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ARABIC CONSONANT CLUSTER
ACQUISITION THE CASE OF
ENGLISH LEARNERS

IMAN SAAD EL DIN FAHMY NAHLA

1997



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The American University in Cairo
The School of Humanities and Social Sciences

ARABIC CONSONANT CLUSTER ACQUISITION
THE CASE OF ENGLISH LEARNERS

A Thesis Submitted to

The Arabic Language Institute
TAFL Program

in partial fulfillment of the requirements for
the degree of Master of Arts in TAFL

by

Iman Saad El Din Fahmy Nahla

June/ 1997

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**ARABIC CONSONANT CLUSTER ACQUISITION
THE CASE OF ENGLISH LEARNERS**

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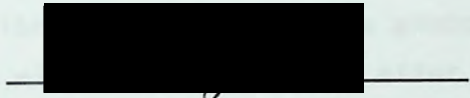
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The degree of Master of Arts in TAFL

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Committee Reader / examiner



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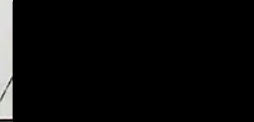


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my brother

and

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to the memory of my father

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Last, but not least, I would like to express my special thanks to Mr. Waheed Samy for his kind and sincere help in all my computer-related problems.

ABSTRACT

The purpose of this study is to test the hypothesis that American L2 learners of Arabic find consonant clusters of Arabic that are not permissible in their native language difficult to pronounce. The interlanguages of six adult native speakers of American English learning Arabic as a second language is investigated. Subjects are asked to read sentences containing words ending with consonant clusters. Subjects' performance on clusters permissible in Arabic and English and clusters non-permissible in English is compared. The difference between subjects' performance on clusters permissible in Arabic and English and clusters permissible in English only is found to be significant, a finding which confirms the hypothesis.

Simplification strategies used by subjects when producing the difficult clusters are: (1) modification of syllable structure via schwa epenthesis between the two consonants of the cluster (in the case of clusters ending with /m n l), (2) inserting a vowel at the end of the word (in the case of clusters ending with /w y/), (3) producing the final consonant as a syllabic consonant (in the case of clusters ending with /m n l). Substitution of one of the cluster constituents also occur (/u i/ for /w y/). These strategies are found to be due to L1 transfer processes, developmental processes, or universal processes. Other simplification strategies, such as schwa epenthesis and final-obstruent devoicing, also occur in subjects'

production of clusters permissible in their native languages. This provides evidence for the existence of developmental processes in the subjects' interlanguages regardless of L1 transfer.

In light of the findings of the study, a number of pronunciation teaching practices are proposed to deal with the problem of consonant clusters in class. These procedures range from dependent practice (imitative speech practice) to guided practice (rehearsed speech practice using fixed texts) and independent practice (extemporaneous speech practice in partially planned or unplanned talks and panel discussion). A blend of the three types of practice is recommended.

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LIST OF PHONETIC SYMBOLS

b	voiced bilabial stop
m	bilabial nasal
f	voiceless labio-dental fricative
s	voiceless dento-alveolar fricative
ʃ	pharyngealized voiceless dento-alveolar fricative
z	voiced dento-alveolar fricative
ʒ	pharyngealized voiced dento-alveolar fricative
t	voiceless dento-alveolar stop
ʈ	pharyngealized voiceless dento-alveolar stop
d	voiced dento-alveolar stop
ɖ	pharyngealized voiced dento-alveolar stop
k	voiceless velar stop
g	voiced velar stop
q	voiceless uvular stop
x	voiceless uvular fricative
ɣ	voiced uvular fricative
n	dento-alveolar nasal
l	dento-alveolar lateral

ʃ voiceless palato-alveolar fricative

w labio-velar semivowel

y palatal semivowel

ɛ voiced pharyngeal fricative

ħ voiceless pharyngeal fricative

h voiceless laryngeal fricative

ʔ glottal stop

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

1.1. Introduction

The acquisition of a second language sound system is one area in second language acquisition that was not given enough attention for a long time, especially when compared to the acquisition of other components of the second language such as grammar and vocabulary. Speech was thought of as to “emerge on its own after a sufficient amount of acquisition has taken place” (Eckman & Iverson, 1994, p. 251).

Beginning in the 1980s and into the present there has been a shift in the approach to second/ foreign language teaching and learning. In the 1960s, 1970s, and into the 1980s, when the communicative paradigm was the dominant paradigm, pronunciation was given very little attention in language teaching curricula, and sometimes it was even neglected. In that paradigm the focus was mainly on making the language learner able to communicate in the second or foreign language with little attention paid to the accuracy of the learner’s production. Recent years, however, have witnessed a shift in the focus of language teaching methodologies, resulting in an increased focus on form (Morley, 1991). Therefore, in teaching oral language skills, pronunciation is now again considered essential.

Clearly, pronunciation is a difficult skill to master. We encounter all the time “advanced” students who master the second language grammar and have a wide range of knowledge of its vocabulary, yet their pronunciation when they talk in the second language is clearly foreign. Within the research on pronunciation, one important component of the pronunciation problem that has been identified is the production of consonant clusters. As Fries (1945) put it:

“ Each language has not only its own set of distinctive sound features; it also has only a limited number of characteristic sequences of consonants and vowels which make up the structural pattern of the syllables and words. From this fact arises the importance of finding the “position” in which the distinctive sounds can occur and the “clusters” which they may form...Ease of pronunciation or difficulty of pronunciation and ease or difficulty of discrimination in hearing are matters primarily of the “patterning” of the sounds in a new language rather than matters of the articulation of the sounds per se .” (p. 16)

Lado (1957), taking up Fries’s position, stated:

“When a language does not have a sequence, or when a sequence does not occur in a position in which it does occur in the foreign language, we will have located a problem.” (p. 19)

He then asserted that such problems, which result from the comparison of the native and the target languages, “must be considered ... hypothetical problems until final validation is achieved by checking against the actual speech of students.” (p. 72)

Personal observation in the classroom validated the above mentioned statements of Fries (1945) and Lado (1957). Kennedy (1960) in her analysis of pronunciation problems of American learners of Egyptian Arabic, recorded many instances of difficulties encountered by students when attempting to produce certain consonant clusters of Arabic.

1.2. Purpose of the Study

The purpose of this study is to test the following hypothesis:

The production of certain consonant clusters in Arabic which are not permissible in the learners' native language is an area of difficulty for these learners even if the consonants making up these clusters are consonants that have counterparts in the learners' native language.

To test this hypothesis, it is necessary to compare the consonants of the native language and the target language -- in our case, American English and Egyptian Colloquial Arabic (urban dialect of Cairo) -- to identify which consonants occur in both languages. Then, the clusters which these consonants form in both languages shall be compared. The learners' production of the clusters of Egyptian Colloquial Arabic which have no counterparts in English, and which are therefore foreign to them, shall be compared to their production of clusters which do have counterparts in English.

It follows that the following consonants shall not be included in the study: the back consonants /q/ (voiceless uvular stop), /ɣ/ (voiced uvular fricative), /x/ (voiceless uvular fricative), /ħ/ (voiceless pharyngeal fricative), /ʕ/ (voiced pharyngeal fricative) and the pharyngealized consonants /S/ (voiceless alveolar fricative), /T/ (voiceless alveolar stop), /D/ (voiced alveolar stop), /Z/ (voiced alveolar fricative) (see the consonant chart in Appendix A). The consonants of Arabic which have no counterparts in English, and which are assumed to form difficulties for students when they occur singly, are also assumed to be difficult when they occur in clusters. These shall not be included in this study, for this study will focus on problems that are due to clustering per se.

The glottal stop /ʔ/, which in Arabic is a phoneme, occurs in English as an allophonic feature of, e.g. word-initial vowels. Students are therefore accustomed to producing it, only they do not perceive it as a phoneme. Therefore, very often they do not hear it and they tend not to produce it when it occurs in positions other than word-initial positions (personal observation; Kennedy, 1960). The glottal stop will not be included in this study since it constitutes a problem of its own.

Another consonant that will not be included in the study is /r/. In American English it is a retroflex. In Arabic it is a tap, trill, or fricative, depending on its position in the word (Gaber, 1986). Students usually find it

difficult to produce this consonant. So the difficulty in producing a cluster including /r/ could be due to the difficulty students have in producing that particular consonant (Kennedy, 1960). As mentioned above, this study will focus on difficulties that are due to clustering per se.

The consonants /t/ and /d/ are dental in Arabic and alveolar in English. This difference however should not cause a difficulty in the pronunciation of the sound in Arabic. Once this difference in articulation is explained to the students, they succeed in producing these Arabic consonants (personal observation; Kennedy, 1960). Therefore, the difference between the English and the Arabic /t/ and /d/ was not sufficient to exclude them from this study. The consonant /h/ differs from the other consonants of English in that it may not occur in the syllable coda, while the other consonants may occur in that position. It is therefore a special case and will not be included in this study.

The study will focus on consonant clusters in word-final position. Medial clusters and clusters occurring at word junctions in connected speech will not be considered in this study, for although studying them would be very interesting, it would go beyond the scope of this study. Investigating students' production of consonant clusters in all positions is a task that could not be done in only one study. Furthermore, the researcher was encouraged by the ground research¹ conducted on final clusters in both

Egyptian Arabic and American English, which would be complemented by this study.

The study will also attempt to account for the difficulties encountered by the students in pronunciation and for the strategies they use to overcome these difficulties. Previous studies reported that epenthesis (the insertion of a vowel to separate a consonant cluster the students find difficult to produce) and consonant deletion (a simplification strategy to reduce the consonant cluster) were common strategies used by L2 learners to deal with the clusters they find difficult.

1.3. Significance of the Study

As can be seen in the reviewed studies in the next section, there is no consensus among interlanguage researchers about the relative importance of the different processes they discussed in shaping interlanguage phonological systems, i.e. the sound systems of the learners' interlanguages. More research studies need to be conducted to test the different claims stated in these studies. This study is intended to contribute to the ongoing research in this field.

Furthermore, the study is also intended to serve as a reference for teachers of Arabic who want to have a better insight into the nature of pronunciation problems of their students, especially since the literature found in that respect was very sparse. The only sources found dealing with

pronunciation problems of adult American learners of Egyptian Arabic were Kennedy (1960) and Broselow (1984).

Kennedy (1960) dealt with pronunciation problems encountered by American students when producing and perceiving the segmental phonemes of Egyptian Arabic. Her study, however, had a number of limitations which she herself mentioned. The author collected her data by observing two Arabic language classes and recording the errors which the teacher pointed out and corrected in class. The author, not being a native speaker of Arabic, had to rely on the teacher of the course in that respect. Therefore, there might have been errors which the researcher did not record, because the teacher did not comment on them. It is obvious that no teacher would correct every single mistake made by his/her students in class. In addition, the study did not include statistics on the frequency of error occurrences. Also, there might have been difficult sequences of sounds that the study did not cover. Furthermore, there is no reference in the study to the proficiency level of the subjects.

Broselow (1984) dealt with errors made by American learners of Arabic when segmenting a phonetic string into words. She attributed these errors to the differences between the syllable structures of English and Arabic.

The researcher found no other studies conducted on adult learners of Arabic dealing with consonant cluster acquisition. Thus, a gap has been identified in the literature. This study is intended to fill this gap.

