتم إجراء البحث في معهد لغة خاص نظراً لاهتمام هذه المؤسسات التعليمية بتدريس اللغة ومساعدة الطلاب على اكتسابها بطرق ووسائل حديثة وتركيز معظمها على اكتساب النطق واللفظ السليم للغة المدروسة، على عكس المدارس العامة التي –وللأسف– لا تبدي ذات الدرجة من الاهتمام بنطق الطلاب الدارسين.

تضم عيّنة البحث طلاباً سوريين من مستويات تعليمية وبيئات اجتماعية مختلفة مما يعني اختلاف لهجاتهم المحكية التي لا يتم التركيز عليها في هذا البحث بقدر اللغة العربية الفصحى. سيتم جمع البيانات الصوتية عبر تسجيل نطق الطلاب السوريين –في خمس مستويات دراسية– لمجموعة من الكلمات الإنكليزية "التي لا تحمل معنى" nonsense words والتي تشابه كلمات إنكليزية معروفة. إن كم الكلمات التي يعرفها الطلاب في المستويات الدراسية الأعلى قد يجعل من لفظ بعض الكلمات أمراً هيّناً، بينما قد تسبب ذات الكلمات مشكلة كبرى لطلاب المستويات الأدنى. لذا كان استخدام "الكلمات التي لا تحمل معنى" nonsense words بديلاً ناجعاً لتفادي هذه المشكلة التي كانت ستؤثر سلباً على جودة البيانات وبالتالي نتائج البحث. تم استخدام برنامج Praat لأجل قياس ترددات الأصوات المسجلة من قبل المشاركين في البحث لهدف مقارنتها مع الترددات القياسية للأصوات الإنكليزية للعمل على الإجابة على أسئلة البحث المتعلقة بمدى تأثير الأحرف الصوتية العربية على نطق نظيراتها الإنكليزية ونسبة الأخطاء الناتجة عن هذا التأثر في كل مستوى دراسي.

يظهر تحليل البيانات أن أحرف العلّة الإنكليزية المركّبة diphthongs and triphthongs سببت أخطاء أكثر من أحرف العلّة البسيطة monophthongs مما يدعم فرضيتنا الأولى كون أحرف العلّة المركّبة غير موجودة في اللغة العربية. كما ويظهر بأن الطلاب المشاركين في البحث اعتمدوا على الكتابة في لفظ الكلمات بلا معنى المستخدمة في الدراسة وجاء تأثير الاعتماد على الكتابة في اللفظ إيجابياً في معظمه على عكس فرضيتنا الثانية. يشير البحث أيضاً إلى مقترحات للمزيد من الأبحاث المتعلقة بأخطاء الطلاب اللفظية بالإضافة إلى اقتراح أنشطة درسية تهدف لتعليم النطق، مظهرين من خلالها للمدرسين أهمية تعليم هذه المهارة اللغوية.

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التأثير السلبي للمنظومة الصوتية للغة العربية في لفظ الطلاب للأحرف الصوتية الإنكليزية – دراسة لطلاب معهد لغة خاص في مدينة دمشق

رسالة مقدّمة لنيل درجة الماجستير في اختصاص اللغويات التطبيقية

إعداد الطالبة نبال الشوفي

إشراف الدكتورة منوّر السيد

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