International Journal of Applied Linguistics & English Literature
E-ISSN: 2200-3452 & P-ISSN: 2200-3592
www.ijalel.aiac.org.au

Interference of Phonological Aspects of Emphatic Consonant Sounds from Arabic into English Consonant Sounds for Sudanese University Students of English

Osman Alteyp Alwasila Alteyp*

The Department of Englsh, College of Science and Humanities at Majmaah University, Kingdom of Saudi Arabia

Corresponding Author: Osman Alteyp Alwasila Alteyp, E-mail: o.awasila@mu.edu.sa

ARTICLE INFO

Article history
Received: July 15, 2019
Accepted: August 19, 2019
Published: September 30, 2019
Volume: 8 Issue: 5
Advance access: September 2019

Conflicts of interest: None
Funding: None

ABSTRAC

This study investigates why SUSE substitue the English consonant sounds /t/, /d/, /s/, /z /and /ð/ by the emphatic Arabic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ in English words. The sample of this study is a group of Sudanese university students majoring in English. The first data collection tool is a test. This test contains a sample of words that contain the problematic sounds; these words have been observed to contain /ʌ/, /ə/ and /ɒ/. The second CAH is used to compare the articulation of the problematic sounds in both languages in addition to the emphatic sounds in Arabic. The most important results are as follows. First, some distinctive features of the English vowel sounds are shared by distinctive features of the emphatic Arabic sounds. Second, because of their absence in Arabic, the English vowels /ʌ/, /ə/ and /ɒ/ regressively and progressively influence the English sounds /t/, /d/, /s/, /z/ and /ð/ and change their quality to the emphatic Arabic sounds) /s̲/, /t̲/, /d̲/, and /ð̲/).

Key words: Sudnaese Unviresity Sudents of English, Contrastive Analysis Hypothesis, Interference, Consonant Sounds of English

INTRODUCTION

I have taught Sudanese university students majoring in English many courses in that language. I have observed these students substituting some English consonant sounds with emphatic Arabic consonants. There are many common errors committed by SUSE. For example, the wrong pronunciation of the voiceless English sound /p/ as the Arabic voiced sound /b/ is attributed to the absence of the English voiceless /p/ in the Arabic sound system. The errors examined in this research are viewed as the formation of a set of bad habits that are transmitted from one generation to another, such as the error of pronouncing the voiced English sound /v/as the Arabic voiced /f/ sound. Such misuse of this sound is transmitted by Arab teachers of English to their students.

Similarly, Cook (1992) claims that the students' native language is found in L2 learners' minds regardless of whether the teacher wants it there. The knowledge of the L2 that they experience is associated in many ways with their L1 knowledge. For this reason, second language learners transfer the features from their L1 into the L2. This type of transfer is called 'interference'. Accordingly, Avery and Ehrlich (1992) assert that learners transfer phonological features of their L1 into the L2 and that this transfer is likely to lead to unfamiliar accents. When these unfamiliar sounds found in many English words are substituted by non-native speakers, they will be understood by neither a native nor a foreign English speaker.

It is known that SUSE encounter some phonological problems in English concerning English consonant sounds that are not found in Arabic, and SUSE are expected to substitute these sounds using Arabic consonant sounds. However, the problem that arises while teaching is that SUSE substitute the same consonants in English /t/, /d/, /s/, /z/ and /ð/ that are found in Arabic with other Arabic consonant sounds that are not found in English /t̲/, /d̲/, /s̲/, and /ð̲/. For example, students have been observed to substitute the English words sun with /s̲ʌn/, ton as /t̲ʌn, /bʌd̲/iː/, father as /ˈfɑː.ð̲ər/and cousin as/kʌð̲ən/.

Objectives of the Study

This study aims to:

- Identify the causes that make SUSE pronounce English consonant sounds as emphatic Arabic sounds.
- Conduct a clear phonological analysis to identify in which phonological environments SUSE are motivated to substitute English consonant sounds with emphatic Arabic sounds.
- Determine why the same English sounds as non-emphatic Arabic sounds (/s̲/, /d/, /z/, /ð/ and /t/) are changed to emphatic Arabic sounds.

Significance of the Study

This study will:

1 Identify which exact articulatory causes motivate SUSE to pronounce English consonants as Arabic emphatic consonants.

Published by Australian International Academic Centre PTY.LTD.

http://dx.doi.org/10.7575/aiac.ijalel.v.8n.5p.10

2 The phonological analysis will help Arab teachers of English identify the linguistic environment in which SUSE mix up between emphatic consonants in Arabic and non-emphatic sounds of Arabic are found in English.

The practical recommendations will help syllabus designers of English curricula design techniques and linguistic activities to tackle this type of phonological problem

Problem Statement

SUSE substitute the English sounds /t/, /s/, (/ð/ and /z/) and /d/ with the emphatic Arabic sounds /s̲/, /t̲/, /d̲/, and /ð̲/, respectively, in the onset and coda of syllables with a core of the English vowel sound /ʌ/, /ɒ/ or /ə/. Committing such errors while speaking results in articulating English words mixed with Arabic sounds that are not found in English.

LITERATURE REVIEW

SUSE encounter many difficulties in the pronunciation of both consonant and vowel sounds in English. The causes of these difficulties have been identified by many researchers using different types of scientific approaches and data collection tools. Many empirical results have been found, and conclusions have been reached in light of these studies. Some of these results are presented in this section.

A study conducted by Altaha (1995) tests a difficulty encountered by Saudi Arabian students in the pronunciation of consonant pairs in English (/ʧ/ and /ʃ/ as in 'chair' and 'share'; /v/ and /f/ as in 'van' and 'fan'; and /p/ and /b/ as in 'pat' and 'bat').

In the above mentioned study, Altaha (1995) shows that the problems faced by Saudi students (concerning the pronunciation of English consonant sounds) are due to the similarities and differences between English and Arabic.

The lack of these sounds in English motivates SUSE to substitute these sounds with sounds from the Arabic language. This substitution leads the speaker to convey a false friend (a word with different meaning). This false friend is due to the replacement of an English sound by an Arabic sound with different distinctive features. This linguistic phenomenon is called linguistic interference. This problem is known as language interference. Language interference includes all the linguistic features of the L1 that are transferred to the L2 (including phonological, syntactical, and morphological features).

Interference has been defined by a number of linguists. Among these linguists are Dulay, et al. (1982), who assert that 'interference' is used to refer to two very distinctive linguistic features, one of which is basically psychological and refers to the power of old habits over new habits taught to learners. The same term 'transfer' is categorized as 'negative transfer', which is used to show the negative influence of the old habit on the new behaviour being taught/learned, and 'positive transfer', which facilitates the correct performance because the new behaviour is similar to the old behaviour.

Linguists and researchers use many linguistic theories to determine which linguistic elements of a native language are either positively or negatively transferred (by the foreign/second language learner). These theories include contrastive analysis and error analysis. Contrastive analysis is used in this research as a method to investigate the articulatory causes that motivate SUSE to substitute consonant sounds in English with emphatic consonant sounds in Arabic.

METHODOLOGY

Study Sample

The study sample consisted of 23 adult native speakers of Arabic (10 female and 13 male). They were university students majoring in English in the 2nd level. They had been taught English in formal classes for approximately 1 academic year at the time of the study. None of them had been to an English-speaking country, and none had an opportunity to practice English outside the classroom. Moreover, none of the 23 subjects speak any other foreign languages.

Data Collection Tools

Data were collected using three tools

1. Checklist observation was used by the researcher to write down any words that made the students substitute the English consonant sounds /t/, /d/, /s/, /z/ and /ð/ with Arabic emphatic sounds /t/, /d/, /s/, /z/ and /ð/ in English words, instead of English consonants as emphatic consonants in Arabic.

2. Contrastive Analysis

To describe the research problem in a real context, the researcher needed to use a contrastive analysis that was appropriate for this type of research problem.

This method is used to compare the linguistic systems of two languages to discover the similarities and differences. Lado (1957) states that an instructor who compares a foreign language with students' native language will be better able to identify the actual learning problems faced by students who are learning a second or a foreign language.