1.4. Literature Review

The past decade has witnessed a revival in the interest of researchers in the acquisition of a second language sound system. Native language transfer, for a long time, was seen as the chief, if not the only cause of pronunciation errors, a fact which discouraged many researchers from studying interlanguage phonological systems (Ioup & Weinberger, 1987). Recent studies revealed that processes other than transfer play an important role in the process of acquiring a second language sound system. This encouraged researchers to study further interlanguage phonological systems in order to come to a better understanding of these different processes.

Researchers investigating the acquisition of a second language sound system have studied interlanguage phonological systems from various perspectives. Some have focused on segmental features such as the substitution of certain sounds for others while others focused on suprasegmental features such as stress, rhythm, intonation and syllabification in interlanguage. Among other things, they were trying to learn more about the processes that shape the interlanguage phonological systems. That is, they were attempting to find out more about the relative

importance of transfer from the native language, first language acquisition processes reactivated in learning to pronounce the second language, and other universal processes (traceable to neither the native language transfer nor first language acquisition processes) in shaping interlanguage phonological systems. The following section includes a review of some very important studies that are considered landmarks in the area of interlanguage phonology and which are primarily concerned with the acquisition of a second language syllable structure and consonant clusters.

1.4.1. Studies emphasizing the role of transfer

The studies included in this section use mainly the language transfer hypothesis to account for their results. According to that hypothesis, the language learner would transfer forms and rules of his/her native language and impose them on the target language forms.

Tarone (1980), in an attempt to determine how interlanguage syllable structures differ from the syllable structures of the target language and in order to identify some of the processes influencing the interlanguage syllable structure, conducted a pilot study in which she investigated the interlanguages of six adult learners of English, two speakers each of Korean, Cantonese, and Portuguese. Subjects were asked to narrate a story by describing a number of pictures. The author tested three hypotheses: The

first one was the language transfer hypothesis which suggested that subjects would impose the syllable structures of their native languages on target language forms. The second hypothesis suggested that subjects would simplify target language syllable structures using the same strategies that first language learners use (such as cluster reduction, final consonant deletion, and weak syllable deletion). The third hypothesis suggested that a universal preference for the open CV syllable might be a factor influencing subjects' interlanguages. Previous research has shown that speakers, in stressful situations, resort to simple CV patterns in their pronunciation of their native language. It might be possible then, that when speaking a foreign language, speakers would resort to this strategy and break difficult sound combinations into simple CV syllable patterns using epenthesis.

In attempting to explain the errors she found in her data, the author noted that since Cantonese and Brazilian Portuguese were both characterized as CV languages and did not share a large proportion of identical segment sequences with English, it would be very difficult to attribute errors of native speakers of these languages to anything other than transfer. Korean, however, had a more complex syllable structure and shared a larger set of segment sequences with English. The Korean data, therefore, was what would provide evidence for processes other than transfer, because "in order to show that interlanguage syllable structure errors do *not* result from language transfer, it is necessary to demonstrate

clearly that the *same* sequence of vowels and consonants exists in the native language and the target language, and that the learner still makes syllable structure errors in trying to produce that sequence in the target language (p.143).”

When analyzing her data, the author categorized the errors into three types: (1) epenthesis, (2) consonant deletion, (3) glottal stop insertion. She did not consider substitutions of one sound for another, since such substitutions did not change the syllable structure. She found that subjects resorted to epenthesis as well as consonant deletion to simplify target language syllable structures. Consonant deletion is a strategy used by first language learners, which suggested that using it by second language learners might be a reactivation of a first language simplification strategy. The author attributed the majority of errors made by her subjects to transfer. Some errors, however, were classified as non-transfer errors. Since both epenthesis and consonant deletion resulted in simplifying the target language syllable structures to the basic CV syllable pattern, this suggested that there may be a universal preference for the open syllable, and for the CV syllable in particular. As for glottal stop insertion, it appeared only between words, usually when the first word ended with a vowel, and the next word began with a vowel. The author suggested that this may be because the subjects were trying to produce lexical items as separate units in the speech stream.

Sato (1987) studied the interlanguages of two Vietnamese children learning English as a second language to test previous claims (mainly those in Tarone 1980) about the effect of native language transfer and universal processes on interlanguage syllable structures. Vietnamese, as opposed to English is described as a monosyllabic language, because a vast majority of its words consist of single syllables. Only eight of its consonants may occur in syllable final position. It allows only syllable initial consonant clusters. The second member of such clusters is /w/. The author found evidence that the language generally preferred the closed CVC syllable. A transfer hypothesis would therefore predict that the subjects would find English final consonant clusters more difficult than initial ones, i.e. final clusters would undergo more restructuring. A transfer hypothesis would also predict a preference for CVC syllables, which would contradict the hypothesized universal preference for CV syllables.

The data consisted of spontaneous speech from informal meetings with the subjects at three points during a period of ten months. The following processes of syllable modification were found in the data: (1) articulatory feature changes (i.e. retention of the cluster but changing place or manner of articulation, e.g. stopping, devoicing); (2) consonant cluster reduction through deletion of part of the cluster or through vowel epenthesis; (3) consonant cluster deletion (i.e. deletion of the whole cluster). The data confirmed the author's hypotheses. As was predicted, based on the

transfer hypothesis, syllable modifications for both subjects yielded the closed CVC syllable rather than the open CV syllable. Also, both learners had much more difficulty producing English final clusters than initial clusters. The data also showed that epenthesis as a simplification strategy was not the dominant strategy. In fact, other strategies occurred more in the data. The author concluded by stating that as far as interlanguage syllable structure was concerned, transfer processes play a more important role than other processes, which confirmed Tarone's findings in (Tarone, 1980). Broselow (1987) studied the pronunciation of English initial consonant clusters by native speakers of two Arabic dialects: Iraqi Arabic (the dialect of Baghdad and environs) and Egyptian Arabic (the dialect of Cairo and lower Egypt in general). The errors she discussed were collected by various ways among which were recording the errors she had heard in conversations with native speakers of both dialects; asking teachers of native speakers of these dialects about the errors that their students had made consistently; asking two native speakers of each dialect to read a word list and read and answer questions on a number of passages ; and searching the literature on second language acquisition for discussions of errors made by native speakers of these dialects when learning English.

The author had argued elsewhere (Broselow 1984) that errors in pronouncing consonant clusters were generally due to the fact that the consonants in these clusters belong to syllable structures not permitted in

the learners' native languages. These errors occur because the learner is attempting to "bring second language forms into conformity with first language restrictions defining possible syllables" (p. 293). In this study she argued that the learners' choice of a certain way to resolve the problem of pronouncing certain consonant clusters was the result of the transfer of a native language rule.

Her data revealed that there were differences between the way Iraqis and Egyptians treated initial clusters in English. In two-consonant clusters Egyptians inserted [i] between the first consonant and the second consonant. Iraqis, on the other hand, inserted [i] before the initial cluster and pronounced it with a glottal stop before the [i]. Generally speaking, they made fewer errors than Egyptians in pronouncing these clusters. The author attributed this to positive transfer from the Iraqi dialect. In the Iraqi dialect initial two-consonant clusters may occur and often they are realized with an initial [i] preceded by a glottal stop. The Egyptian dialect however does not permit initial two-consonant clusters. Therefore, Egyptians were found to make more errors than Iraqis in pronouncing those clusters.

The fact that Egyptians chose to insert [i] in that particular position (between the two consonants) needed an explanation. It was necessary to have a closer look at how epenthesis rules function in both languages. So the author considered epenthesis rules in medial three-consonant clusters in both dialects. She found that both dialects insert [i] into these clusters,

only they insert it in different places. In Iraqi, the [i] is inserted after the first of the three consonants, while in Egyptian, the [i] is inserted after the second of the three consonants. She stated these epenthesis rules in the following way:

Iraqi $\emptyset \Rightarrow i / C_CC$

Egyptian $\emptyset \Rightarrow i / CC_C$

She asserted that if these epenthesis rules were viewed as rules that make surface forms conform to permissible syllable structures in the language, they would help us explain the errors recorded.

After stating the permissible syllable structures in Egyptian and Iraqi Arabic, the author divided the utterances with medial three-consonant clusters where epenthesis occurred into syllables and found that each contained a 'leftover' consonant that did not belong to any syllable. She found that epenthesis occurred to create a syllable that would incorporate this 'leftover' consonant. To illustrate, she presented the following examples:

Iraqi	(ki) (tab) t (la) (I wrote it/him)
	(čil) d (ren)
Egyptian	(ka) (tab) t (lu)
	(čil) d (ren)

In Iraqi, epenthesis will occur to the left of the 'leftover' consonant resulting in [katabitla], while in Egyptian, epenthesis will occur to the right of the 'leftover' consonant resulting in [katabtilu]. This rule will be transferred when attempting to pronounce English medial clusters and will

result in the following errors: Iraqis [čilidren] and Egyptians [čildiren]. In light of these findings, Iraqis' and Egyptians' errors in pronouncing initial two-consonant clusters can be seen as a transfer of the epenthesis rule in both dialects. Iraqis would insert the vowel to the left of the first consonant in the cluster, producing [ʔiflor] for 'floor', while Egyptians would insert the vowel to the right of the first consonant in the cluster, producing [filor].

This rule did not apply however to the Egyptians' production of initial two-consonant clusters of *s* + stop consonants *p*, *t*, or *k*. When producing these clusters they inserted the vowel before the first consonant in the cluster, e.g. [istadi] for 'study'. When producing clusters of *s* + any other consonant Egyptians inserted the vowel after the first consonant in the cluster, e.g. [silayd] for 'slide'. The author considers two-consonant clusters of *s* + stop, as well as three-consonant clusters of *s* + stop + sonorant to be exceptions to the transfer hypothesis for Egyptians. She found that native speakers of other languages also find these particular clusters difficult, which suggests that the problem may be in the make-up of these clusters. These clusters, she found, violated the sonority hierarchy principle². The author concludes then by saying that universal principles may have a role in learners' errors in cases where transfer cannot explain these errors.

1.4.2. Studies emphasizing the role of universal principles

The studies reviewed in this section resort to principles such as the sonority hierarchy principle and typological markedness to account for their results. These principles are derived from language universals. Resorting to them to account for certain errors in the learners' interlanguages was based on the assumption that interlanguages are languages in their own right and that they have their own rules which are separate from both the native language and the target language (Eckman, 1986). The need for this arose from the fact that the language transfer hypothesis could not account for many errors that occurred in the learners' interlanguages.

Karimi's (1987) findings contradicted Broselow (1987). She examined the strategies used by Farsi speakers to overcome difficulties in pronouncing English initial consonant clusters by studying the interlanguages of four adult native speakers of Farsi learning English as a second language. Initial consonant clusters are not allowed in modern Farsi. The Contrastive Analysis Hypothesis would therefore predict that Farsi speakers would find English initial consonant clusters difficult. It would not however predict what strategies Farsi speakers would use to overcome such difficulties.

Subjects were asked to read aloud an English passage and engage in a conversation with an English native speaker about the content of that passage. They were also asked to read a word list. The data represented

different degrees of formality ranging from very formal (reading word lists) to free speech (conversing with an English native speaker). The fewest number of errors occurred in reading the list. The paragraph reading contained more errors and the free conversation contained most errors. All subjects used the same strategy to avoid the initial consonant cluster, namely epenthesis. In the case of initial two-consonant clusters, subjects inserted the vowel after the first consonant. Clusters beginning with /s/ were an exception. In this case, subjects inserted the vowel before the cluster, regardless of the type of consonant following the initial /s/.

