

## **Phonological Analysis of English Phonotactics: A Case Study of Arab Learners of English**

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### **Abstract**

This study aims to analyze the English phonotactics in the English of Arab learners of English as a foreign language to determine the types of pronunciation difficulties they encounter. More specifically, it investigates the types of declusterization processes found in their interlanguage and the sources of such processes. The results of this study demonstrate that Arab learners of English unintentionally insert an anaptyctic vowel in the onset as well as in the coda of certain English syllables. Results also show that the major reason for declusterization processes is the mother tongue influence. In order to overcome such difficulties, this paper suggests a new approach for teaching and learning L2 syllable structure system.

**Key words:** English phonotactics, declusterization, phonological processes, second language acquisition, pronunciation errors, Arab learners

### **1 Introduction**

The ultimate goal of most second language learners is to attain native like fluency. They want to be indistinguishable from native speakers. However, for many learners, this dream has remained a dream especially in the area of pronunciation as native speakers usually identify individuals as non-native speakers because of their accent. Moreover, a large number of second language learners believe that the main difficulty

they encounter when speaking the second language is pronunciation and consider this difficulty as the main source of their communication problems.

English has developed from a foreign language used between native speakers and non-native speakers to an international language, or a means of global communication, spoken far more often by non-native speakers among themselves than between native speakers. Therefore, it is vital that students learning English for international communication learn to speak it as intelligibly and comprehensibly as possible – not necessarily like native speakers, but well enough to be understood. Moreover, it is equally important that they learn to understand it when spoken by people with different accents speaking in natural conditions.

It is believed that one goal of pronunciation training in any course, is intelligible pronunciation – not perfect pronunciation. The former is an essential component of communicative competence. The attainment of the latter should no longer be the objective. Instead, we should set realistic goals that are reasonable, applicable and suitable for the communication needs of the learner. Learners need to develop their ability to be easily understood in communication and their ability to meet the communication needs they face.

The importance of investigating pronunciation difficulties stems from the fact that pronunciation stands as an obstacle in communication especially when the meaning of a certain word or an expression is altered because of the incorrect pronunciation of an item as when one says ‘pin’ for ‘pen’, or ‘ship’ for ‘chip’. However, it is necessary, in this research, to see the factors that have a role to play in the acquisition of the phonological system of any non-native language.

## **1.1 Factors Affecting Pronunciation**

The pronunciation of any non-native speaker of any language is promoted or impeded by a number of factors including, among others, age, mother tongue influence and personality.

### **1.1.1 Age**

Age has been a hot issue in language acquisition and learning since it was introduced; it has received a fair amount of attention and research as it is a controversial factor. It may make adults find acquisition more difficult than children do and will probably impede them from attaining native-like proficiency. The role of age is more prominent in pronunciation than in other areas. It was Lenneberg (1967) who proposed the Critical Period Hypothesis (CPH), suggesting that there is a period of time when language learning is more successful than any other time in one's life. He links the close of the critical period to the completion of the cerebral lateralization of the language function which takes place at puberty. The CPH is still disputed in many language acquisition studies; for instance, Chiswick and Miller (2007) define the CPH as a sharp decline in learning outcome with age. They add that to ensure native-like proficiency, one has to acquire the language before the critical period ends. In response to Lenneberg point of view, Johnson & Newport (1989) conclude that they do not find a direct relationship between performance and age of learning throughout

childhood, with a rapid decline in performance marking the end of the critical period; instead, in their study performance increasingly declined only from about age seven until adulthood.

According to CPH, there is a biological or neurological period, which ends around the age of 12; after which, it becomes extremely difficult to attain the complete mastery of a second language, especially pronunciation. Conversely, Bongaerts, Planken and Schils (1997) have shown that it is not always the case; adult learners are capable of achieving native-like in an L2. However, the degree of pronunciation accuracy differs from one learner to another in spite of the age similarity, as we shall see in the following sections.