In this context, Yar mohammadi (1995) and Ringbom (1994) define Contrastive Phonology as the process of contrasting and comparing the sound systems of two languages to identify their differences and similarities. Similarities are considered facilitators of learning, and differences are considered predictable sources of errors committed by foreign or second language learners.

Gass and Selinker's studies (1993 and 1994) describe the procedures of Contrastive Analysis as follows:

- Description of the linguistic elements of two languages;
- Selection of certain linguistic elements of the two languages for comparison;
- Comparison of areas of similarity and difference;
- Prediction of which areas motivate L2 learners to commit errors; and
- Testing of the predictions.

3. Test

Test is used to investigate the authenticity of the assumptions that are concluded by CAH. The followings are the procedures of the test.

Description of the test items

After the problematic sounds were selected, the sounds of both languages were compared to verify the differences between them. The next step was to combine these sounds into a larger phonological construction (English words consisting of one syllable). The structure of the syllable had to contain either (onset core), (core +onset) or (onset +core +coda). The problematic sound had to be the onset and coda of the syllable. The core of the syllable had to be one of the English vowel sounds that are not found in Arabic (the half-open centre (/ʌ/ and /ə/ and half open-close /ɒ/). There are eight items in each question of the test. The results of the test will be of the test are analysed by SPSS (Statistic Package for Social Studies).

The items tested were monosyllabic words in which the study sample substituted consonant English sounds with emphatic Arabic consonant sounds. Therefore, the test items were carefully selected; the problematic consonant sounds (whether located at onset or coda of the syllable) had to contain the syllabic core of /ʌ/, /ə/ or /ɒ/.

DATA COLLECTION, DATA ANALYSIS AND RESULTS DISCUSSION

Check List Observation

The checklist observation includes the following sample of words. These words are monosyllabic words containing the same problematic sounds and they are grouped according to the vowel sound they contain:

Words with /ʌ/

The vowel sound	English consonant sound	The structure of the syllable	The sample of the word	Phonetic transcription of the word
/ʌ/	/s/	/s+ ʌ/	son	/sʌn/
/ʌ/	/s/	/ʌ+s/	Bus	/bʌs/
/ʌ/	/t/	/t+ ʌ/	ton	/tʌn/
/ʌ/	/t/	/ʌ+t/	cut	/kʌt/
/ʌ/	/d/	/d+ ʌ/	Does	/dʌz/
/ʌ/	/d/	/ʌ+d/	Body	/bʌdi:/
/ʌ/	/ð/	/ð + ʌ/	Thus	/ðʌs/
/ʌ/	/z/	/ʌ+z/	Does	/dʌz/

Words with /ɒ/

The vowel sound	English consonant sound	The structure of the syllable	The sample of the word	Phonetic transcription of the word
/ɒ/	/s/	/s + ɒ/	Solid	/s ɒlid/
/ɒ/	/s/	/ɒ + s/	Boss	/b ɒ s/
/ɒ/	/t/	/t + ɒ/	Top	/t ɒp/
/ɒ/	/t/	/ɒ + t/	Pot	/p ɒ t/
/ɒ/	/d/	/t + ɒ/	dot	/d ɒt/
/ɒ/	/d/	/ɒ + d/	god	/gɒ d/
/ɒ/	/z/	/ɒ+z/	position	/p ɒziʃən/
/ɒ/	/z/	/z+ɒ/	Zombie	/zɒ mbe/

Words with/ə/

The vowel sound	English consonant sound	The structure of the syllable	The sample of the word	Phonetic transcription of the word
/ə/	/s/	/ə + s/	atlas	/ə tl ə s/
/ə/	/t/	/t + ə/	tomorrow	/təˈmɒr.əʊ/
/ə/	/t/	/ə + t/	capital	/kæp.ɪ.təl/
/ə/	/d/	/d + ə/	adroit	/əˈdrɔɪt/
/ə/	/d/	/ə + d/	older	/ɔldə/
/ə/	/ð/	/t + ə/	father	/ˈfɑː.ðər/

Contrastive analysis between the problematic sounds in both languages

The researcher will not present a full description of the sound systems of Arabic and English because this work has already been conducted by many other scientific studies and papers. Rather, all efforts will be focused on the emphatic consonant sounds in Arabic that are not found in English with their counterpart sounds of English. Some vowel sounds in English that are not found in Arabic will be also considered.

The description of the English vowel sounds that are not found in arabic and the description of the emphatic and non-emphatic sounds in Arabic

Although English has 20 vowel sounds, and Arabic has only six vowel sounds, three short vowel sounds and three vowel sounds, Elmahdi and Khan (2015) state that Arabic vowels are grouped into short and long vowels. The short vowels include fatha kasra and damma. Fatha is distinguished by a small diagonal stroke above consonants, e.g. the short vowels ‘i, u, a’ and the long vowels ‘i:, u:, a:’; all Arabic vowels are included in the English vowel system.

Some vowel sounds in English are not found in Arabic. Elmahdi and Khan (2015) assert that these vowels create great difficulties in production and perception for Arabic speakers: these vowels are [e], [ɔ], and [ʌ].

The following Figures 1 and 2 show the difference between the English and Arabic vowel sounds:

The above Figures include all the English sounds, and the circled sounds are not found in Arabic; therefore, the description concerns English vowel sounds that are not found in Arabic.

Making a comparison using the charts, we can state that none of the centre, middle, back and low-middle vowel sounds in English are found in Arabic. These vowel sounds have been described by Vizental (2008) as follows:

English sound/ʌ

The front of the tongue is withdrawn slightly backwards, and the centre of the tongue is raised slightly towards the half-open position. The opening area between the front of the tongue and the alveolar ridge is wide, and the opening

area between the centre of the tongue and the soft palate is in the mid-open position. The mood of the tongue is lax. The lips are unrounded. /ʌ/ is described by Brinton (2000) as a 'lower and somewhat back sound than schwa', and it is sometimes characterized as a half-mid back vowel.

/ə/

The middle of the tongue is lower than for the articulation of/3:/. The tongue is in the lax mood, and the lips are unrounded while articulating this vowel. This sound is described as either schwa or weak form.

/ɒ/

The soft palate is lowered to the near-open position so that the distance between the jaws is very wide. The tongue is withdrawn towards the back, and then the back of the tongue is raised above the open position. The tongue is in a tense mood. The lips are somewhat rounded.

The description of the emphatic and non-emphatic sounds in Arabic

Emphatic and non-emphatic sounds in Arabic are described by Huthaily (2003) as follows:

/t/ voiceless dentil-alveolar stop

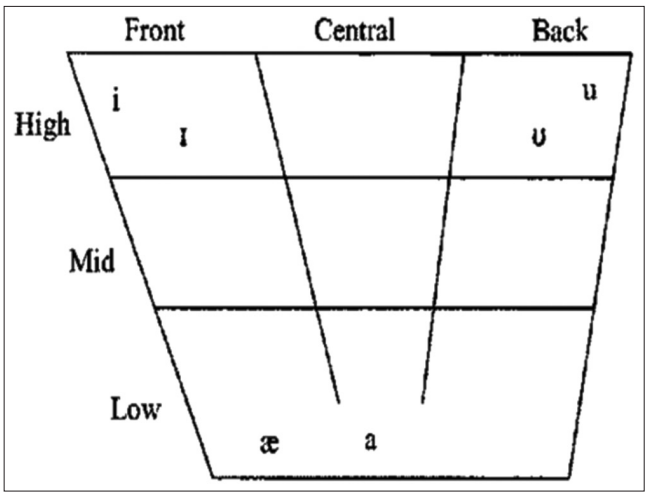

Figure 1. Cardinal vowels of Arabic

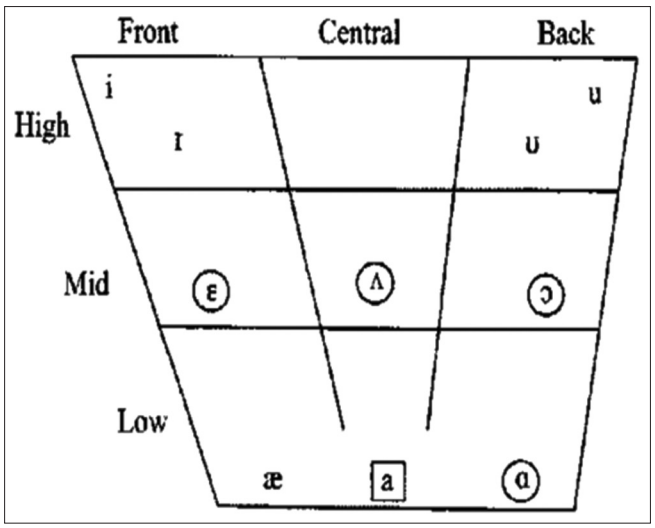

Figure 2. Cardinal vowels of English

In the pronunciation of the sound /t/, the soft palate comes close to contact with the nasal cavity. The apex of the tongue touches the back side of the upper incisors, and the front of the tongue touches the alveolar ridge, making a complete block; when the block is suddenly released, the slight noise is audible, and the sound is described as voiceless because the vocal cords do not vibrate.