The fact that subjects resorted to epenthesis could not be attributed to transfer, since epenthesis does not occur in the grammar of modern Farsi. Instead, consonant deletion is the simplification strategy that occurs in the language. As for clusters beginning with /s/, Broselow (1987) found that only those clusters that violated the sonority hierarchy were exceptional to the epenthesis rule she had formulated. Karimi found in her data that all clusters beginning with /s/ were exceptional regardless of the consonant that followed. She concluded that native language transfer does not play the significant role attributed to it by Broselow (1987) and that further research should be done to investigate the role of universal processes in the acquisition of L2 phonology.

Tropf (1986) investigated the role of a certain characteristic of syllable structure -- the sonority hierarchy within the syllable (see note # 2, end of chapter) -- in shaping L2 phonology by studying the production of consonant clusters in the interlanguages of 11 adult Spaniards who have acquired German as an L2 without any formal instruction. He wanted to find out whether the sonority hierarchy could account for certain forms that occurred in the subjects' interlanguages and that could not be directly explained through native language or target language restrictions. More specifically, he wanted to see whether the sonority hierarchy principle played a significant role in determining which variants of the consonant cluster (and of final consonants) the subjects would prefer.

The author first established the canonical syllable structure illustrated in figure 1 which many languages conform to:

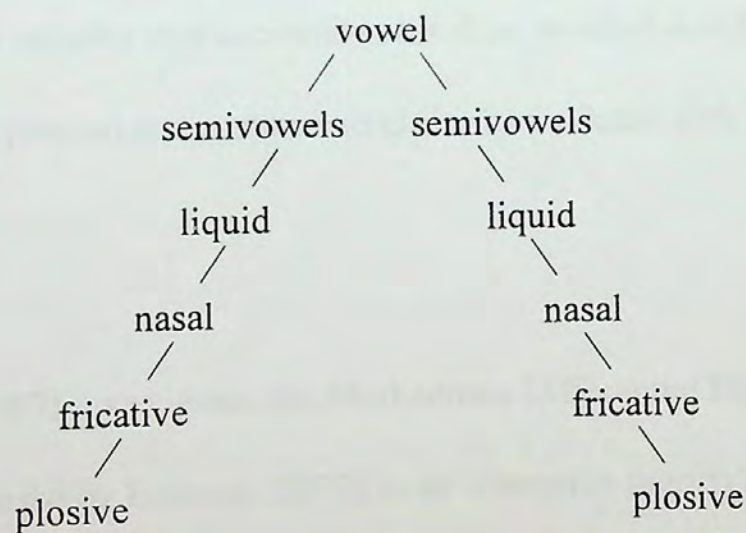


Figure (1)

German has a more complex syllable structure than Spanish, which shows a tendency towards the CV-syllable. The author recorded informal

conversations of two to three hours between each of the subjects separately. The data was then transcribed and the relative frequencies of the different variants were calculated.

The author found that the sonority factor, which is independent of both the native and the target languages, played a crucial role in determining the subjects' preferences for certain variants as was shown by the case of initial plosive-fricative target clusters. The data showed that when the target cluster was simplified, there was a correlation between the frequency of consonant omission and the sonority of the target language consonants. The realization of a fricative (which is according to Figure 1 more sonorous than the plosive) was preferred to the realization of the plosive. In other words, the realization of the plosive implicated the realization of the fricative. The quantitative distribution of the interlanguage variants that occurred in his data revealed that the ease of acquisition of (single) consonants and clusters correlated with their degree of sonority.

Anderson (1987) investigated the Markedness Differential Hypothesis (MDH) proposed by Eckman (1977) in an attempt to modify the strong form of the Contrastive Analysis Hypothesis by incorporating certain principles of universal grammar. Eckman (1977) was trying to identify a principle that would help *predict* areas of difficulty as well as directionality

of difficulty -- whether a certain phenomenon is more of a problem for speakers of language A learning language B, or for speakers of B learning A. Besides comparing the two languages, he incorporated the notion of 'relative degree of difficulty', which would correspond to the notion of 'typologically marked'. MDH stated that "The areas of difficulty that a language learner will have can be predicted on the basis of a systematic comparison of the grammars of the native language, the target language and the markedness relations stated in universal grammar, such that those areas which differ from the native language and are more marked than the native language will be difficult. The relative degree of difficulty ... will correspond to the relative degree of markedness... [and] areas of the target language which are different from the native language, but are not more marked than the native language will not be difficult" (Eckman, 1977 p. 61).

The author attempted to test the MDH by studying L2 syllabification in the interlanguages of forty adult ESL learners. Twenty of those subjects were native speakers of Egyptian Colloquial Arabic and twenty of them were natives of Taiwan. Ten of the Taiwanese subjects spoke Amoy Chinese as their native language and all of them spoke Mandarin Chinese, the official language in Taiwan. The subjects' overall proficiency levels in English were equal. The data was collected by interviewing each subject

individually and asking them to talk about a holiday in their home countries.

After comparing the syllable structures of English, Arabic, and Chinese, the author made predictions based on the Markedness Differential Hypothesis about the subjects' production English consonant clusters. The longer the clusters of English, the more difficult they would be, since longer clusters are more marked than shorter ones. Neither Egyptian Arabic nor Chinese permit clusters as long the English clusters. As for the position of the clusters, the author predicted that for Chinese native speakers, final clusters would be more difficult than initial ones, since final clusters are more marked than initial clusters. Both dialects of Chinese do not permit consonant clusters either initially or finally. As for the Egyptian subjects, the author did not make predictions about the relative difficulty of initial and final clusters. The Egyptian dialect permits only final consonant clusters, which are the more marked clusters. Would Egyptians find English final clusters more difficult than initial clusters, because final clusters are more marked than initial ones, or would they find final clusters easier than initial ones, because the Egyptian dialect permits final clusters and does not permit initial ones; are questions that the Markedness Differential Hypothesis does not answer. In other words, the Markedness Differential Hypothesis does not predict whether markedness or native language transfer will prevail in such a case.

The author found that as far as the length of the cluster is concerned, her results supported her hypothesis. Both Egyptians and Chinese found the longer clusters, which are also more marked clusters, more difficult than shorter ones. As for the position of the cluster, for the Chinese subjects, the more marked final clusters were more difficult than initial clusters. No predictions were made for the Egyptian subjects. The author found that they performed better on initial, less marked clusters, which suggested that universal factors might have stronger influence on the subjects' interlanguage than native language transfer.

Eckman (1986) studied consonant reduction through consonant deletion in word-final consonant clusters in the interlanguages of six adult learners of English, two speakers each of Cantonese, Japanese, and Korean, which are languages that permit only singleton consonants word-finally, and arrived at rules that govern consonant deletion in those clusters. Subjects were asked to read aloud lists of words that included final consonant clusters, each word twice. What the author considered in his analysis were the cases where both tokens of the word as pronounced by the subjects were different, since according to him, those were the forms which "provide evidence for motivating underlying representations pertinent to phonological rules (p.147)". So he discarded the cases where both tokens were target-like, or where both tokens were non-target-like but identical. In

those cases “there is no motivation for an underlying representation which is different from the interlanguage phonetic representation, nor is there any justification for a phonological rule (p.147)”.

When analyzing the data the author found a pattern which he attempted to explain by resorting to the notion of typological markedness and the universals concerning initial and final consonant clusters stated in Greenberg (1978). He found that “consonant reduction applied to final consonant clusters producing relatively less marked structures along two dimensions. First, this rule reduces a more marked structure (e.g. tri-literal cluster) to a less marked structure (bi-literal cluster); and second, ... when there is more than one possible resultant cluster from the application of consonant reduction, it applies to produce a biliteral cluster which is less marked or equally marked with respect to the other biliteral clusters that could result from the reduction of the tri-literal cluster (p.153)”.

Since his data included exceptions to the above stated rule, the author referred to it as a tendency in the learners’ interlanguages rather than an exceptionless rule. The author concluded his discussion of the results with some remarks on interlanguages in general. According to the cases he considered in his analysis, the underlying forms indicated that the subjects knew the target language forms. However, even in careful speech, they shortened at least some of the bi-literal and tri-literal clusters. The rule that governed this process was separate from both the target language and the

native language. This agrees with how interlanguages are generally described. They include rules that belong neither to the native language, nor to the target language. The data in the study show also that interlanguages are simpler in some cases than the target languages in the sense that they include forms which are relatively less marked than those of the target languages. This shed more light on another feature of interlanguages that second language researchers generally assume to be true, namely that "interlanguages are, in some well defined sense, simpler than the target languages in question" (p. 143).

Eckman (1991) studied initial and final consonant clusters in the interlanguages of eleven adult ESL learners who are native speakers of Japanese, Chinese (Cantonese dialect), and Korean, languages that do not permit initial or final consonant clusters. Subjects were of different levels of proficiency in English, from elementary to advanced. The author's aim was to test the *Interlanguage Structural Conformity Hypothesis (SCH)*, which states that: "The universal generalizations that hold for the primary languages hold also for interlanguages" (p.24). This hypothesis was tested against the following generalizations, which are based on Greenberg (1978):

a. *Fricative-Stop Principle*: If a language has at least one final consonant sequence consisting of stop + stop, it also has at least one final sequence consisting of fricative + stop.

b. *Resolvability Principle*: If a language has a consonantal sequence of length m in either initial or final position, it also has at least one continuous subsequence of length $m-1$ in this same position (pp. 24,25).

As a control group the author used four university-aged native speakers of English. To elicit English words containing initial and final consonant clusters, the subjects were asked to read word lists, passages, and comment on pictures. In addition to this, the subjects were engaged by the researcher in a number of free conversations, the aim of which was to gather as many words as possible with initial and final consonant clusters.

The author found that the overwhelming majority of his data confirmed the hypothesis, which suggested that primary language universals also hold for nonprimary languages. He then discussed the Interlanguage SCH and compared it with the Markedness Differential Hypothesis (MDH) proposed in Eckman (1977). He claimed that the Interlanguage SCH is more powerful than the MDH. While the MDH makes predictions on the basis of implicational universals as well as the differences between the native language and the target language, the SCH makes predictions on the basis of implicational universals only. SCH asserts that interlanguages will obey these universals. So if there are no

differences between the two languages, the SCH will predict that universals still obtain, while the MDH would not make any predictions.

1.4.3. A model for L2 phonology acquisition

Major (1987) proposed the *Ontogeny Model* in an attempt to “offer an integrated view of the way the L2 learner’s phonology changes over time, as well as the way it varies with style, rather than merely attempting to explain the possible sources of error of an L2 learner at one particular stage” (p. 102). He proposed that at early stages of acquisition, interference processes prevail. At this stage developmental processes are very infrequent. Then interference processes decrease while developmental processes increase in frequency and then decrease over time. He also proposed that the same relationship between developmental and interference processes would hold as style changes from casual to normal to formal style. The reason for this may be that as formality of speech increases, the speaker pays more attention to the form of his speech and is therefore, more able to suppress certain processes.

After presenting evidence for the model from theories of learning and from previous studies, the author, in order to test the model, conducted a pilot study in which he analyzed the recorded readings of twelve adult Brazilian Portuguese speakers learning English in Brazil. Half the subjects were beginners and the other half were advanced in English. Subjects were

asked to read a word list, a list of sentences, and a passage. Reading the word list was considered the most formal style and reading the passage was considered the casual style.