### **1.1.2 Mother Tongue Influence**

First language learning is complete as compared to second language learning in the sense that learners have no choice but to retain certain aspects of L1 as they need it for communication in their daily life. As far as the former is concerned, L1 learners have no difficulty in producing most words in their language after the age of puberty because the learner's mind only has to understand one linguistic system and he/she is exposed to the language all the time; whereas, in the learning of L2, L1 features clash with those of the L2. So it seems to be true that, as Odlin (1989: 112) puts it, 'there is no little doubt that native language phonetics and phonology are powerful influences on second language pronunciation.'

When discussing the influence of L1 on L2, it is necessary to refer to Contrastive Analysis Hypothesis (CAH), which states that those L2 elements that are similar to learner's L1 will be simpler for him/her and those different elements will be difficult. In this sense, it is evident that the language teacher and language learners should know the structures of both L1 and L2. Because such knowledge can help the language teacher identify the areas of influence of L1 on L2 and develop some methods to rectify the interferences.

Cook (1992) states that L1 is present in L2 learners' minds, whether the teacher wants it to be there or not. Their knowledge of the L2 is connected in all sorts of ways with their L1 knowledge. According to this, learners' interlanguage is open to L1 influence, that is, they transfer features from their L1 into L2. This type of transfer results in error if the transferred feature is not similar or not found in L2. Such transfers are called 'interference'.

Second language is the language acquired by a person after having acquired the basic L1 system. Researchers focus on the errors learners make when learning an L2. In L2 learning, errors are indispensable. Researchers are interested in errors because errors contain valuable information about the language and the way it is learned. As we all know, when we communicate orally and/or in writing where errors are found in both types of communication.

Avery and Ehrlich (1992) claim that learners transfer their L1 sound patterns into the second language and this transfer is likely to cause foreign accents. It is heard in the mispronunciations of words made by non-native speakers.

In this respect, Avery and Ehrlich (1992), point out that the sound system of the native language can influence the learners' pronunciation of a target language in at

least three ways. First, when there is a sound in the target language, which is absent from the learners' native sound inventory, or vice versa, learners may not be able to produce or even perceive the sound(s). Second, when the rules of combining sounds into words (i.e., phonotactics constraints/rules) are different in the learners' mother tongue from those of the target language, they cause problems for learners because these rules are language specific as they vary from one language to another. Thirdly, since the rhythm and melody of a language determine its patterns of stress and intonation, learners may transfer these patterns into the target language.

Eckman (1977) proposed the Markedness Differential Hypothesis (MDH) as an explanation for areas of difficulties in second language acquisition. The common sounds in many languages are considered unmarked, whereas the less common ones are considered marked. He predicted that for L2 learners, the acquisition of the former would be easier than the latter. This hypothesis has been disputed since some scholars have agreed with it and think it is the cause of L2 errors, while others think it cannot be the sole answer to identify sources of errors. The current study identifies pronunciation errors that could lead to predicting some problematic sources of difficulty.

### **1.1.3 Personality**

Certain non-linguistic factors related to an individual's personality and learning goals, attitude towards the target language, native speakers and their culture, and type of motivation, which are beyond the teacher's control, all have their role in the development of pronunciation skills. In addition, the degree of exposure to and use of the target language can support or impede pronunciation skills development. For example, learners who are outgoing and confident and get involved in interactions with native speakers are liable to practice their foreign language pronunciation (Avery and Ehrlich, 1992). Conversely, some learners feel uncomfortable trying out new speech rhythm and melody patterns, while others feel stupid pronouncing 'weird' sounds, and with time, they decide that it is fruitless and impossible to learn English pronunciation. In this respect, Miller (2000) believes that changing – and not changing – speech patterns is affected by how much responsibility the learner takes, and how much the learner practices outside class.

To sum up, the factors discussed above may help English language teachers consider what learners are likely to encounter when learning English as a foreign language. These factors would enable the teachers to identify the difficulties in the pronunciation of the target language experienced by non-native speakers in order to help them overcome these difficulties and consequently improve their performance. In addition, these factors would also enable teachers to provide competent pronunciation instructions, and design their teaching methodology according to learners' needs.