/t̲/ voiceless denti-alveolar velarized stop

The sound /t̲/ has the same articulation as the non-emphatic /t̲/, but during the articulation of /t/, the back of the tongue is raised towards the soft palate.

/d/ voiced dentil-alveolar stop

In the production of this phoneme, the soft palate comes close to contact with the nasal cavity. The apex of the tongue makes a complete block with the back side of the upper incisors, and the front of the tongue makes a complete closure with the alveolar ridge. When the front of the tongue suddenly parts from the ridge, the air escapes with an audible explosion. This phoneme is described as a voiced sound because the vocal cords vibrate while articulating it.

/d̲/ velarized stop

The voiceless /d̲/ and its counterpart /t̲/ have the same articulation, but during the articulation of /d̲/, the back of the tongue is raised towards the soft palate.

/ô/

To produce this sound, the tip and blade of the tongue touch the upper incisors, forming a narrow passage. Air escapes with audible friction. This sound is described as a voiced sound because the vocal cords vibrate while articulating it.

/ô̲/

The sound /ô/ is produced similar to the sound /ô/, but during its articulation, the back of the tongue is raised towards the soft palate.

/z/ voiced alveolar fricative

The phoneme /z/ is substituted exactly the same as the sound /s/, but during the production of /z/, the vocal cords vibrate, so this sound is described as a voiced alveolar fricative.

/s/ voiceless alveolar fricative

In the production of the sound /s/, the soft palate is raised. The blade of the tongue moves against the alveolar ridge, making a very narrow passage between them so that air escapes with friction. The vocal cords do not vibrate. This phoneme is a voiceless alveolar fricative.

/s̲/ voiceless alveolar velarized fricative.

The sound /s̲/ has the same production as the sound /s/; during the articulation of /s/, the back of the tongue is raised in the direction of the soft palate. This phoneme is a voiceless alveolar velarized fricative.

English has all of the non-emphatic sounds of Arabic (/t/, /d/, /s/, /z/ and /ð/), and these sounds are not included in the list of problematic Arabic sounds that are not found in English.

English consonants

The articulation of English consonant sounds is described by Vizental (2008).

The English stops /t/ and /d

The alveolar ridge is touched by the tip of the tongue forming a complete block. The air stream is blocked in the oral cavity; then, the block is suddenly released, and the air escapes with an explosion. During the production of the sound /t/, the vocal cords do not vibrate, so the sound /t/ is described as voiceless. The sound /d/ is described as voiced because the vocal cords vibrate during its production.

Fricative /s/ and /z/

The tip and blade of the tongue touch the upper alveolar ridge, and the front of the tongue is raised against the hard palate, forming a narrow passage. The air-stream escapes with great friction.

Fricative /ð/

To produce the sound /ð/, the blade of the tongue is pressed against the upper side teeth, making a narrow passage. This sound is described as voiced because there is a vibration while articulating it. The air-stream passes through this narrow passage with audible friction.

Comparison between the Arabic and English vowel sounds

There are many common distinctive features between Arabic and English monophthongs. Furthermore, all Arabic monophthongs are found in English. Most of the front-open /æ/, front-close (/i:/ and /i/) and back-close (/u/ and/u:/) vowels are found in both languages. The only differences between monophthongs in English and Arabic are the half-open centre (/ʌ/ and /ə/), open-back/ɑ:/and half open-close /ɒ/.

Comparison between the Articulation of English and Arabic Consonant Sounds

To review the articulation of emphatic sounds, we must use pictures to show the different mechanisms of the articulation of the emphatic and non-emphatic Arabic sounds (the same consonant sounds that are found in English). All of the pictures showing the articulation of emphatic and non-emphatic Arabic sounds were taken from http://durus.nur.nu/Tajweed/_makharij/more/makharij-poster.jpg.

/d/ and /ḍ/

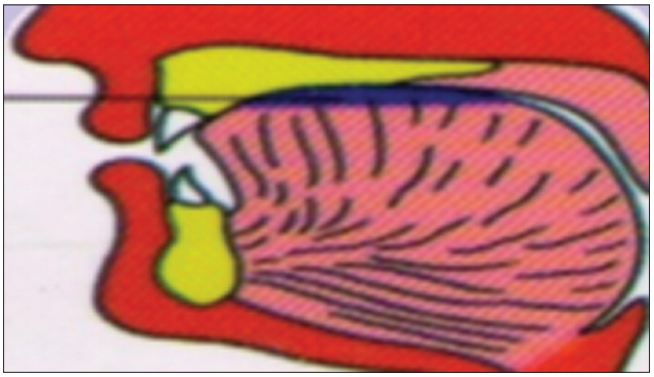

Figure 3. /ḍ/

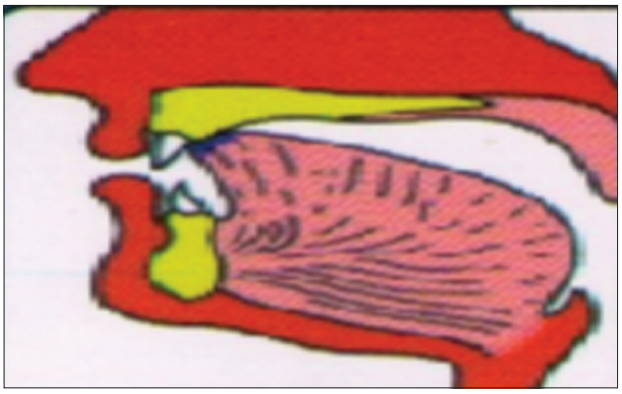

Figure 4. /d/

Arabic emphatic sound /أضْ //ḍ/	**Arabic and English /d/**
This sound has the same articulation, but the middle of the lower tongue makes a curled shape, and the back of the tongue is raised against the soft palate, making a narrower passage than in the production of /d/during the articulation of this emphatic consonant sound.	In the production of this phoneme, the soft palate comes into close contact with the nasal cavity. The apex of the tongue makes a complete block with the back side of the upper incisors and the front of the tongue, making a complete closure with the alveolar ridge; when the front of the tongue suddenly parts from the ridge, the air escapes with an audible explosion. This phoneme is described as a voiced sound because the vocal cords vibrate while articulating it.

/t/ and /ṯ/

Figure 5. /t/

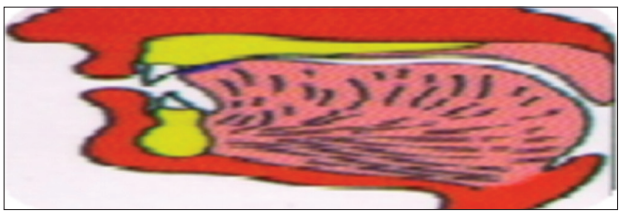

Figure 6. /ṯ/

Arabic and English /t/	**Arabic emphatic sound /اظ //ṯ/**
In the pronunciation of the sound/t/, the soft palate comes into close contact with the nasal cavity. The apex of the tongue touches the back side of the upper incisors, and the front of the tongue touches the alveolar ridge making a complete block; when the block is suddenly released, a slight noise is audible. The sound is described as voiceless because the vocal cords do not vibrate.	This sound has the same articulation as the non-emphatic sound; however, when the centre and back of the tongue are raised against the soft palate, the front of the tongue makes a curled shape during the articulation of this emphatic consonant sound.