The author chose to investigate the following phenomena: the acquisition of the English /r/ which differs from the Brazilian /r/; final consonant clusters, which are not permitted in Brazilian; and final obstruents, since /s/ is the only word-final obstruent in Portuguese. The following errors occurred in the data: As far as /r/ is concerned the subjects substituted native language sounds for the American /r/, which was classified as an interference process, and also substituted [w], which was considered a developmental process. As for final consonant clusters, the subjects inserted [i] or [ə] to break up the clusters. The [i] insertion was considered an interference process since it occurs in loan words in Portuguese, while the schwa insertion was considered a developmental process. Subjects also devoiced final obstruents, which was considered a developmental process. Besides terminal devoicing, subjects also inserted [i] or [ə] after word final obstruents. The [i] insertion was considered interference, while the schwa insertion was considered developmental, since it occurs in L1 acquisition. The author found the trends in the data supporting his model, the only limitation being the small size of his data.

Major (1994) tested the Ontogeny Model proposed in Major (1987) using longitudinal and stylistic data from four adult native speakers of Brazilian Portuguese who are beginning learners of English. The phenomena investigated were English initial and final consonant clusters that do not occur in Portuguese. Subjects were asked to read a word list and a passage containing the same words in the list. Subjects' readings were recorded three times at intervals of four weeks. The author found that his data supported the model in terms of chronology, but not for style.

1.4.4. Summary of the reviewed studies

The reviewed studies covered the major directions in L2 phonology research, with an emphasis on syllable structure and consonant cluster acquisition. Researchers have used the language transfer hypothesis and universal processes (developmental processes like those occurring in L1 acquisition and processes resulting from language universals) to account for pronunciation errors or problems. From these studies it can be seen that the different processes that shape the interlanguage phonological systems all interact in a way that still needs to be investigated more before any theory of L2 phonology acquisition can be formulated.

To provide an overview for the reader, the following table includes a summary of the studies reviewed in the previous section:

Table 1: Summary of the reviewed studies

	Author	Subjects	No.	Data collected	Type of study
The role of transfer	Tarone (1980)	Korean, Cantonese, and Portuguese adult ESL learners	6	story narration using pictures	cross-sectional
	Sato (1987)	Vietnamese children learning English	2	spontaneous speech from informal meetings	longitudinal (10 months)
	Broselow (1987)	Adult Egyptian and Iraqi ESL learners	4	reading word lists; answering questions on passages; data from various sources	cross-sectional
The role of universal principles	Karimi (1987)	Adult Farsi ESL learners	4	reading a word list; reading a passage; free conversation	cross-sectional
	Tropf (1986)	Adult Spaniards learning German	11	informal conversations	cross-sectional
	Anderson (1987)	Adult Egyptian and Taiwanese ESL learners	40	free conversations	cross-sectional
	Eckman (1986)	Adult Cantonese, Japanese, Korean ESL learners	6	reading word lists	cross-sectional
	Eckman (1991)	Adult Japanese, Cantonese, Korean ESL learners	11	reading word lists, passages; commenting on pictures; free conversations	cross-sectional
A model for L2 phonology acquisition	Major (1987)	Adult Brazilian Portuguese EFL learners	12	reading a word list, sentences, a passage	
	Major (1994)	Adult Brazilian learners of English	4	reading a word list and a passage	longitudinal

Notes to Chapter 1

1. See Chapter 2.
2. As formulated in Goldsmith (1990) the sonority principle operates such that:
 - (i) the segmental material in the onset of the syllable must be arranged in a linear order of increasing sonority from the beginning of the syllable to the nucleus of the syllable; and (ii) conversely, the segmental material in the rhyme of the syllable must be arranged in a linear order of descending sonority from the nuclear vowel of the syllable to the final segment of the syllable. (p. 110) (rhyme = nucleus + coda)

The sonority hierarchy used by Goldsmith (1990) is the following (starting from the most sonorous and ending by the least sonorous) (p.111):

vowels [low vowels, mid vowels, high vowels]

semivowels

liquids

nasals

obstruents [fricatives, affricates, stops]

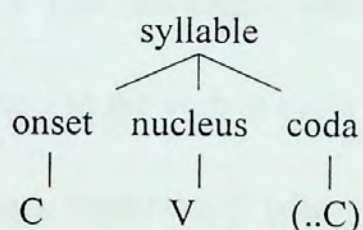
CHAPTER 2

COMPARISON BETWEEN ARABIC AND ENGLISH

SYLLABLE STRUCTURES

2.1. Syllable structure of Arabic

For the purposes of this study the Arabic syllable shall be represented by the following tree diagram ¹, where *C* represents a consonant and *V* represents a vowel:



In Egyptian Colloquial Arabic, the nucleus, which is obligatory in any syllable, may contain a short or long vowel. The onset position is obligatory and may contain only one consonant. The coda, on the other hand, is optional and may contain up to two consonants. Hence, the following syllabic structures occur: CV, CVV, CVC, CVCC, CVVC. CVVCC occurs only in Standard Arabic. The last two types CVCC and CVVC occur only word-finally. Moving from the 'syllable' to the 'word', we can see that in Egyptian Arabic, initial clusters do not occur. Medially, clusters of two consonants occur. Harrell (1957) calls them abutting consonants. These consonants cluster across the syllable boundary-- the

first consonant of these clusters falls in the first syllable and the second one in the following syllable. Word-finally, clusters of two consonants occur.

These consonants occur in the same syllable.

Fries (1945) distinguishes between two types of final clusters:

1) clusters that occur at the end of single morphemes and 2) clusters that are formed by adding inflectional morphemes. The first type occurs in Arabic in words such as /ħuzn/ 'sadness', /ʔamn/ 'security', and /ʔird/ 'monkey'.

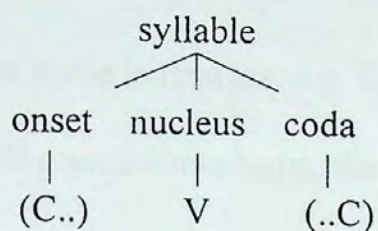
The second type occurs when adding the inflectional morpheme *t* to the past tense verb, e.g. /ʔakalt/ (I/ you {masculine singular} ate) and when adding the inflectional morpheme *f* to the verb in order to negate it, e.g.

/maʔakalf/ (he did not eat), /mabtakulf/ (she, you {masculine singular} does not eat).

Many other Arabic dialects differ from Egyptian Arabic in their treatment of final consonant clusters. Speakers of those dialects separate the final clusters by inserting an anaptyctic vowel between the two consonants of the cluster, e.g. /binit/ (girl) in Jordanian Arabic and in Cyrenaican Bedouin Arabic, /wazin/ (weight) in Iraqi Arabic and /saʔalit/ (I/ you {masculine singular} asked) in Syrian Arabic (Mitchell, 1994: 69).

2.2. Syllable structures of English

The English syllable structure shall be represented by the following tree diagram:



The onset position, which is an optional position, can contain up to three consonants. The coda position, also an optional position, can contain up to four consonants. It must be noted here that nasal and lateral consonants may constitute the syllable nucleus, i.e. be syllabic, when they occur in the final position in the word in an unstressed syllable, e.g. sudden [sʌdn̩]

(Ladefoged, 1982; Clark & Yallop, 1990).

As can be seen, English has more complex syllable structures than Arabic, in terms of length of the clusters permitted within the syllable. A Contrastive Analysis Hypothesis would predict that as far as length of the clusters is concerned, the difficulty would be for Egyptian speakers learning English, and not vice versa. As we shall see in the next section, Arabic allows many more consonant combinations to occur in a cluster. It is this that is expected to be the difficulty that English learners of Arabic will face.

2.3. Syllable-final consonant cluster inventories in Arabic and English

2.3.1 Basic definitions:

As we can see in Appendix B, consonants can be divided into two classes: obstruents and sonorant consonants (also called resonants). Stops and fricatives (and affricates in some languages, e.g. English) form the class of obstruents. When producing such consonants, the velum is raised to prevent airflow through the nasal cavity. The airflow is either fully obstructed in its passage through the vocal tract, as in the case of plosives, or partially obstructed as in the case of fricatives. Nasals are sonorants. They have greater sonority than obstruents because in their production the air resonates and passes through the nose. The lateral /l/ and the semivowels /w/ and /y/ are also sonorants because the air resonates when producing them without being stopped (Ladefoged, 1982; Clark & Yallop, 1990).

Based on the consonant classification in Appendix B, the next section includes a discussion of four cluster types: Clusters of obstruents, clusters of obstruents and sonorant consonants, clusters of sonorant consonants and obstruents, and clusters of sonorant consonants. Of these four types, the clusters occurring in Arabic are listed in tables 2-5. The clusters marked with an asterisk are the ones *not* permissible in English in word-final position². Below each table examples from Egyptian Arabic are listed for each cluster³.

2.3.2. Clusters of obstruents

The consonants considered are the stops /b, d, g, t, k/ and the fricatives /z, f, s, ʃ/.

Table 2: Clusters of obstruents

	b	d	g	t	k	z	f	s	ʃ
b		bd	----	bt	*bk	bz	----	bs	*bʃ
d	*db		----	*dt	----	----	*df	ds	*dʃ
g	*gb	gd		*gt	----	gz	----	----	*gʃ
t	----	----	----		*tk	----	*tf	----	tʃ
k	*kb	----	----	kt		kz	----	ks	*kʃ
z	*zb	----	*zg	zt	----		*zf	----	*zʃ
f	----	fd	----	ft	*fk	fz		fs	*fʃ
s	*sb	----	*sg	st	sk	----	*sf		*sʃ
ʃ	*ʃb	ʃd	----	ʃt	*ʃk	----	*ʃf	----	

a) Clusters of stop + stop

1- voiced stop + voiced stop

- /bd/ /ɛabd/ 'slave', /kibd/ 'liver'
 */db/ /gadb/ 'barrenness', /kidb/ 'lying',
 /nadb/ 'uttering words of lamentation'
 */gb/ /hagb/ 'concealing', /ʃagb/ 'destruction'
 /gd/ /magd/ 'glory', /wagd/ 'love (in poetry and songs)'

2- voiced stop + voiceless stop

In these clusters the voiced stop becomes voiceless, or at least its final part becomes voiceless in anticipation of the voiceless stop (Gaber, 1986). We have the following clusters:

- /bt/ /sabt/ 'Saturday', /kabt/ 'repression'

	pronounced as [sapt], [kapt]
*/bk/	/rabk/ 'to confuse', /habk/ 'to cause to fit exactly'
	pronounced as [rapk], [hapk]
*/dt/	/xadt/ 'I, you {masculine singular} took', /?æadt/ 'I, you {masculine singular} sat'
	pronounced as [xatt], [ʔæatt]
*/gt/	/xaragt/ 'I, you {masculine singular} took', /?itfarragt/ 'I, you {masculine singular} watched'
	pronounced as [xarakt], [ʔtfarrakt]

3- voiceless stop + voiced stop

The voiceless stop in this cluster will be phonetically voiced (Gaber, 1986).