A lot of work has been done on errors committed by Arab learners of English as a second language, particularly, phonology, morphology and syntax. For instance, Al-Shuaibi (2009) investigates the interlanguage of 30 Yemeni learners of English as a second language. Focusing on the phonology of phonotactics, he finds that learners have difficulty in producing English initial consonant clusters having three members and final consonant clusters of three and four members. He pointed out the processes

involved in the pronunciation of these clusters, namely, reduction, substitution and deletion.

In their attempt to identify problems that Arab students of English encounter at initial stages, Kharma & Hajjaj (1989) present four major areas of difficulty. As far as consonants are concerned, they presented two problematic issues. First, certain pairs are confused by learners such as /tʃ/ and /ʃ/ as in 'chair' and 'share'; /v/ and /f/ as in 'fast' and 'vast'; /p/ and /b/ as in 'pin' and 'bin'; /s/ and /θ/ as in 'sin' and 'thin'. Second, learners insert a short vowel to break down the long consonant clusters to pronounce them as in /sɪprɪŋ/ for 'spring'; /wɪʃɪd/ for 'wished'; /ɑːskɪd/ for 'asked' (Kharma & Hajjaj, 1989: 14). In vowels, two types of difficulty are identified. First, certain diphthongs are replaced by other sounds due to L1 interference for example, /eə/ → /eɪ/; /ʊə/ → /uː/; /ɪə/ → /ɪː/; and /əʊ/ → /ɔː/. Second, the distinction between certain pairs of vowels as in /ɪ/ and /e/ as in 'sit' and 'set'; /ʌ/ and /ɒ/ as in 'luck' and 'lock'; /əʊ/ and /ɔː/ as in 'coat' and 'caught' (Kharma & Hajjaj 1989: 16).

Analyzing the pronunciation errors experienced by five Saudi learners of English as a second language, Binturki (2008) investigates the difficulties in producing the voiceless bilabial stop /p/, the voiced labiodental fricative /v/ and the alveolar approximant /r/ especially what word environments are most difficult for participants. His results show that participants have difficulty with the three-targeted consonants, but the greatest is with /v/. The study also finds that the difficulty is closely related to certain word positions, so all three sounds are used more accurately when occurring in word initial position than in word final position.

A similar study was carried out by Altaha (1995). He investigates the problems Saudi Arabian students encountered when learning English pronunciation. The participants in his study started learning English at age 13 and never left their native country to acquire English. He collected the data by recording and analyzing the spoken English of the participants in different conditions and situations. Regarding consonants, he finds that the participants have problems with some pairs of consonant sounds (i.e. /tʃ/ and /ʃ/ as in 'chair' and 'share'; /v/ and /f/ as in 'van' and 'fan'; /p/ and /b/ as in 'pat' and 'bat'); consonant clusters (i.e. grandfather often mispronounced \*grandifather); consonant doubling (i.e. allow often mispronounced \*al-low).

Tushyeh (1996) investigates errors committed by Arab learners of English at various linguistic levels. At the phonological level, participants have difficulty in distinguishing the following pairs: /p/ and /b/, /f/ and /v/, and /ɪ/ and /e/.

Wahba (1998) focuses his study on problems encountered by Egyptian learners of English as a second language and concludes that certain phonological errors are related to stress and intonation. These errors are interlingual ones; attributed to phonological differences between the sound systems of English and Arabic.

In order to see the influence of ones' L1 on the acquisition of the L2 pronunciation, Barros (2003) identifies and analyzes the difficulties encountered by Arabic speakers when pronouncing English consonants. The participants were a group of Arabic speakers who came from different Arab countries with different colloquial Arabic backgrounds. All participants were in contact with the target language group and culture after the age of puberty for at least four years. The results show that eight English consonants, namely, /ŋ/, /p/, /v/, /d/, /l/, /dʒ/, /ð/, and /r/ are identified as

problematic for Arabic speakers. The author also finds that L1 interference seems to be the major factor contributing to pronunciation problems that might differentiate one Arabic speaker from another, depending on the colloquial variety of Arabic they use.