/s/ and /s̲/

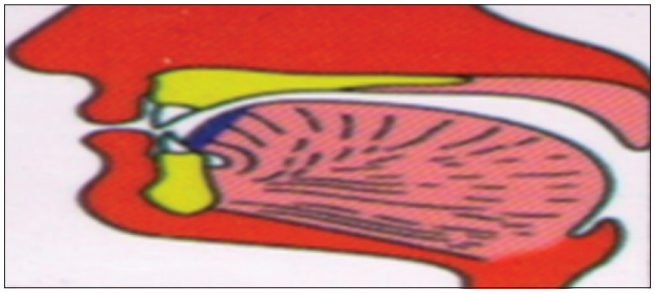

Figure 7. /s/

Figure 8. /s̲/

Arabic and English /s/	Arabic emphatic sound /اصْ //s̲/
In the production of the sound /s/, the soft palate is raised. The blade of the tongue moves against the alveolar ridge, making a very narrow passage between them such that air escapes with friction. The vocal cords do not vibrate. This phoneme is a voiceless alveolar fricative.	This sound has the same articulation as the non-emphatic sound; however, when the centre and back of the tongue are raised against the soft palate, the front of the tongue makes a curled shape during the articulation of this emphatic consonant sound.

/ð/, /z/ and /ð/

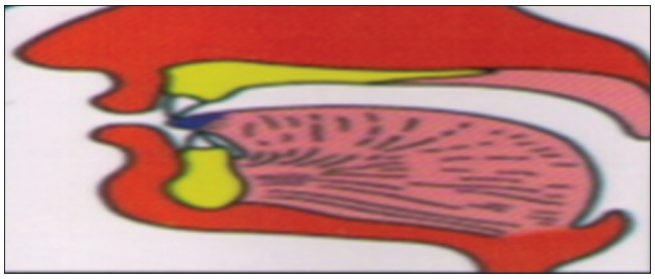

Figure 9. /ð/, /z/

Figure 10. /ð̲/

Arabic and English /ð/, /z/	Arabic emphatic sound //اظْ ð̲/
1 To produce this sound, the tip and blade of the tongue touch the upper incisors, forming a narrow passage. Air escapes with audible friction. This sound is described as a voiced sound because the vocal cords vibrate while articulating it. 2 The phoneme /z/ is substituted exactly the same as the sound /s/, but during the production of /z/, the vocal cords vibrate; thus, this sound is described as a voiced alveolar fricative.	This sound has the same articulation as the non-emphatic sound; however, when the centre and back of the tongue are raised against the soft palate, the front of the tongue makes a curled shape during the articulation of this emphatic consonant sound.

The Differences between the Sounds in Arabic and in English

It is clear that any differences between the sound systems of English and Arabic will lead to phonological problems for both Arabs who learn English as a foreign language and English speakers who learn Arabic as a foreign language. There are many studies noting this linguistic phenomenon. A study carried out by Huthaily (2003) centres around the difficulties encountered by adult native speakers of American English learning Arabic as a foreign language. The results suggest that the subjects' first language had a negative effect on their pronunciation of speech sounds in the second language.

Difference between the Emphatics and Counterparts of Non-Emphatics (English and Arabic (/t/, /d/, /s/, /z/ and /ð/)

The previous comparison (between the articulation of emphatic and non-emphatic sounds in Arabic) shows the features that distinguish the emphatic sounds in Arabic from the non-emphatic sounds (/t/, /d/, /s/, /z/ and /ð/). These features include, first, raising the back of the tongue against the soft plate, making a whole that is felt by air such that the air passes through the mouth cavity either with or without any obstacle. Second, the centre of the tongue is raised against the soft palate. In this respect, the famous Arab grammarian Sibawayh (796 A.D.) observed that the four emphatics (/t̲/, /d̲/, /ð̲/ and /s̲/) are articulated similarly to their non-emphatics (/t/, /d/, /ð/ and /s/) by Arabic speakers. The tongue makes a curled shape during the articulation of emphatic consonant sounds. This distinctive feature was more recently proven using X-ray by Al-Ani (1970), who concludes that the back of the tongue was raised while articulating the emphatic /t/ by the study sample.

The second feature that differentiates emphatics from non-emphatics is the force of articulation observed by Norlin (1987) using critical band spectra. Norlin finds that there is no need for muscular tension and strong breath for the articulation of the emphatic sounds. Similarly, Lehn (1963) proposes that emphasis generally includes slight retraction, lateral spreading, concavity of the tongue and raising of its back.

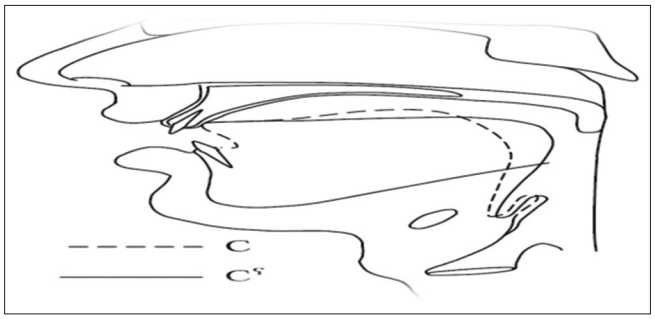

Figure By Al-Ani (1970)

The Linguistic Environments under which the English Consonant Sounds Change to Arabic Emphatic Sounds while SUSE Articulate English Words

It is known that in connected speech, the quality of sound is changed by the power of the preceding or following sound within a word. All of the non-emphatic sounds in Arabic are found in English, but the quality of these sounds changes if they share some of the distinctive features with the core of the syllable.

The results that have been produced by the CAH show the following:

The distinctive features of the English vowels that are not found in Arabic influence the consonants in the onset and coda where the core of the syllable is either /ɒ/, /ə/ or /ʌ/. All of these vowels are characterized by raising either the centre or the back of the tongue while articulating them. The same distinctive features (that differentiate emphatic sounds from non-emphatic ones) appear in raising the back of the tongue against the soft palate, creating an empty cavity that is filled by air. As a result, the air passes through the mouth cavity either with or without any obstacle, and in the second feature, the centre of the tongue is raised against the soft palate in pronunciation. Therefore, the selected sample of the study is expected to use the same distinctive features of these vowels to articulate the English consonants /s/, /t/, /d/, /z/ and /ð/. The impact of the distinctive features of the vowel (core of the syllable) on the onset and coda changes their quality from that of English consonants to that of emphatic Arabic sounds.

Hypotheses of the Study

In the light of the results of contrastive analysis between the problematic sounds in both language, the researcher concludes the following assumptions or hypotheses.

1 The subjects will substitute the English sounds /s/, /t/, /d/, /z/ and /ð/ by the emphatic Arabic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ in the onset and coda of syllables in which the core is /ʌ/.
2 The subjects will substitute the English sounds /s/, /t/, /d/, /z/ and /ð/ by the emphatic Arabic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ in the onset and coda of syllables in which the core is /ɒ/.
3 The subjects will substitute the English sounds /s/, /t/, /d/, /z/ and /ð/ by emphatic Arabic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ in the onset and coda of syllables in which the core is /ə/.

To varfy the authenticity of the obove assumptions, a test has been conducted on the sample of the study.

RESULTS AND DISCUSSION

Discussion of the Test Results

The discussion of the results is based on the following:

1 The assumptions are drawn by CAH.
2 The results of the test are based on comparing the scoring of the mispronunciation of the problematic sounds in the onset and coda of the syllable.
3 The assumptions of the CAH must be verified by the results of the test.
4 There are eight items in each parameter of the test.
5 The items of the test are analysed by SPSS (Statistic Package of Social Studies).

Hypothesis (1)

The subjects substitued the English sounds /s/, /t/, /d/, /z/ and /ð/ by the Arabic emphatic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ in the onset and coda of the syllable in which the core was /ʌ/.

(A) The item contained two words containing the vowel sound /ʌ/ as the core of the syllable and the English consonant sound /s/ in the onset and coda of the syllable.

'Sun'

		Frequency	Valid percent
Valid	Wrong	20	87.5
	Correct	3	13.5
	Total	23	100.0

The English sound /s/ in the item 'sun' was substituted by 20 of 23 subjects as the emphatic Arabic sound /s/ in the onset of the syllable, and the sound was pronounced correctly by only 3 of the subjects.