*/kb/	/rakb/ 'procession', pronounced as [ragb]
-------	--

4- voiceless stop + voiceless stop

*/tk/	/hatk/ 'tearing', /fatk/ 'to wreak destruction'
/kt/	/nakt/ 'making a mess of', /Diħikt/ 'I, you {masculine singular} laughed'

b) Clusters of stop + fricative

1- voiced stop + voiced fricative

bz	/nabz/ 'discarding', /xabz/ 'baking'
gz	/ħagz/ 'restraining', /εagz/ 'disability'

2- voiced stop + voiceless fricative

In these clusters the voiced stop becomes voiceless, or at least its final part becomes voiceless in anticipation of the voiceless stop (Gaber, 1986). We have the following clusters:

- /bs/ /ħabs/ 'imprisonment', /kabs/ 'compressing',
 /labs/ 'misunderstanding', /libs/ 'clothing'
 pronounced as [ħaps], [kaps], [laps], [lips]
- */bʃ/ /kabʃ/ 'ram', /dabʃ/ 'rough-cut limestone',
 /nabʃ/ 'digging up', /ħabʃ/ 'scratching',
 /makatabʃ/ 'he did not write',
 pronounced as [kapʃ], [dapʃ], [napʃ], [ħapʃ],
 [makatapʃ]
- */dʃ/ /ħadf/ 'throwing', /ridʃ/ 'hip',
 pronounced as [ħatʃ], [ritʃ]
- /ds/ /ɛads/ 'lentils', /ħads/ 'intuition',
 pronounced as [ɛats], [ħads] 'intuition'
- */dʒ/ /xadʒ/ 'scratch', /maxadʒ/ 'he did not take',
 pronounced as [xatʃ], [maxatʃ]
- */gʃ/ /maxaragʃ/ 'he did not go out',
 /matfarragʃ/ 'he did not watch'
 pronounced as [maxarakʃ], [matfarrakʃ]

3- voiceless stop + voiced fricative

The voiceless stop in this cluster will be phonetically voiced (Gaber, 1986).

/kz/ /lakz/ 'hitting', pronounced as [lagz]

4- voiceless stop + voiceless fricative

*/tf/ /natf/ 'plucking (hair, feathers, etc.)', /kitf/ 'shoulder'

/tʃ/ /ratʃ/ 'rubble, broken stone',

 /magatʃ/ 'she did not come',

 /maʃafetʃ/ 'she did not see'

/ks/ /ɛaks/ 'opposite', /naks/ 'causing to relapse',

 /taks/ 'taxi'

*/kʃ/ /nakʃ/ 'putting into disarray, messing up',

 /maDhekʃ/ 'he did not laugh'

c) Clusters of fricative + stop

1- voiced fricative + voiced stop

*/zb/ /hizb/ 'political party', /gazb/ 'attracting',

 /ɛazb/ 'sweet'

*/zg/ /mazg/ 'mixing, blending'

2- voiceless fricative + voiced stop

The first consonant in these clusters may be voiced or voiceless. Both

allophones of the consonant phoneme occur in free variation (Gaber, 1986).

/fd/	/wafd/ 'delegation', /rafd/ 'dismissing'
*/sb/	/kasb/ 'profit, earnings'
*/sg/	/nasg/ 'weaving'
*/ʃb/	/euʃb/ 'grass'
/ʃd/	/haʃd/ 'crowd', /ruʃd/ 'maturity of mind'

3- voiced fricative + voiceless stop

The first consonant in this cluster will be voiceless, or at least its final part will be voiceless (Gaber, 1986).

/zt/	/εuzt/ 'I, you {masculine singular} wanted',
	/fuzt/ 'I, you {masculine singular} won',
	pronounced as [εust], [fust]

4- voiceless fricative + voiceless stop

/ft/	/lift/ 'turnip(s)', /ʃuft/ 'I, you {masculine singular} saw', /xuft/ 'I, you (masc. sing.) feared'
/fk/	/safk/ 'blood shedding'
/st/	/bust/ 'I, you {masculine singular} kissed',
	/dust/ 'I, you {masculine singular} stepped on'

- /sk/ /misk/ 'musk', /nusk/ 'ascetism'
- /ʃt/ /ɛiʃt/ 'I, you {masculine singular} lived',
 /faraʃt/ 'I, you {masculine singular} spread, laid out',
 /Tiʃt/ 'large shallow metal or plastic basin used for
 laundry and bathing'
- */ʃk/ /kuʃk/ 'kiosk', /kiʃk/ 'dish of a creamy consistency
 based on chicken stock'

d) Clusters of fricative + fricative

1- voiced fricative + voiceless fricative

The first consonant in this cluster will be voiceless, or at least its final part will be voiceless (Gaber, 1986).

- */zʃ/ /hazʃ/ 'ommission', /ɛazʃ/ 'playing music',
 pronounced as [hasʃ], [ɛasʃ]

- */zʃ/ /maɛazʃ/ 'he did not want', /maħagazʃ/ 'he did not
 reserve', /mafazʃ/ 'he did not win',
 pronounced as [maɛasʃ], [maħagasʃ], [mafasʃ]

2- voiceless fricative + voiced fricative

The first consonant in this cluster will be voiced (Gaber, 1986).

/fz/ /hafz/ 'giving incentive', /qafz/ 'jumping',

pronounced as [havz], [qavz]

3- voiceless fricative + voiceless fricative

/fs/ /nifs/ 'appetite, desire', /nafs/ 'self',

*/fʃ/ /ɛafʃ/ 'furnishings', /nafʃ/ 'swelling', /ʔafʃ/ ,

/mafʃafʃ/ 'he did not see', /maxafʃ/ 'he did not fear'

*/sf/ /xasf/ 'to eclipse', /nasf/ 'blowing up with explosive',

/kasf/ 'to make ashamed'

*/sʃ/ /mabasʃ/ 'he did not kiss',

/maʔasʃ/ 'he did not measure

*/ʃf/ /kaʃf/ 'exposing, uncovering'

2.3.3. Clusters of obstruents + sonorant consonants:

The consonants considered are /b d g t k z f s ʃ / and /m n l w y/.

Clusters of obstruent + sonorant consonant are not permissible in English.

Table 3: Clusters of obstruents + sonorants

	m	n	l	w	y
b	----	*bn	*bl	*bw	*by
d	*dm	*dn	*dl	*dw	*dy
g	*gm	*gn	*gl	----	----
t	*tm	*tn	*tl	----	----
k	*km	*kn	*kl	*kw	----
z	*zm	*zn	*zl	*zw	----
f	----	*fn	*fl	*fw	----
s	*sm	*sn	*sl	----	----
ʃ	*ʃm	----	*ʃl	*ʃw	*ʃy

a) Clusters of stop + sonorant consonant:

I- voiced stop + sonorant

*/bn/ /ʔibn/ 'son', /tibn/ 'chopped straw',

/gubn/ 'to become cowardly'

*/bl/ /habl/ 'rope', /kabl/ 'electric cable', /ʔabl/ 'before',

/ʃibl/ 'lion cub', /Tabl/ 'large drum', /nubl/

'nobility', /hubl/ 'silly, simple-minded (pl.)'

*/bw/ /qabw/ or /ʔabw/ 'vault, cellar',

/habw/ 'blasts of hot air', /rabw/ 'asthma'

*/by/ /Zaby/ 'gazelle'

*/dm/	/radm/ 'covering, filling-in with layer of earth', /hadm/ 'demolishing, destroying'
*/dn/	/widn/ 'ear'
*/dl/	/ɛadl/ 'justice', /nadl/ 'low, mean'
*/dw/	/badw/ 'bedouins, /fadw/ 'food or money given to the poor in compensation for the emission of certain religious duties'
*/dy/	/gidy/ 'young goat'
*/gm/	/hagm/ 'size', /ragm/ 'stoning', /nigm/ 'star'
*/gn/	/sign/ 'prison', /ɛagn/ 'kneading'
*/gl/	/rigl/ 'leg', /ɛigl/ 'calf' , /figl/ 'radish(es)'

2- voiceless stop + sonorant

The following consonant clusters are generally pronounced voiceless. In careful speech, however, the second consonant is pronounced as a syllabic consonant, i.e. it is fully voiced. Phonologically the structure may be represented as CVC.Cv, where v is a 'pulse' pronounced to ensure the complete voicing of the consonant preceding it (Gaber, 1986).

*/tm/	/katm/ 'holding ones' breath', /xitm/ 'stamp, seal'
*/tn/	/matn/ 'main body of a text'

- */tl/ /ʔatl/ 'killing', /ɛatl/ 'carrying, bearing'
- */km/ /ħukm/ 'judgement, verdict', /bukm/ 'pl. dumb'
- */kn/ /rukʌn/ 'corner'
- */kl/ /ʃakl/ 'shape, form', /ʔakl/ 'food'
- */kw/ /ʃakw/ 'complaining'

b) Clusters of fricative + sonorant:

1- voiced fricative + sonorant

- */zm/ /ħazm/ 'strictness', /ɛazm/ 'power, energy'
- */zn/ /ħuzn/ 'sadness', /ʔizn/ 'permission',
/wazn/ 'weight'
- */zl/ /ɛazl/ 'isolating', /ħazl/ 'fun, joking',
/ɣazl/ 'spinning'
- */zw/ /ɣazw/ 'invasion'

2- voiceless fricative + sonorant

- */fn/ /gifn/ 'eyelid', /dafn/ 'burying'
- */fl/ /Tifl/ 'child', /ʔifl/ 'lock', /ʔafl/ 'locking',
- */fw/ /ɛafw/ 'forgiveness', /Safw/ 'becoming clear'

*/sm/	/ʔism/ 'name', /gism/ 'body', /rasm/ 'painting'
*/sn/	/ħusn/ 'beauty'
*/sl/	/nasl/ 'offspring', /yasl/ 'washing'
*/ʃm/	/waʃm/ 'tattoo', /yuʃm/ 'pl. naive'
*/ʃl/	/naʃl/ 'pickpocketing'
*/ʃw/	/ħaʃw/ 'stuffing'
*/ʃy/	/maʃy/ 'walking'

2.3.4 Clusters of sonorant consonant + obstruent:

It must be noted here that /wC/ and /yC/ clusters occur in Classical Arabic only. All other clusters of sonorant consonant + obstruent are permissible in both Arabic and English.

Table 4: Clusters of sonorants + obstruents

	b	d	g	t	k	z	f	s	ʃ
m	mb	md	mg	mt	mk	mz	mf	ms	mʃ
n	nb	nd	ng	nt	nk	nz	nf	ns	nʃ
l	lb	ld	lg	lt	lk	----	lf	ls	lʃ
w	----	----	----	----	----	----	----	----	----
y	----	----	----	----	----	----	----	----	----

a) Sonorant consonant + stop

/mb/ /bomb/ 'bombs', /gamb/ 'beside',

	/koromb/ 'cabbages'
/md/	/ħamd/ 'praise', /εamd/ 'deliberateness'
/mg/	/damg/ 'amalgamating'
/mt/	/Samt/ 'silence', /εumt/ 'I, you {masculine singular} swam'
/mk/	/sumk/ 'thickness'
/nb/	becomes [mb] e.g. /ganb/ 'beside'
/nd/	/εind/ 'stubbornness', /εand/ 'at', /band 'item', /gund/ 'soldiers', /ʔil-hind/ 'India'
/ng/	/bing/ 'anaesthetic'
/nt/	/bint/ 'girl', /kunt/ 'I was, you {masculine singular} were'
/nk/	/bank/ 'bank', /fiʃink/ 'blank (of cartridges)'
/lb/	/ʔalb/ 'heart', /ħalb/ 'milking', /salb/ 'taking away by force', /Sulb/ 'steel', /γulb/ 'suffering', /kalb/ 'dog'
/ld/	/gild/ 'leather, skin'
/lg/	/talg/ 'ice'
/lt/	/tilt/ 'a third', /ʔult/ 'I, you {masculine singular} said'
/lk/	/silk/ 'wire', /mulk/ 'reign, kingship'

b) Sonorant consonant + fricative:

In clusters where a sonorant consonant is followed by a voiceless fricative, the sonorant consonant may be either voiced or voiceless. The fricative remains voiceless (Gaber, 1986).