## 2 Objectives and Methodology

This study aims at:

- 1 Identifying classifying, and analyzing errors of insertion made by Jordanian Arab learners of English in the area of pronunciation,
- 2 Finding out the possible sources of these errors, and
- 3 Suggesting teaching procedures that might help teachers and students overcome the areas of difficulty.

Twenty fourth-year Jordanian English language and literature majors at two public universities voluntarily participated in this study. They are classified as upper intermediate level. All of them speak the Ammani dialect of Arabic as a first language. The students were asked to read a list of words designed by the researcher. The participants' pronunciations were recorded on a computer provided with a sensitive microphone. Using IPA symbols, utterances were phonemically transcribed and then compared with the target language norm in order to decide which were correct and which were not. To this end two native speakers of English were asked to evaluate the pronunciation of the participants. The incorrect ones were classified according to the type of error what took place whereas; the correct ones were regarded as irrelevant to the scope of this study.

## 3 Discussion

Before discussing the different types of errors committed by participants of this study, it is necessary to have a quick look at the syllable structures in Modern Standard Arabic (MSA) and in English language.

In MSA, the syllable structure may be expressed by the following formula: CV(V)(C)(C). Therefore, the following syllable types are admissible:

- a) CV as in /bi/ 'with'
- b) CVV as in /fii/ 'in'
- c) CVC as in /rab/ 'God'
- d) CVVC as in /fiil/ 'elephant'
- e) CVCC as in /kalb/ 'dog'
- f) CVVCC as in /dʒaadd/ 'serious'

There is some difference between MSA syllable structure and that of the participants' Ammani dialect of Arabic; for example, the syllable CVVCC does not exist in Ammani Arabic while CVCC is not a common one. Another syllable structure, namely, CCVC is found in Ammani Arabic but not in MSA.

English syllable may be expressed by the formula: (C)(C)(C)V(C)(C)(C)(C). The following syllables exist in English:

- a) V as in 'eye'
- b) CV as in 'go'
- c) VC as in 'at'
- d) CVC as in 'man'
- e) CCV as in 'stay'
- f) VCC as in 'end'
- g) CCVC as in 'stop'
- h) CCVCC as in 'plant'
- i) CCCV as in 'stray'
- j) CCCVCC as in 'strand'
- k) CCCVCCC as in 'scripts'
- l) CVCCCC as in 'texts'

The errors found in this study fall under three types namely, (i) insertion, (ii) substitution and (iii) deletion. As far as the declusterization process is concerned, attention is paid only to the insertion type of errors. Therefore, substitution and deletion types are not tackled in this study.

As mentioned above, learners' native language interference is indispensable. It is found in this study that the high front short vowel /ɪ/ is the only vowel sound that is erroneously inserted in word-initial, word-medial and word-final positions word-different positions; however, certain consonants are inserted too in the above environment. As consonants are beyond the scope of this study, they are ignored.

As evident from the above syllable structures, the systems are different. Many English syllables are predicted to be difficult for Arab learners since they do not exist in Arabic language. In Arabic language, onset is an obligatory element in the structure of any syllable and it should be always C which means that no word is allowed to begin with a vowel sound. In other words, no two consonants are allowed to meet in the beginning of any word without being separated by a vowel. The coda of the syllable is optional in the above structures since some syllable types are open (i. e. ending in a vowel). So the coda can be zero, one or two consonants but not more.

Considering the participants' dialect of Arabic, the situation is little different as the combination CC is allowed in the onset of the syllable, a fact that eases the pronunciation of English words beginning with a two-consonant cluster. Whereas, all words beginning with a three-consonant cluster or ending with three or more consonant cluster remain difficult for the participants to pronounce. To overcome this difficulty, participants unintentionally insert an anaptyctic vowel which in turn eases the pronunciation of such words. The vowel is inserted in the onset of the syllable or in the coda; it depends on the number of elements of each.

### **3.1 Insertion of /ɪ/ in the Onset**

In all the following English monosyllabic words, the onset consists of three consonants; actually, such combinations pose difficulties for Arab learners of English,

as their native dialect does not allow clusters of the type CCC initially. As a result, they inserted the high front short vowel /ɪ/ which declusterizes the clusters to ease their pronunciation. What can be inferred here is that insertion is a rule governed process as all participants insert the above vowel after the first member of the consonant cluster, namely, /s/ as in examples (1-8).