'Bus'

		Frequency	Valid percent
Valid	Wrong	20	87.5
	Correct	3	13.5
	Total	23	100.0

As shown in the table above, 20 of the subjects in the study substituted the English sound /s/ in the item 'bus' by the emphatic Arabic sound /s̲/ in the onset of the syllable, and the sound was pronounced correctly by only 3 of the subjects.

Comment

Comparing the two results, the English sound /s/ was substituted as the emphatic Arabic sound /s/ by 87.5% versus only 13.5% in the onset and the coda in a syllable with the core /ʌ/.

(B) The item included two words containing the vowel sound /ʌ/ as the core of the syllable and the English consonant sound /t/ in the onset and coda of the syllable.

'Ton'

		Frequency	Valid percent
Valid	Wrong	23	100.0
Total		23	

As shown in the table above, 100% of the subjects in the study substituted the English sound /t/ in the item 'ton' as the emphatic Arabic sound /t/ in the onset of the syllable.

'Cut'

		Frequency	Valid percent
Valid	Wrong	19	82.6
	Correct	4	17.4
	Total	23	100.0

The English sound /t/ in the item 'cut' was pronounced correctly (in the coda of the syllable) by only 4 of the subjects of the study; 19 of the subjects substituted the English sound /t/ by the emphatic Arabic sound /t̲/.

Comment

The comparison of the results of the two pronunciations show that 91.6% of the subjects of the study substituted the English consonant /t/ by the emphatic Arabic sound /t/ in both the onset and coda of a syllable in which the core was /ʌ/.

(C) The item contained two words bearing the vowel sound /ʌ/ as the core of the syllable and the English consonant sound /d/ in the onset and coda of the syllable.

'Does'

		Frequency	Valid percent
Valid	Wrong	19	82.6
	Correct	4	17.4
	Total	23	100.0

As shown in the table above, among the total number of subjects (23), only 4 correctly pronounced the English sound /d/ in the item 'does'; the sound was substituted by the emphatic Arabic sound /d̲/ by a total of 19 subjects.

'Body'

		Frequency	Valid percent
Valid	Wrong	18	78.3
	Correct	5	21.7
	Total	23	100.0

The table above reflects the fact that there are two different pronunciations of the English sound /d/ in the onset of the item 'body'. Eighteen subjects substituted this sound by the emphatic Arabic sound /d̲/ (in the coda of the syllable). This sound was pronounced correctly by only 5 of the subjects. As a percentage, 80.5% of the subjects substituted the English sound /d/ as the emphatic Arabic sound /d/ in the onset and coda of this syllable with a core of /ʌ/.

(D) The item contained two words containing the vowel sound /ʌ/ as the core of the syllable and the English consonant sound /z̲/ or /ð̲/ in the onset and coda of the syllable.

'Thus'

		Frequency	Valid percent
Valid	Wrong	20	87.0
	Correct	3	13.0
	Total	23	100.0

The table above compares the results of the pronunciation of the English sound /ð/ in the item 'thus'. The table shows that only 3 of the subjects pronounced the English sound correctly, and 20 substituted it by the emphatic Arabic sound /ð̲/ in the onset of the syllable in which the core was /ʌ/.

'Dose'

		Frequency	Valid percent
Valid	Wrong	19	82.6
	Correct	4	17.4
	Total	23	100.0

As shown above, the English sound /z/ was substituted as the Arabic emphatic sound /ð̲/ by 19 students in the sample *versus* only 4 subjects who correctly pronounced the English sound /z/ in the item 'does' in the coda of a syllable in which the core was /ʌ/.

Comment

Comparing the results, 84.3% of the subjects substituted the English sound /d/ as the Arabic emphatic sound /d/ in the onset and coda of a syllable with the core of /ʌ/.

Discussion of the results of hypothesis (1)

There is a significant relation between the assumption (Hypothesis 1) drawn by the CAH and the results of the test. The relation is reflected in the distinctive feature of the centre vowel /ʌ/. In the production of this vowel, the front of the tongue is lowered, and the centre and back of the tongue move against the soft palate in the half-open position.

To produce the English consonant sounds /s/, /t/, /d/, /z/ and /ð/, the blade of the tongue is pressed against the alveolar ridge, forming a complete block, partial closure or a narrow passage, and *the front of the tongue moves close to the hard palate*; however, this feature of these sounds differs when the same sounds are substituted by SUSE and is located at the onset or coda of syllables in which the core is /ʌ/. SUSE assimilate the distinctive feature of vowel sounds /ʌ/ and /s/, /t/, /d/, /z/ and /ð/ into Arabic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ because the /s/, /t/, /d/, /z/ in the English sound patterns/ s+ʌ /,/ ʌ+s /,/ t+ʌ /,/ ʌ+t /,/ z+ʌ /,/ ʌ+z /,/ ð +ʌ/, and/ʌ+ ð/are influenced by the distinctive features of the sound /ʌ/. One of these distinctive features is raising the centre of the tongue (between half open and half closed). This process makes the front of the tongue lower instead of approaching the hard palate before or after articulating /s/, /t/, /d/, /z/ and /ð/. If these sounds are characterized by this feature, the whole patterns of English will be assimilated to the emphatic Arabic consonants /s̲/, /t̲/, /d̲/, and /ð̲/. The emphatic Arabic sound is characterized by raising the back of the tongue towards the hard palate. This blocks air in a cavity; then, the air escapes gradually instead of in a sudden explosion.

Hypothesis (2)

The subjects substituted the English sounds /s/, /t/, /d/, /z/ and /ð/ by emphatic Arabic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ in the onset and coda of syllabic words with the core /ɒ/.

(A) The item contains two words containing the vowel sound /ɒ/ as the core of the syllable and the English consonant sound /s/ in the onset and coda of the syllable.

'Solid'

		Frequency	Valid percent
Valid	Wrong	19	82.6
	Correct	4	17.4
	Total	23	100.0
Total	24		

As shown in the above table, there are two different pronunciations of the English sound /s/ in the onset of the item 'solid'. Nineteen students substituted this sound by the emphatic Arabic sound /s/, and 4 students pronounced the sound correctly.

'Boss'

		Frequency	Valid percent
Valid	Wrong	18	78.3
	Correct	5	21.7
	Total	23	100.0

The English sound /s/ in the item 'boss' was pronounced correctly (in the coda of the syllable) by only 5 students. Eighteen students substituted the sound by the emphatic Arabic sound /s̲/.

Comment

A comparison of the results shows that 80% of the subjects substituted the emphatic /s/ Arabic sound by substituting the sound of the English /s/ *in the onset and coda of the syllable in which the core was /ɒ/.*

(B) The item contained two monosyllabic words bearing the vowel sound /ɒ/ (the core of the syllable) and the English consonant sound /t/ in the onset and coda of the syllable.

'Top'

		Frequency	Valid percent
Valid	Wrong	18	78.3
	Correct	5	21.7
	Total	23	100.0

The statistical data presented in the table above show that 18 of the subjects substituted the /t/ by the emphatic Arabic sound /t̲/ in the onset of the syllable in which the core was /ɒ/, and only 5 subjects pronounced it correctly.

'Pot'

		Frequency	Valid percent
Valid	Wrong	19	82.6
	Correct	4	17.4
	Total	23	100.0

The chart above shows two different statistical values. Four subjects pronounced the English /t/ correctly in the coda of the syllable 'item', and 19 failed to pronounce the sound correctly.

The results show that 20,3% of the subjects s pronounced the English consonant correctly while 79,7% substituted the /t/ sound by the Arabic emphatic consonant /t/.

(C) The item included two words containing the vowel sound /ɒ/ as the core of the syllable and the English consonant sound /d/ in the onset and coda of the syllable.

'Dot'

		Frequency	Valid percent
Valid	Wrong	18	78.3
	Correct	5	21.7
	Total	23	100.0

The table above presents 18 subjects who substituted the English sound /d/ by the emphatic Arabic consonant sound /d̲/. The sound was articulated correctly by only 5 students.