/mz/	/ramz/ 'symbol', /yamz/ 'winking'
/mf/	/galamf/ 'oaf, boor'
/ms/	/hams/ 'whispering', /ʃams/ 'sun', /lams/ 'touching'
/mʃ/	/rimʃ/ 'eyelash', /maɛamʃ/ 'he did not swim'
/nz/	/kinz/ 'treasure'
/nf/	usually pronounced [mf] /Sanf/ 'kind', /ɛunf/ 'violence'
/ns/	/gins/ 'sex', /kans/ 'sweeping'
/nʃ/	/winʃ/ 'winch', /mabanʃ/ 'he did not appear'
/lf/	/hilf/ 'alliance', /silf/ 'husband's brother'
/ls/	/hals/ 'empty talk, nonsense'
/lʃ/	/maʔalʃ/ 'he did not say'

2.3.5. Clusters of sonorant consonants:

The consonants considered are / m n l w y /. As mentioned above, /wC/ and /yC/ clusters occur in Classical Arabic only.

Table 5: Clusters of sonorants

	m	n	l	w	y
m		*mn	*ml	----	*my
n	----		----	----	*ny
l	lm	----		*lw	*ly
w	----	----	----		*wy
y	----	----	----	----	

*/mn/ /ʔamn/ 'security', /Dimn/ 'among, included in'

- * /ml/ /ħaml/ 'pregnancy', /raml/ 'sand', /naml/ 'ants'
- * /my/ /Tamy/ 'silt', /ramy/ 'throwing', /εmy/ 'pl. blind'
- * /ny/ /gany/ 'gathering, harvesting'
- /ɪm/ /ħilm/ 'dream', /εilm/ 'knowledge',
 /film/ 'film'
- * /lw/ /ħilw/ 'sweet', /dalw/ 'bucket'
- * /ly/ /ʔaly/ 'frying'
- * /wy/ /kawy/ 'ironing', /ʃawy/ 'grilling', /lawy/ 'twisting'

After having compared the syllable structures in Arabic and English, it is now possible to move on to the next chapter which includes a description of the design of the study.

Notes to Chapter 2

1. Phonologists have proposed other representations of the syllable. The representation chosen here, however, is adequate for the purpose of this study. For more detailed information on the syllable, the reader is referred to general phonology books, e.g. Hogg, R. & C.B McCully (1987), and Goldsmith (1990).
2. For Egyptian Arabic, Harrell (1957) and Gadalla (1969) were consulted. For English, the following sources were consulted: Kennedy (1960), Fudge (1969), and Goldsmith (1990).
3. Badawi & Hinds's (1986) A Dictionary of Egyptian Arabic was consulted for the meanings of the mentioned examples.

CHAPTER 3

METHODOLOGY

3.1. Subjects:

The subjects who participated in this study were six native speakers of American English ¹. Three of them were males and three were females. Their ages ranged between 24 and 32. At the time of the study they were enrolled in a one-year intensive Arabic language program at the Center for Arabic Study Abroad (CASA) hosted by the Arabic Language Institute at the American University in Cairo ².

Although some of them had traveled in the Arab World, none of the subjects had studied any Arabic dialect other than the Egyptian dialect. As previously mentioned in Chapter 2, many other Arabic dialects differ from Egyptian in the pronunciation of final consonant clusters. Students who had studied an Arabic dialect other than Egyptian were not selected as subjects for this study. This was done in order to avoid transfer of training which may affect their production of the target clusters.

All the subjects were rated by their teachers in terms of oral proficiency and overall pronunciation. To produce these scores, the teachers used the FSI scale, which is the scale used to measure oral proficiency at the institute.

The FSI scale is a 5-point scale ranging from no proficiency to functionally native proficiency. To determine the proficiency level of a language learner on this scale, the following components of the learner's speech are assessed: Comprehension, discourse, structure, lexicalization, and fluency. Pronunciation is a sub-component of the structure component (see Appendix C). Table 6 shows the scores for each of the six subjects of the study:

Table 6: Proficiency scores for the subjects of the study

Subject	Oral Proficiency Score	Pronunciation Score
S1	2+	20
S2	3+	23
S3	3	20
S4	3+	24
S5	3+	26
S6	3+	20

Most subjects' proficiency scores ranged between 3 and 3+. The pronunciation scores ranged between 20 and 26. Since subjects were selected from advanced classes, the scores are not expected to vary considerably.

3.2. Data Collection

3.2.1. Task

The subjects were asked to read aloud sentences containing words that end with the clusters being investigated. These were the clusters permissible in Arabic and English and the clusters permissible in Arabic only (see Chapter 2, Section 2.3). The sentences were written by the researcher (see Appendix D). Each sentence usually contained more than one of the target words. There was no particular order in occurrence of the clusters within the sentences. The sentences were arranged in random order. They were written in such a way that these words would occur in pre-pause position (see the next section for justification).

In order to avoid having the subjects read Egyptian Colloquial, which is a skill not taught in colloquial classes, the researcher formulated sentences in Standard Arabic for words that are shared by both language varieties. Words that are used in Colloquial speech only were put in colloquial sentences. The diacritic marks used with these sentences were the same ones used in the colloquial textbook which the subjects use in their colloquial classes. The number of sentences written in Standard Arabic and in Egyptian Colloquial was 26 and 10 respectively. In addition, there was a short passage written in Egyptian Colloquial Arabic. On a formality continuum, the data represent a formal style, less formal than reading a word list (Tarone, 1979).

3.2.2. Procedures

Each subject met with the researcher individually. In order to familiarize the subjects with the sentences they were going to read, they were given about half an hour to read the sentences first. They were also given a list containing the meanings of all words that included the clusters being investigated. The words on the list were all vowelized. Subjects were asked to point out any words that were unfamiliar to them. The researcher explained these words if they were not on the list, and pronounced them. Subjects were asked to repeat their pronunciation after her. When the subjects had no more questions about the sentences they were going to read, the researcher instructed them to read without the case endings. The researcher gave this particular instruction in order to ensure that clusters are followed by a pause, so that they would fall within one syllable. Had the subjects added a vowel to the word containing the cluster, the two consonants of the cluster would have fallen in two syllables, the first one closing the first syllable and the second one opening the following syllable. Since the words were written in pre-pause positions in the sentences, the subjects did not attempt to connect these words to the following ones and alter the syllable structure of these words. The time taken to record the readings was 20 - 25 minutes for each subject.

As mentioned before, the data represent the subjects' formal style, which is characterized by much attention to form. In order not to increase

the effect of this attention on the subjects' speech, they were not told the reason for the study.

3.2.3. Scoring the task

Each sentence was read three times to obtain three tokens for each cluster. The readings were tape recorded and then the specific clusters under investigation were analyzed by the researcher. The researcher scored the specific clusters as either target-like (TL) or not target-like (NTL). The NTL clusters were identified as errors and the researcher recorded how these clusters were actually pronounced.

In order to ensure reliability of the data obtained, half the data were transcribed by another teacher at the institute to obtain a measurement of the inter-rater reliability. The teacher selected had considerable experience in teaching Egyptian Colloquial Arabic and in assessing oral proficiency of students. Tables 7 and 8 show the Pearson correlations between the ratings of the researcher and the other rater:

Table 7: Correlations for clusters permissible in Arabic *and* English

Cluster Type		Correlation
1) Obstruents	a) stop + stop	--
	b) stop + fricative	0.87
	c) fricative + stop	1.00
	d) fricative + fricative	--
2) Obstruents + Sonorants	non-permissible in English	
3) Obstruents + Sonorants	a) sonorant + stop	--
	b) sonorant + fricative	1.00
4) Sonorants		--

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Table 8: Correlations for clusters non-permissible in English

Cluster type			Correlation	
1) Obstruents	a) stop + stop	1- v.s. + v.s.	0.98	
		2- v.s. + vl.s.	bk	1.00
			dt	0.95
			gt	--
	b) stop + fricative	3- vl.s. + v.s. and 4- vl.s. + vl.s.		--
			1- v.s. + v.f.	-----
		2- v.s. + vl.f.	bf	--
			df	--
			dʃ	--
			gʃ	--
		3- vl.s. + vl.f. 4- vl.s. + vl.f.	-----	
			tf	--
			kʃ	--
		c) fricative + stop		1.00
		d) fricative + fricative	1- v.f. + vl.f.	zf
	zʃ			0.66
	2- vl.f. + v.f. 3- vl.f. + vl.f.		-----	
			fʃ	--
			sf	1.00
sʃ			1.00	
ʃf	--			

v.s. = voiced stop
vl.s. = voiceless stop

v.f. = voiced fricative
vl.f. = voiceless fricative

Table 8 cont'd: Correlations for clusters non-permissible in English

Cluster Type		Correlations
2) Obstruent s + Sonorants	a) stop + sonorant	0.91
	b) fricative + sonorant	0.99
3) Sonorant + Obstruent	permissible in English	
4) Sonorants		0.25

The correlations ranged between perfect correlation and 0.87, which is considered a very high agreement between the two ratings. The only exception was a low correlation of 0.25 found between the two ratings of clusters of sonorants. The majority of disagreements between the two raters were in judging the subjects' production of clusters with final /w/ and /y/.

Notes to Chapter 3

1. One of the subjects is Canadian. This, however, does not affect the specific feature being investigated, which is the pronunciation of consonant clusters.

Canadian and American English together form the North American variety of English, as opposed to other major varieties such as British English. Local varieties of English vary in other features such as vowel pronunciation, pronunciation of /r/, and other prosodic features (Ladefoged, 1982; Finegan & Besnier, 1989; Pennington, 1996).

The other subjects come from different regions in the United States, and therefore speak different local varieties of American English. This, however, is not expected to have an effect on consonant clusters being studied (Finegan & Besnier, 1989; Pennington, 1996; Major, personal communication).

2. One of the subjects had already finished that program but was staying in Cairo for her post-graduate studies.

CHAPTER 4

RESULTS AND DISCUSSION

4.1. Results

Tables 9 and 10 show subjects' performance on clusters permissible in Arabic and English (Ps) and clusters non-permissible in English (NPs). To calculate the means reported in these tables, the following was done: Every target-like (correct) cluster was given the score of 1, while every non-target-like (incorrect) cluster was given the score of 0. For each group of clusters, the number of clusters in that group was multiplied by 3 (since there were three tokens for each cluster) to obtain the maximum number of correct tokens each subject could score. After the mean score for all subjects was calculated, it was divided by this maximum number of possible correct tokens to obtain the percentage of correct clusters for each group of clusters. For example, for the cluster group 1a (clusters of obstruents: stop+stop), the mean 11.83 was divided by 12 (3 x 4 clusters bd, gd, bt, kt) and yielded 98.58 %, meaning that subjects produced 98.58 % of the clusters in this group correctly.