- (1) /sɪblæʃ/ 'splash'
- (2) /sɪblɪ:n/ 'spleen'
- (3) /sɪkrɪ:n/ 'screen'
- (4) /sɪpraɪt/ 'sprite'
- (5) /sɪtreɪn/ 'strain'
- (6) /sɪkræp/ 'scrap'
- (7) /sɪtreɪt/ 'straight'
- (8) /sɪpreɪ/ 'spray'

The above insertions can be captured in the phonological rule:

$$\emptyset \rightarrow \left[ \begin{array}{l} +\text{high} \\ -\text{back} \\ -\text{low} \\ -\text{tense} \end{array} \right] / \# \left[ \begin{array}{l} +\text{continuant} \\ -\text{voiced} \\ +\text{coronal} \\ +\text{anterior} \\ +\text{sibilant} \end{array} \right] \text{ \_\_\_\_\_\_ } \text{CC.}$$

In the literature, support for this finding comes from Kharma & Hajjaj (1989) in which they show that the word 'spring' is pronounced as /sɪprɪŋ/.

### 3.2 Insertion of /ɪ/ in the Coda

The high front short vowel /ɪ/ is inserted in final clusters as well. In each of the following words, the final cluster consists of two members. What is interesting here is that all the examples are derivatives in which the vowel is inserted before the inflectional suffix.

- (9) /stʌbɪd/ 'stopped' (\*)
- (10) /dɪvɪlʊbɪd/ 'developed' (\*)
- (11) /lɑ:fɪd/ 'laughed' (\*)
- (12) /ɑ:skɪd/ 'asked' (\*)
- (13) /wɔ:kɪd/ 'walked' (\*)
- (14) /gru:bɪz/ 'groups' (\*)

In the above examples, intralingual and interlingual influences are visible. For the former, one might attribute the difficulty to the spelling-pronunciation correspondence where the grapheme 'd' is pronounced at least in two ways namely, /d/ and /t/ as in (9-13). The grapheme 's' is pronounced at least in two ways namely, /s/ and /z/ as in (14). As per the latter, the participants' dialect does not have the sound /p/ so they replace it

by its voiced counterpart /b/ as in (9, 10 and 14). The above insertion process is captured in the following phonological rule:

$$\emptyset \rightarrow \left[ \begin{array}{l} +\text{high} \\ -\text{back} \\ -\text{low} \\ -\text{tense} \end{array} \right] / \text{C} \_\_\_ \text{C}\#.$$

Khurma & Hajjaj (1989) have given two examples which in turn provide a kind of support for the above finding. Examples are: /wɪʃɪd/ for 'wished' and /ɑ:skɪd/ for 'asked'.

The insertion of the same vowel was found to be true in final clusters that consist of three members as in (15-18).

- (15) /tɪksɪt/ 'text'
- (16) /mʌnθɪs/ 'months'
- (17) /hændɪz/ 'hands'
- (18) /lændɪz/ 'lands'

In (15-18), the declusterization process that took place changed the syllable structure of all examples from CVCCC to CVC-CVC, as a result, the monosyllabic words became disyllabic ones. It is covered by the following phonological rule:

$$\emptyset \rightarrow \left[ \begin{array}{l} +\text{high} \\ -\text{back} \\ -\text{low} \\ -\text{tense} \end{array} \right] / \text{CC} \_\_\_ \text{C}\#.$$

This process is found to be more prominent in long final clusters that consist of four members CCCC as in (19) and (20).

- (19) /tɪkstɪs/ 'texts'
- (20) /kɒntɪkstɪs/ 'contexts'

The syllable structure of (19) as well as the second syllable structure of (20) was of the type CVCCCC but after declusterization it became CVCC-CVC. What is noticeable here is that the combination CC is not always difficult in syllable coda for participants as it was left intact.