'God'

		Frequency	Valid percent
Valid	Wrong	19	82.6
	Correct	4	17.4
	Total	23	100.0

As shown in the chart, only 4 subjects pronounced the English sound /d/ in the coda of the syllable correctly while 19 substituted /d/ by the emphatic Arabic consonant sound /d̲/.

Comparing the two results, approximately 82.6% of the subjects substituted the emphatic sound /d/ instead of the English consonant /d/. Only 17.4% pronounced the sound correctly.

(D) The item contained two words containing the vowel sound /ɒ/ as the core of the syllable and the English consonant sound /z/ in the onset and coda of the syllable.

'Position'

		Frequency	Valid percent
Valid	Wrong	20	87
	Correct	3	13.
	Total	23	100.0

The chart above includes the statistical values of two different pronunciations of the English sound /z/. Twenty subjects in the study substituted the English /z/ by an emphatic Arabic consonant, /z/, and only 3 substituted this sound correctly in the onset of the syllable.

'Zombie'

		Frequency	Valid percent
Valid	Wrong	19	82.6
	Correct	4	17.4
	Total	23	100.0

The English sound /z/ in the item 'zoology' was pronounced correctly (in the onset of the syllable) by only 4 students in the sample. Nineteen subjects substituted this sound by the emphatic Arabic sound /ð̲/.

Discussion of the results of hypothesis (2)

The statistical values presented by the two charts show that only 15.2% of the subjects pronounced the English /z/ correctly in the onset and coda of the syllable with /ɒ/ while 84.8% substituted the English sound /z̲/ by the emphatic Arabic sound /z/ in different parts of the syllable (onset and coda) with /ɒ/ as a core.

The statistical means of the values (including the items A, B, C, and D) show that 81.2% of the subjects of the study substituted the English sounds /s/, /t/, /d/, /z/ and /ð/ by the emphatic Arabic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ in the onset and coda of syllabic words with the core /ɒ/. This result is in consistent with the assumption drawn by the CHA (hypothesis 2).

In the pronunciation of the English consonant sounds /s/, /t/, /d/, /z/ and /ð/, the blade of the tongue comes into contact with the alveolar ridge, forming a complete block, partial closure or narrow passage. The front of the tongue moves close to the hard palate; these features are not stable when these sounds precede or follow the English vowel sound /ɒ/.

One of the distinctive features of the English vowel /ɒ/ is its description as a back vowel because, during the production of this vowel sound, the back of the tongue is raised against the soft palate in the half-open position; when the English sounds /s/, /t/, /d/, /z/ and /ð/ are substituted in the patterns/s+ɒ /, / ɒ+s /, / t+ɒ /, / ɒ+t /, / d+ɒ /, / ɒ+d, /z+ɒ /, /ɒ+z /, / ð+ɒ/, and /ɒ+ð/, the same feature of this vowel lowers the front of the tongue, making a cavity, and air escapes gradually rather than in a sudden explosion or with audible friction. If these patterns of English sounds are described by this feature, then the whole patterns of English will be assimilated to the feature of the emphatic Arabic consonants /s̲/, /t̲/, /d̲/, and /ð̲/. The emphatic sound in Arabic is characterized by raising the back of the tongue towards the hard palate. This motion compresses air in a cavity; then, the air escapes gradually rather than in a sudden explosion.

Hypothesis (3)

The subjects articulated the English sounds /s/, /t/, /d/, /z/ and /ð/ as the emphatic Arabic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ in the onset and coda of syllables in which the core was /ə/.

(A) The item contained two words including the vowel sound /ə/ as the core of the syllable and the English consonant sound /s/ in the onset and coda.

'Support'

		Frequency	Valid percent
Valid	Wrong	20	87.0
	Correct	3	13.0
	Total	23	100.0

The English sound /s/ in the item '**Support**' was substituted by the emphatic Arabic sound /s̲/ in the onset of the syllable by 20 of 23 subjects, and the sound was pronounced correctly by only 3 subjects.

'Atlas'

		Frequency	Valid percent
Valid	Wrong	19	82.6
	Correct	4	17.4
	Total	23	100.0

As shown in the table above, 19 of the subjects substituted the English sound /s/ in the item 'Atlas' by the emphatic Arabic sound /s̲/ in the onset of the syllable, and the sound was pronounced correctly by only 4 subjects.

Approximately 85% of the subjects substituted the English sound /s/ by the emphatic Arabic sound /s/, and approximately 15% of the subjects pronounced the sound correctly.

(B) The item contained two words bearing the vowel sound /ə/ as the core of the syllable and the English consonant sound /t/ in the onset and coda.

'Tomorrow'

		Frequency	Valid percent
Valid	Wrong	15	82.6
	Correct	8	17.4
	Total	23	100.0

As shown in the table above, 15 subjects substituted /t̲/ by the emphatic Arabic sound /t/ in the item 'tomorrow', and only 8 pronounced the sound correctly in the onset of the first syllable with /ə/ as its core.

'Capital'

		Frequency	Valid percent
Valid	Wrong	17	87.0
	Correct	6	13.0
	Total	23	100.0

The chart above shows the statistical values of two different pronunciations of the English sound /t/ in the coda of the last syllable of the word 'capital'. Seventeen subjects substituted the English sound /t/ by the emphatic Arabic sound /t̲/, and only 4 pronounced this sound correctly in the onset coda.

In conclusion, in item (2), 15,4% of the subjects pronounced substituted the English sound /t/ correctly in the onset and coda of the syllable in which the core was /ə/. The sound was substituted by the emphatic Arabic sound /t/ by 84.6% of the sample.

(C) The item comprised two words containing the vowel sound /ə/ as the core of the syllable, and the English consonant sound /d/ was in the onset and coda of the syllable.

'Adroit'

		Frequency	Valid percent
Valid	Wrong	19	80.0
	Correct	4	20.0
	Total	23	100.0

The English sound /d/ in the item 'adroit' was pronounced correctly (in the onset of the syllable) by 3 subjects. Twenty subjects substituted /d/ by the Arabic emphatic sound /d̲/.

'Order'

		Frequency	Valid percent
Valid	Wrong	20	87.0
	Correct	3	13.0
	Total	23	100.0

As shown in the table above, among 23 subjects, only 3 pronounced the English sound /d/ in the item 'order' correctly. The sound was substituted by the emphatic Arabic sound /d/ by 20 subjects.

The percentage of the results of item (C) shows the pronunciation of the English sound /d/ in the onset and coda of the syllable in which the core was /ə/. The English consonant sound /d/ was pronounced correctly by only 16.5% of the subjects, and 84.5% substituted the sound by the emphatic Arabic sound /d̲/.

(D) The item comprised two words containing the vowel sound /ə/ as the core of the syllable and the English consonant sound /ð/ in the onset of the syllable.

'Father'

		Frequency	Valid percent
Valid	Wrong	21	91.3
	Correct	2	8.7
	Total	23	100.0

As shown in the table above, there were two different pronunciations of the English sound /ð/ in the onset of the item 'father'. Twenty-one subjects substituted this sound by the emphatic Arabic sound /ð̲/, and only 3 subjects pronounced the sound correctly.

Discussion of the results of hypothesis (3)

The subjects of the study were observed to substitute the English sounds /t/, /d/, /s/, /z/ and /ð/ by the Arabic emphatic sounds /t̲/, /d̲/, /s̲/, /z̲/ and /ð̲/ in the onset and the coda of the syllable with /ə/ core because the English sounds /t/, /d/, /s/, /z/ and /ð/ are characterized by the feature of the vowel /ə/ sound in either the onset or the coda. In the production of these consonant sounds for the plosive sounds, the tip of the tongue makes a complete closure with the alveolar ridge. For the English fricative (/s/, /z/, and /ð/), there is a narrow passage made by the tip of the tongue and the upper teeth. In all cases, the front of the tongue comes close to contact with the hard palate. In the production of the English vowel sound /ə/ before or after /t/, /d/, /s/, /z/ and /ð/, the centre of the tongue is raised against the soft palate in the half-open position, and then the front of the tongue is lowered, making a cavity; air is then compressed in this cavity and escapes gradually instead of in a sudden explosion. English consonant sounds (/t/, /d/, /s/, /z/ and /ð/) are changed to Arabic emphatic sounds (/t̲/, /d̲/, /s̲/, /z̲/ and /ð̲/) before or after /ə/ because the centre of the tongue is raised and the front part is lowered.