Table 9 shows that subjects performed very well on the clusters permissible both in Arabic and English (Ps). Their scores ranged from 84-100% correct. Comparing the different clusters, subjects made the most errors on the obstruents: stop+fricative.

Table 9: Subjects' performance on clusters permissible in Arabic *and* English

Cluster Type		Mean	SD	Max. Score	% Correct Clusters
1) Obstruents	a) stop + stop	11.83	0.41	12	98.58
	b) stop + fricative	17.67	2.94	21	84.15
	c) fricative + stop	22.50	1.38	24	93.75
	d) fricative + fricative	6.0	0.00	6	100
2) Obstruents + Sonorants	non-permissible in English				
3) Obstruents + Sonorants	a) sonorant + stop	41.00	42	1.55	97.62
	b) sonorant + fricative	31.33	33	2.07	93.94
4) Sonorants		3.00	3.00	0.00	100

Table 10 shows that subjects' performance was more varied on clusters that are non-permissible in English (Nps). Their scores ranged from 38% to 100% correct. The results are discussed in the next section.

Table 10: Subjects' performance on clusters non-permissible in English

Cluster Type				Mean	SD	Max. Scores	% correct clusters
1) Obstruents	a) stop + stop	1- v.s + v.s.		2.67	2.5	6	44.5
		2- v.s.+vl.s.	bk	1.33	1.37	3	44.33
			dt	2.33	0.21	3	77.67
			gt	3.00	0.00	3	100.00
	3-vl.s+v.s. & 4- vl.s.+ vl.s.			4.00	3.1	6	66.67
	b) stop + fricative	1- v.s.+v.f	-----	-----	-----	-----	-----
		2- v.s.+vl.f.	bʃ	3.00	0.00	3	100.00
			dt	0.50	1.23	3	16.67
			dʃ	3.00	0.00	3	100.00
			gʃ	3.00	0.00	3	100.00
		3- vl.s.+ vl.f.		-----	-----	-----	-----
	4- vl.s.+vl.f.		tf	3.00	0.00	3	100.00
			kʃ	3.00	0.00	3	100.00
	c) fricative + stop			16.17	2.71	18	89.83
		d) fricative + fricative	1- v.f.+vl.f.	zʃ	1.83	1.33	3
			zʃ	2.33	0.82	3	77.67
	2- vl.f.+v.f.		-----	-----	-----	-----	-----
	3- vl.f.+vl.f.		fʃ	2.67	0.82	3	89.00
			sf	2.33	1.20	3	77.67
			sʃ	2.33	1.20	3	77.67
ʃf			3.00	0.00	3	100.00	

v.s. = voiced stop
vl.s. = voiceless stop

v.f. = voiced fricative
vl.f. = voiceless fricative

Table 10 cont'd: Subjects' performance of clusters non-permissible in English

Cluster Type		Mean	SD	Max. Scores	% Correct Clusters
2) Obstruents + Sonorants	a) stop + sonorant	21.83	16.34	57	38.29
	b) fricative + sonorant	20.17	14.44	42	48.02
3) Sonorants + Obstruents	permissible in English	-----	-----	-----	-----
4) Sonorants		10.67	6.83	21	50.8

The subjects' mean performance on all Ps all NPs was found to be as follows (Table 11):

Table 11: Means and SD of Ps and NPs

	Ps	NPs
Mean	0.946	0.575
Standard Deviation	(0.048)	(0.239)

A t test was conducted and the difference between these two means (averages) was found to be statistically significant ($t = 4.394$, $p = 0.0007$). These results confirm the hypothesis that subjects' performance on clusters of Arabic permissible in their native language was significantly better than their performance on clusters non-permissible in their native language. The production of consonant clusters is hence a problem that persists even at advanced levels of proficiency.

Table 12 shows the performance of each individual subject on P and NP clusters. There was little variation between the subjects' performance on P clusters, whereas more variation was found between their performance on NP clusters.

Table 12: Performance of each subject

Subject	Mean performance of P clusters	Mean performance of NP clusters
S1	0.957	0.467
S2	0.993	0.846
S3	0.936	0.328
S4	0.915	0.692
S5	1.00	0.810
S6	0.872	0.308

A regression analysis of the pronunciation scores (reported in Table 6, Chapter 3) was done using the P and NP scores as the predictors. The results indicated that NP scores predicted pronunciation significantly ($p < 0.02$) and accounted for 77% of the variance. However, the scores on the P clusters did not account for any of the pronunciation scores. This implies that teaching the pronunciation of NP consonant clusters is a very important component of teaching pronunciation. If the teacher has limited time and has to decide on what to teach the students, he/she can teach the pronunciation of NP consonant clusters, since the pronunciation of these clusters can be considered an indicator of overall pronunciation.

4.2. Discussion

4.2.1. Consonant clusters not permissible in English (NP)

In the following section, subjects' performance on NP clusters, simplification strategies occurring in each group of these clusters, and possible processes that could account for these strategies shall be analyzed and discussed in detail.

4.2.1.1. Clusters with final sonorants

This section includes a discussion of clusters of obstruents+sonorants and clusters of sonorants+sonorants. Table 10 shows that the largest number of errors occurred in the pronunciation of clusters of obstruents+sonorants (38.29% stop+sonorant clusters and 48% fricative+sonorant clusters). A lower, but still large number of errors occurred in the production of clusters of sonorants (50.8% of the target clusters were correct). The sonorant consonants considered in the study were the nasals /m n/, the lateral /l/, and the semivowels /w y/.

The simplification strategies used to modify target clusters with final /m n l/ were different from the strategies used to modify target clusters with final /w y/. Two strategies were used to alter the syllable structure of words ending with clusters with final /m n l/. The first of these strategies was pronouncing the final nasal or lateral as a syllabic consonant. This is evidently due to transfer from English. In English, nasal and lateral

consonants may constitute the syllable nucleus, i.e. be syllabic, when they occur in the final position in the word in an unstressed syllable, e.g. sudden [sʌdn̩] (Ladefoged, 1982; Clark & Yallop, 1990).

The other strategy used to alter the syllable structure of the difficult words was epenthesis, a strategy reported in most studies on interlanguage phonology (the reader is referred to the literature review for detailed descriptions of epenthesis in interlanguage phonology, pp. 8-23). The vowel was inserted between the two consonants of the clusters. It was the neutral vowel schwa ə. The schwa-epenthesis in this position cannot be considered a result of transfer from English. The insertion of a vowel in English in this position is "a mark of a foreign accent" (Ladefoged, 1982: 51). Schwa-epenthesis, however, is a developmental process occurring in L1 acquisition of English (Major, 1987). Hence, it can be considered a development process resulting from the reactivation of L1 acquisition processes. The data showed no preference for one strategy over the other. Both processes interacted in the subjects' interlanguage.

Different strategies were used to simplify clusters with final /w y/. The majority of errors that occurred when pronouncing these clusters were phoneme substitutions. For the final semivowels /w y/, subjects substituted the vowels /u i/, which seems to be a reasonable choice, since these vowels are the closest vowels to the target semivowels. Ladefoged (1982) refers to the semivowels /w y/ as the "the nonsyllabic versions of /u i/" (p. 209).

Due to the very close nature of these vowels and semivowels, there were some instances in the data where it was not very clear whether the final sonorant produced was a semivowel or a vowel. The researcher and the teacher who rated the data judged many of these particular clusters differently¹. This disagreement on clusters with final semivowels was the reason for the low inter-rater reliability obtained for sonorant clusters.

A different strategy used to simplify clusters with final semivowels was the insertion of an open vowel at the end of the word, e.g. $\epsilon afw \implies \epsilon afwa$. This way the syllable structure was altered from CVCC \implies CVC.CV. Both CVC and CV syllables are less marked than CVCC (Greenberg, 1978). In other words, subjects reduced the more marked syllables to less marked ones, which suggests that universal processes are at play in this case.

4.2.1.2. Clusters of obstruents

Table 10 shows that subjects got perfect scores on the following NP obstruent clusters: /gt bʃ dʃ gʃ kʃ/. These clusters occurred in the data in words such that they contained a morpheme boundary between the two consonants. For example, the *t* in the /gt/ cluster in the word /xaragt/ “I, you {masculine singular} left” is the marker of first person singular and the second person masculine singular attached to the perfect stem ending with

g. The /ʃ/ in the other clusters occurred in the data as the suffix attached to the negated perfect verb, e.g. /magabʃ/ "he did not bring".

These particular clusters receive special attention when verb conjugation and negation are taught in class. In the CASA program, in which the subjects are enrolled (see Chapter 3), conjugation and negation of perfect and imperfect verbs are taught in the summer session as the students start their intensive year of study in Cairo. These grammatical points are then reinforced throughout the whole year. It is therefore expected that at the end of the year the students would master these points. Therefore, this perfect performance of the students on the above mentioned clusters, which are not permissible in their native language, is expected, since these clusters received considerable attention in class, being a component of the system of verb conjugation in Arabic. Other clusters belonging to this same group are /fʃ sʃ zʃ dt/.

Subjects also got perfect scores on /tʃ/ and /ʃf/ clusters. It is expected at advanced levels of proficiency that subjects would have completely mastered at least some of the NP clusters.

The simplification strategy used by subjects to modify the difficult clusters in this group was epenthesis. Subjects inserted a schwa between the two consonant of the difficult cluster, a developmental process discussed in the previous section.

Greenberg's (1978) universals and the markedness relations they imply may account for the variance in the subjects' performance of obstruent clusters. According to Greenberg's universals the existence of a fricative + fricative (FF) cluster in word final position implies the existence of a stop + fricative (SF) and a fricative + stop (FS) cluster in the same position. Hence, FF clusters are more marked than SF and FS clusters. Also, the existence of an SS cluster word finally, implies the existence of an FS cluster in the same position, hence SS clusters are more marked than FS clusters.

Table 10 shows that subjects' performance on FS clusters was better than their performance on SS clusters. Also, their performance on SF and FS clusters was better than their performance on FF clusters. In other words, subjects performed better on less marked clusters. Hence, the data suggest that markedness relations play a role in the acquisition of consonant clusters. Less marked clusters seemed to be acquired more readily than more marked clusters.

Markedness relations, however, do not account for the fact that the number of errors occurring with clusters ending with a sonorant was larger than the number of errors occurring with obstruent clusters. A possible explanation may be that transfer processes which played a significant role in the production of the first type of clusters have a stronger influence on

interlanguage phonology than developmental processes and universal processes.

4.2.2. Consonant clusters permissible in Arabic and English

The results shown in Table 9 show that, contrary to what is expected, some errors occurred in the production of P clusters. It is the purpose of this section to account for these error occurrences.

The lowest score obtained on the P clusters was on SF clusters (84% correct). The errors occurred with /bz/ and /gz/ clusters. Subjects devoiced the final obstruents. This final-obstruent devoicing is a developmental process that occurs in L1 acquisition of languages that maintain word-final voicing contrast (e.g. English) (Major, 1987; Carlisle, 1994). Final-obstruent devoicing occurred also with the sonorant + fricative P cluster /lg/.

A few errors also occurred with sonorant + fricative P clusters /mz ns ls/ and FS P clusters. In these instances subjects used schwa epenthesis to separate the vowels of the cluster. Schwa epenthesis also occurred with /bz kz / clusters, once for each cluster.

The occurrence of these errors suggests that developmental processes may play a role in shaping interlanguage phonological systems, regardless of the native language and the target language.