The process involved in (19) and (20) is governed by the phonological rule:

$$\emptyset \rightarrow \left[ \begin{array}{l} +\text{high} \\ -\text{back} \\ -\text{low} \\ -\text{tense} \end{array} \right] / \text{CCC} \_\_\_ \text{C} \#.$$

In summary, the declusterization process was carried out by inserting the same vowel namely, /ɪ/. In onset, it was inserted after the first member whereas, in the coda, it was inserted before the final element whether the coda consists of two, three or four members.

### 3.3 Sources of Difficulty

The source of any error in language learning can be overgeneralization, omission - as a learning strategy, spelling-to-sound rules, stage of development or learner's mother tongue interference. What is relevant to this study is (i) interference and (ii) stage of development. They are discussed below.

#### 3.3.1 Interference

Learners of any language, whether L1 or L2, form hypotheses about the rules of the language they are learning. In an L2 situation, they sometimes rely on their L1 background to form such hypotheses that will result in successful or erroneous structures, depending on the feature or rule being transferred. As far as the English syllable structure is concerned, it is clear that certain English syllable types do not exist in Arabic and they pose difficulties for Arab learners in different ways. When looking at the structure of the permitted English onsets, one finds that the combinations: CC and CCC are going to be problematic ones for Arab learners of English in general. CC- does not pose any difficulty for these learners in particular as it is used in their colloquial variety of Arabic. Permitted English codas are more problematic than onsets as the number of consonant members is relatively high. The following combinations are predicted to form difficulties for learners: CCC and CCCC. It is believed that vowels ease articulation, that is to say, without vowels it is difficult to produce a string of consonants, as it is difficult for any speaker to move from one place of articulation to another where the articulators are very close to each other, if not in contact. With the required practice and experience, one will overcome such difficulties. Learners without such experience tend to break down the long combinations by inserting a short vowel somewhere within the cluster to declusterize it. This declusterization splits the syllable into two syllables that ultimately makes the word easy to pronounce. The declusterization that took place in example (1-20) can be attributed to mother tongue interference.

### 3.3.2 Stage of Development

Language acquisition does not take place all at once but through stages. The learner constructs a system of abstract linguistic rules, which underlies comprehension, and production of the target language; this system is equivalent neither to L2 nor to L1 and referred to as 'interlanguage'. At each stage, the learner modifies his/her interlanguage by adding rules, deleting rules, or restructuring the whole system. Such modifications are based on the learner's errors; and if the utterance is grammatical, there will be no need for any modification. Certain errors belong to beginning stages while others are found in other stages. Many errors produced by beginners are not found in the interlanguage of advanced learners, which means that learners need more time to master certain features; a fact that reflects their stage of development in their interlanguage. One might attribute the pronunciation errors found in (1-20) to the participants' stage of development.

## 4 Conclusions and Suggestions

As shown in this study, it is evident that certain English syllables are difficult to learn for Arab learners of English. Although the literature suggested some pronunciation problems which were predictable regarding Arab learners of English in relation to some sounds, the main objective of this paper was to find out if the English syllable structures pose pronunciation difficulties for Jordanian Arab learners and what makes them declusterize certain English clusters rather than others.

As mentioned above, this paper has three main objectives. In relation to objective one, participants did make pronunciation errors in which they declusterize certain target language clusters by inserting an anaptyctic vowel in the onset of some syllables as well as in certain syllable codas.

As far as the second objective is concerned, it is evident from the types of pronunciation errors made by the participants that the sources of such difficulties were interference of participants' L1 as well as their stage of development. The former was more prominent than the latter.

The third objective was suggesting some teaching procedures that may help teachers as well as learners overcome pronunciation difficulties. The following procedures might be of great assistance when dealing with pronunciation problems related to consonant sequences:

- i Introducing syllable patterns of learners' mother tongue,
- ii Introducing short syllable patterns of English language first,
- iii Introducing long syllable patterns of English language,
- iv Making a comparison between the syllable patterns of both languages pinpointing the differences, and
- v Putting more emphasis on the foreign syllable patterns in order to eliminate the number of predicted errors.

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