The production of English plosive /d/ and /t/ in the onset and coda of the syllable with /ə/ is characterized by two features of the movement of the tongue. In the production of the plosive sound in the onset or coda, the tip of the tongue makes a complete closure when the air is released with a sudden puff, and then the centre part of the tongue is raised against the soft palate in the half-open position to produce /ə/. As a result of lowering the front of the tongue, this feature changes English plosives into an emphatic Arabic plosive sound.

The fricatives (/s/, /z/, and/ð) in the onset and coda of the syllable (with the /ə/ core) have these two features. There is a narrow passage made by the tip of the tongue to produce the fricative. The tongue is raised to produce a vowel sound (/ə/), and the front of the tongue is lowered; therefore, each of these sounds is influenced by the /ə/ in either the onset or coda, and their quality will be changed into emphatic Arabic sounds (/s̲/, /z̲/ and /ð̲/).

CONCLUSION

The results of the contrastive analysis and the test show that:

(1) The absence of the English vowels /ʌ/, /ə/ and /ɒ/ causes SUSE to substitute the English sounds /d/ /t/, /s/, /ð/ and /z/ with the emphatic Arabic sounds /s̲/, /d̲/ /t̲/, and /ð̲/.

(2) Both the Arabic emphatic sounds (/t̲/, /d̲/, /s̲/, /z̲/ and /ð̲/) and English vowels (/ʌ/, /ə/ and /ɒ/) have the same distinctive features, in which the centre and back of the tongue are raised and the front part is lowered. These features motivated the study sample to pronounce the English consonants /d/ /t/, /s/, /ð/ and /z/ as the Arabic emphatic sounds (/t̲/, /d̲/, /s̲/, /z̲/ and /ð̲/).

(3) The English vowels /ʌ/, /ə/ and /ɒ/ progressively and regressively assimilate the consonant sounds /d/ /t/, /s/, /ð/ and /z/ in English to the emphatic consonant /s̲/, /d̲/, /t̲/, and /ð̲/ sounds in Arabic

ACKNOWLEDGMENT

The author would like to thank Deanship of Scientific Research at Majmaah University- Kingdom of Saudi Arabia for supporting this work.

REFERENCES

Al-Ani, S.H. (1970). *Arabic phonology: An accoustical and physiological investigation*. Hague: Mouton.

Altaha, F.M. (1995). Pronunciation errors made by Saudi University students learning English. *ITL - Internatio al Journal of Applied Linguistics*, 109-110(1), pp. 110-123.

Avery, P. and Ehrlich, S. (1992). *Teaching American English pronunciation*. Oxford, England: Oxford University Press.

Brinton, L.J. (2000). *The structure of modern English: A linguistic introduction*. Amsterdam, NL: John Benjamins Pub.

Cook, V.J. (1992). Evidence for multicompetence. *Language Learning*, *42*(4), pp. 557-591.

Dulay, H.C., Burt, M.K. and Krashen, S.D. (1982). *Language two*. New York, NY: Oxford University Press.

Elmahdi, O.E.H. and Khan, W.A. (2015). The pronunciation problems faced by Saudi EFL learners at secondary schools. *Education and Linguistics Research*, *1*(2), pp. 85-99.

Huthaily, K. (2003). *Contrastive phonological analysis of Arabic and English*. Dissertations, & Professional Papers 8110. Graduate Student Theses, The University of Montana.

Lado, R. (1957). *Linguistics across cultures: Applied linguistics for language teachers*. CSU, Chico: University of Michigan Press.

Lehn, W. (1963). Emphasis in Cairo Arabic. *Language*, *39*(1), pp. 29-39.

Norlin, K. (1987). *A phonetic study of emphasis and vowels in Egyptian Arabic*. Working Papers 30. Lund University, The Department of Linguistics.

Ringbom, H. (1994). Contrastive analysis. In: R. Asher and J. Simson, eds. *The encyclopedia of language and linguistics*. Oxford: Pergamon Press, pp. 737-742.

Vizental, A. (2008). *Phonetics and phonology: An introduction*. Arad: Editura Universitatii "Aurel Vlaicu" Bibliogr.

Sibawayh, X. (1898). *Kitab Sibawayh*. Baghdad: Al-Muthanna Library. (Original work undated).

Yarmohammadi, L. (1995). *Fifteen articles in contrastive linguistics and the structure of Persian*. Tehran: Rhnama Publication.

APPENDIX

Description of the Test Items

(1) Hypothesis (1)

(1) The subjects will pronounce the English sounds /s/, /t/, /d/, /z/ and /ð/ as the emphatic Arabic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ in the onset and coda of syllables with a core of /ʌ/, respectively

(A). The item contains two words containing the vowel sound /ʌ/ as the core of the syllable and the consonant sound of English /s/ in the onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ is as the emphatic sound of Arabic/s/before and after/ʌ/
/ʌ/	/s/	/s+ ʌ/	son	/sʌn/	23		
/ʌ/	/s/	/ʌ+s/	Bus	/bʌs/	23		

(B). The item includes two words containing the vowel sound /ʌ/ as the core of the syllable and the consonant sound of English /t/ in onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study samplewho pronounce the sound /s/ as English/s/before and after /ʌ/	The percentage of the study sample who pronouncethe sound /s/ as the emphatic Arabic sound /s/ before and after /ʌ/
/ʌ/	/t/	/t+ ʌ/	ton	/tʌn/	23		
/ʌ/	/t/	/ʌ+t/	cut	/kʌt/	23		

(C). The item contains two words containing the vowel sound /ʌ/ as the core of the syllable and the consonant sound of English /d/ in onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ as the emphatic sound of Arabic/s/before and after /ʌ/
/ʌ/	/d/	/d+ʌ/	Does	/dʌz/	23		
/ʌ/	/d/	/ʌ+d/	Body	/bʌdi:/	23		

(D). The item contains two words containing the vowel sound /ʌ/ as the core of the syllable and the consonant sound of English /z/ or /ð/ in the onset and coda of the syllable

Ccore of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ as the emphatic Arabic sound Arabic /s/ before and after /ʌ/
/ʌ/	/ð/	/ð + ʌ/	Thus	/ðʌs/	23		
/ʌ/	/z/	/ʌ+z/	Does	/dʌz/	23		

(2) Hypothesis (2)

(2) The subjects will pronounce the English sounds /s/, /t/, /d/, /z/ and /ð/ as the Arabic emphatic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ in the onset and coda of syllabic words with the core /ɒ/.

(A). The item contains two words containing the vowel sound /ɒ/ as the core of the syllable and the consonant sound of English /s/ in the onset and coda of the syllable

Ccore of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the Study sample who pronounce the sound /s/ as the emphatic sound of rabic/s/before and after /ʌ/
/ɒ/	/s/	/s + ɒ/	Solid	/s ɒlid/	23		
/ɒ/	/s/	/ɒ + s/	Boss	/b ɒ s/	23		

(B). The item contains two monosyllabic words containing the vowel sound /ɒ/ as the core of the syllable and the consonant sound of English /t/ is in the onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before andafter /ʌ/	The percentage of the study sample who pronounce the sound /s/ as the emphatic sound of Arabic /s/ before and after /ʌ/
/ɒ/	/t/	/t + ɒ/	Top	/t ɒp/	23		
/ɒ/	/t/	/ɒ + t/	Pot	/p ɒ t/	23		

(C). The item contains two words containing the vowel sound /ɒ/ as the core of the syllable and the consonant sound of English /d/ in the onset and coda of the syllable

Ccore of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/as the emphatic sound of Arabic /s/before and after /ʌ/
/ɒ/	/d/	/t + ɒ/	dot	/d ɒt/	23		
/ɒ/	/d/	/ɒ + d/	god	/gɒ d/	23		

(D). The item contains two words containing the vowel sound /ɒ/ as the core of the syllable and the consonant sound of English /z/ in onset and coda of the syllabl

Ccore of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English/s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ as the emphatic sound of Arabic/s/before and after /ʌ/
/ɒ/	/z/	/t + ɒ/	position	/p ɒziʃən	23		
/ɒ/	/z/	/ɒ + d/	Zombie	/zɒ mbɐ/	23		

(3) Hypothesis (3)

(3) The subjects will articulate the English sounds /s/, /t/, /d/, /z/ and /ð/ as the emphatic Arabic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ in the onset and coda of the syllables in which the core is /ə/.

(A). The item contains two words including the vowel sound /ə/ as the core of the syllable and the consonant sound of English /s/ in the onset and coda

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ is as emphatic sound of Arabic /s/before and after /ʌ/
/ə/	/s/	/s + ə/	position	/səp ɒɔ:t	23		
/ə/	/s/	/ə + s/	Atlas	/ə tl ə s/	23		

(B). The item contains two words containing a vowel sound /ə/ as the core of the syllable and the consonant sound of English /t/ in the onset and coda

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /t/ as English/s/before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ is as emphatic sound of Arabic/t before and after /ʌ/
/ə/	/t/	/t + ə/	tomorrow	/təˈmɒr.əʊ	23		
/ə/	/t/	/ə + t/	Capital	kæp.ɪ.təl	23		

(C). The item contains two words containing the vowel sound /ə/ as the core of the syllable and the consonant sound of English /d/ is in onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /d/ as English/s/before and after /ə/	The percentage of the study sample who pronounce the sound /s/ as the emphatic sound of Arabic /d/ before and after /ə/
/ə/	/t/	/t + ə/	Adroit	/əˈdrɔɪt/	23		
/ə/	/t/	/ə + t/	ɔɪdə	kæp.ɪ.təl	23		

(D). The item contains two words containing the vowel sound /ə/ as the core of the syllable and the consonant sound of English /ð/ in the onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /d/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ is as emphatic sound of Arabic/d/before and after /ʌ/
/ə/	/t/	/t + ə/	father	/ˈfɑː.ðər/			

Statistical Analysis

(1) Hypothesis (1)

(1) The subjects will pronounce the English sounds /s/, /t/, /d/, /z/ and /ð/ as the emphatic Arabic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ in the onset and coda of syllables in which the core is /ʌ/.

(A). The item contains two words containing the vowel sound /ʌ/ as the core of the syllable and the consonant sound of English /s/ in the onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ as the emphatic Arabic sound /s/ before and after /ʌ/
/ʌ/	/s/	/s+ ʌ/	son	/sʌn/	3	13.5	87.5%
/ʌ/	/s/	/ʌ+s/	Bus	/bʌs/	20	13.5	87.5%

(B). The item includes two words containing the vowel sound /ʌ/ as the core of the syllable and the consonant sound of English /t/ in the onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcript	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ as the emphatic Arabic sound /s/ before and after /ʌ/
/ʌ/	/t/	/t+ ʌ/	ton	/tʌn/	23	100	00. %
/ʌ/	/t/	/ʌ+t/	cut	/kʌt/	23	100	00. %

(C). The item contains two words containing the vowel sound /ʌ/ as the core of the syllable and the consonant sound of English /d/ in the onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English/s/before and after/ʌ/	The percentage of the study sample who pronounce the sound /s/ as the emphatic sound of Arabic /s/ before and after /ʌ/
/ʌ/	/d/	/d+ ʌ/	Does	/dʌz/	23	17.4%	82.6%
/ʌ/	/d/	/ʌ+d/	Body	/bʌdi:/	23	21.3%	78.3%

(D). The item contains two words containing the vowel sound /ʌ/ as the core of the syllable and the consonant sound of English /z/ or /ð/ in the onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ as the emphatic sound of Arabic /s/ before and after /ʌ/
/ʌ/	/ð/	/ð + ʌ/	Thus	/ðʌs/	23	13%	87%
/ʌ/	/z/	/ʌ+z/	Does	/dʌz/	23	14.4%	82.6%

(2) Hypothesis (2)

The subjects will produce the English sounds /s/, /t/, /d/, /z/ and /ð/ as the emphatic Arabic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ in the onset and coda of syllabic words with the core /ɒ/.

(A). The item contains two words containing the vowel sound /ɒ/ as the core of the syllable and the consonant sound of English /s/ in the onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ as the emphatic sound of Arabic /s/ before and after /ʌ/
/ɒ/	/s/	/s + ɒ/	Solid	/s ɒlid/	23	17.4%	82.6%
/ɒ/	/s/	/ɒ + s/	Boss	/b ɒ s/	23	21.7%	78.3%

(B). The item contains two monosyllabic words containing the vowel sound /ɒ/ is the core of the syllable and the consonant sound of English /t/ is in the onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ as the emphatic sound of Arabic /s/ before and after /ʌ/
/ɒ/	/t/	/t + ɒ/	Top	/t ɒp/	23	23.7%	78.3%
/ɒ/	/t/	/ɒ + t/	Pot	/p ɒ t/	23	17.4%	82.6%

(C). The item contains two words containing the vowel sound /ɒ/ as the core of the syllable and the consonant sound of English /d/ in the onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ as the emphatic sound of Arabic /s/ before and after /ʌ/
/ɒ/	/d/	/t + ɒ/	dot	/d ɒt/	23	21.7%	78.3%
/ɒ/	/d/	/ɒ + d/	god	/gɒ d/	23	17.4%	82.6%

(D). The item contains two words containing the vowel sound /ɒ/ as the core of the syllable and the consonant sound of English /z/ in the onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ as the emphatic sound of Arabic /s/ before and after /ʌ/
/ɒ/	/z/	/t + ɒ/	position	/p ɒziʃən	23	21.7%	78.3%
/ɒ/	/z/	/ɒ + d/	Zombie	/zɒ mbɐ/	23	17.4%	82.6%

(3) Hypothesis (3)

The subjects will articulate the English sounds /s/, /t/, /d/, /z/ and /ð/ as the emphatic Arabic sounds /s̲/, /t̲/, /d̲/, and /ð̲/ in the onset and coda of syllables in which the core is /ə/.

(A). The item contains two words including the vowel sound /ə/ as the core of the syllable and the consonant sound of English /s/ in the onset and coda

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ as the emphatic sound of Arabic /s/ before and after /ʌ/
/ə/	/s/	/s + ə/	position	/səp ɒƆ:t	23	13%	87%
/ə/	/s/	/ə + s/	Atlas	/ə tl ə s/	23	17.4%	82.6%

(B). The item contains two words containing a vowel sound /ə/ as the core of the syllable and the consonant sound of English /t/ in the onset and coda

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ʌ/	The percentage of the study sample who pronounce the sound /s/ as the emphatic sound of Arabic /s/ before and after /ʌ/
/ə/	/t/	/t + ə/	tomorrow	/təˈmɒr.əʊ	23	17.4%	82.6%
/ə/	/t/	/ə + t/	Capital	kæp.ɪ.təl	23	13%	87%

(C). The item contains two words containing the vowel sound /ə/ as the core of the syllable and the consonant sound of English /d/ is in the onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ə/	The percentage of the study sample who pronounce the sound /s/ as the emphatic sound of Arabic /s/before and after /ə/
/ə/	/t/	/t + ə/	Adroit	/əˈdrɔɪt/	23	20%	80%
/ə/	/t/	/ə + t/	ɔɪdə	kæp.ɪ.təl	23	13%	87%

(D). The item contains two words containing the vowel sound /ə/ as the core of the syllable and the consonant sound of English /ð/ in the onset and coda of the syllable

Core of the syllable	Onset	Onset core	Word	Phonetic transcription	Sample 23	The percentage of the study sample who pronounce the sound /s/ as English /s/ before and after /ə/	The percentage of the study sample who pronounce the sound /s/ as the emphatic sound of Arabic /s/before and after /ə/
/ə/	/t/	/t + ə/	father	/ˈfɑ:.ðər/	23	8.7%	91.3%

Consonant sounds in English	Non-emphatic sounds in Arabic	Arabic version	English version
		Emphatic sound in Arabic	Emphatic sound in Arabic
/t/	/t/	/اطْ/	/t̲/
/d/	/d/	/أضْ/	/d̲/
/s/	/s/	/اص/	/s̲/
/z/	/z/	//أظ	/z̲/
/ð/	/ð/	//ظأ	/ð̲/