4.2.3. Summary of findings and concluding remarks

The Contrastive Analysis Hypothesis (CAH) predicts that English learners of Arabic would find consonant clusters that are non-permissible in their native language more difficult to pronounce than clusters permissible in their native language (see Chapter 1). The quantitative analysis of the data in this study, collected from six adult native speakers of American English learning Arabic as a second language, confirm this hypothesis.

Furthermore, the data provide evidence that the pronunciation of consonant clusters is a problem that persists in later stages of L2 acquisition of Arabic.

The CAH does not make predictions about the relative degree of difficulty of the NP consonant clusters, i.e. it does not make any statements about which group of consonant clusters would be more difficult and which would be less difficult for L2 learners. Also, it does not account for the different simplification strategies used by L2 learners to deal with difficult consonant clusters. And lastly, it does not account for errors that occur in the production of clusters permissible in the learners' native language -- errors, which according to the CAH, should not occur.

The data in this study show that Greenberg's (1978) implicational universals and the markedness relations derived from these universals account for the relative degree of difficulty of some types of consonant clusters. They did not account for the relative degree of difficulty of all

clusters, however. A stronger role attributed to L1 transfer processes over developmental and universal processes may account for the larger number of errors occurring in the production of obstruent+sonorant and sonorant+sonorant NP clusters.

With regards to the simplification strategies used by English learners of Arabic when pronouncing consonant clusters, Table 12 provides a summary of the strategies that occurred in the data and the processes that account for these strategies. There were four main simplification strategies for NP clusters and two strategies for P clusters. The processes that account for errors in NP clusters are L1 transfer, universal and developmental processes. However, for the P clusters developmental processes better account for the errors produced rather than L1 transfer processes.

Table 13: Simplification strategies occurring in the data for NP and P clusters

Cluster Type	Simplification strategy	Processes accounting for simplification strategies	
I. Clusters non-permissible in English	1) Obstruent + sonorant	1) producing final syllabic /m n l/	
	2) Sonorant + sonorant	2) schwa epenthesis before final /m n l/	L1 transfer processes
		3) substitution of /u i/ for final /w y/	developmental processes
	3) Obstruent + obstruent	4) schwa epenthesis after final /w y/	L1 transfer processes
		schwa epenthesis	universal processes
II. Clusters permissible in Arabic and English	1) final-obstruent devoicing	developmental processes	
	2) schwa epenthesis	developmental processes	

Consonant deletion, a strategy reported in many studies of interlanguage phonological systems (e.g. Tarone, 1980; Eckman, 1986; Anderson, 1987; Weinberger, 1987), did not occur in the data. This may be due to the formality of style of the data. Major (1987) mentioned lenition and fortition, which are universal stylistic considerations expected to affect interlanguage phonological systems. Fortition are strengthening processes that reinforce segments or sequences. Insertions are examples of these processes. Lenition are weakening processes that weaken segments or sequences. Examples are ease of articulation processes such as assimilations, reductions, and deletions. Fortition processes are expected to

operate in more formal speech styles, like the style of data in this study.

Hence, epenthesis would be expected to appear in the data and not deletion, which was what actually happened.

Errors occurring in the production of P clusters provide evidence that processes other than L1 transfer are at play.

Notes to Chapter 4

1. Another variant pointed out to the researcher by Dr. Badawi, her thesis advisor, was the following: $\epsilon a f w \implies \epsilon a f u w$. Subjects pronounced a short vowel first and then the semivowel followed. The researcher thinks that it was the presence of this variant in the data, which neither the researcher nor the other teacher who rated the data could clearly identify, that was the reason for the low inter-rater reliability obtained for clusters of sonorants.

CHAPTER 5

PEDAGOGICAL IMPLICATIONS OF FINDINGS

This chapter addresses the problem of consonant clusters from a pedagogical perspective. A number of decisions have to be taken in order to teach consonant clusters, some of which depend on the particular group of students the teacher is concerned with. The first of these decisions is whether or not consonant clusters should be taught in the first place.

Further decisions have to be taken regarding the choice of clusters to be taught, the place of teaching consonant clusters in the curriculum, the choice of techniques for teaching consonant clusters, and finally, the assessment of the success of a certain teaching technique, in other words, what should the teacher expect from his/her students. This chapter shall deal with each of these issues in turn.

5.1. Implications of the hypothesis

As shown in Chapter 4, the results of this study confirm the hypothesis that students, even at advanced levels of proficiency, find consonant clusters that are not permissible in their native language (NPs) difficult to pronounce.

Hence, it cannot be assumed that the pronunciation of consonant clusters is a component of L2 phonology that the students will pick up on their own, once a sufficient amount of acquisition has taken place. This provides the

answer to the first question about whether or not consonant clusters should be taught. The answer is that the pronunciation of consonant clusters is a problem that should definitely be dealt with in class, because otherwise, students will not be able to deal with it on their own.

Furthermore, the regression analysis of the pronunciation scores (see Table 6, Chapter 3) that was done using the P (clusters that are permissible in English) and NP scores as the predictors and reported in Chapter 4, emphasizes the importance of teaching consonant clusters. The results of this regression analysis indicated that NP scores predicted pronunciation significantly ($p < 0.02$) and accounted for 77% of the variance. However, the scores on the P clusters did not account for any of the pronunciation scores. This implies that teaching the pronunciation of NP consonant clusters is a very important component of teaching pronunciation. If the teacher has limited time and has to decide on what to teach the students, he/she can teach the pronunciation of NP consonant clusters, since the pronunciation of these clusters can be considered an indicator of overall pronunciation.

5.2. Selecting clusters to be taught

Deciding on which consonant clusters to teach, depends on the specific group of students the teacher is concerned with. As far as the subjects of this study are concerned, Table 10 in Chapter 4 shows that the largest

numbers of errors occurred in their performance on clusters of obstruents + sonorants (38.29% of stop+sonorant clusters and 48% of fricative + sonorant clusters were correct) and clusters of sonorants + sonorants (50.8% of the target clusters were correct). It is therefore recommended that when teaching Egyptian Arabic to native speakers of American English, teachers focus on the clusters shown in Table 14:

Table 14: Clusters recommended to be taught to native speakers of American English learning Arabic

		m	n	l	w	y
a) stops	b	----	bn	bl	bw	by
	d	dm	dn	dl	dw	dy
	g	gm	gn	gl	----	----
	t	tm	tn	tl	----	----
	k	km	kn	kl	kw	----
b) fricatives	z	zm	zn	zl	zw	----
	f	----	fn	fl	fw	fy
	s	sm	sn	sl	----	----
	ʃ	ʃm	----	ʃl	ʃw	ʃy
c) sonorants	m	----	mn	ml	---- ¹	my
	n	----	----	----	----	ny
	l	---- ²	----	----	lw	ly
	w ³	----	----	----	----	wy

Besides looking at the consonant clusters that students find difficult to pronounce, these are other criteria that could be considered when selecting which consonant clusters to teach. Catford (1987) mentions

frequency of occurrence and *functional load* as the main criteria for choosing pronunciation features to be taught. By *frequency of occurrence* is meant the number of time the sound [or cluster, in our case] occurs per thousand words in the text. By *functional load* is meant the number of words in the lexicon in which the sound occurs. In the case of consonant clusters, priority should be given to teaching words including the clusters mentioned in Table 14 that have a high frequency of occurrence and a high functional load. This shall be left to the teacher to determine.

5.3. The place of teaching consonant clusters in the curriculum

As mentioned in Chapter 1, the change in language teaching and learning paradigms resulted in a renewed interest in teaching pronunciation. The aim now when teaching L2 speech is to integrate the focus on both “getting-the-sound-correct” and “getting-the-message-across”. In other words, instead of having classes devoted to teaching pronunciation only, many programs now integrate pronunciation in the language classes (Morley, 1994).

Morely (1994) discusses a dual-focus program for teaching L2 speech. This program focuses on speech at the micro and the macro levels. At the micro level, attention is paid to discrete elements of pronunciation such as clarity and precision in articulation of consonant and vowel sounds, consonant combinations within and across word boundaries, assimilations,

elisions, and linking words across word boundaries. The goal is to develop the learners' linguistic competence. At the macro level, attention is paid to general elements of communicability such as overall fluency, general communicative command and control of grammar, vocabulary words, and phrasal units. The goal is to develop the learners' discourse competence and sociolinguistic competence.

The purpose of this brief description of the dual-focus program was to provide the context in which consonant clusters are taught in programs that aim at improving their students' overall oral proficiency. This study recommends that consonant clusters be taught in a similar context where pronunciation is an essential part of the curriculum and is integrated at both the micro and macro levels. The following section illustrates the possible implementation of teaching consonant clusters within a lesson plan.

5.4. A lesson plan for teaching consonant clusters

The sample lesson plan presented in this section is intended to address the problems of the subjects of this study, which are assumed to represent adult native speakers of American English learning Egyptian Arabic. The steps of designing the lesson plan, the different techniques to be used and the teachers' expectations are discussed followed by a sample lesson plan.

5.4.1. Designing the techniques

In designing the lesson plan, the following steps recommended by Celce-Murcia (1987) for developing pronunciation activities were followed (p. 10):

- 1- Identify students' problem area.
- 2- Find lexical/grammatical contexts that have a number of natural occurrences of the problem sounds.
- 3- Develop communicative tasks that incorporate the words.
- 4- Develop at least 3 or 4 exercises so that you can recycle the problem and keep providing students with practice of the target sound(s) but in new contexts.

Morley (1994) distinguishes between three modes of pronunciation practices differing in the level of learner dependence-independence. These are: 1) Imitative speech practice; 2) Rehearsed speech practice; 3) Extemporaneous speech practice. Morley suggests that there should be a cycle of these three modes of speech-pronunciation practices in the language class. The next section includes a description of these 3 modes of practice in addition to suggested pronunciation teaching techniques for each mode of speech practice.

5.4.2. Suggested techniques

I. The stage of imitative speech practice:

At this stage it is important to bring the problem of consonant clusters to the awareness of the students by pointing out their errors to them and presenting the alternative correct pronunciation of the clusters. As Pennington (1994) suggests: "Language teachers can capitalize on the skills that adolescents and adults have, such as the ability to compare and contrast and to recognize patterns in input (p. 102)." Furthermore, considerable research has been conducted in the area of metacognitive strategies (e.g. Carrell, 1989; Reid, 1995; Cohen, 1996). This research has shown that the use of these strategies does improve language learning and language performance.

The performance of the subjects in this study emphasizes the importance of increasing the awareness of the language learners of their problems. The results reported on subjects S2 and S5, shown in Table 15 below, provide evidence for this. Subjects' S2 and S5 performance on NP clusters was considerably better than the performance of the rest of the subjects. They informed the researcher after they had finished the task that while reading the sentences they were asked to read, they had realized the point that the researcher was investigating. They were the only subjects who were able to find that out. They then informed the researcher that their teacher had introduced this problem to them. Subject S5 mentioned that her

teacher had explicitly taught her class the pronunciation of some of the difficult clusters. In other words, subjects S2 and S5 were sensitized to the problem. Although none of them had intensive training in the pronunciation of NP clusters, the fact that they were sensitized to the problem and realized as they were engaged in the task that it was the point the researcher was investigating, indicates that introducing the problem to the students, let alone dealing with it in class, may positively affect the students' pronunciation of NP clusters considerably. It must be noted, that subjects' S2 and S5 profiles were very similar to the profiles of the other subjects. In other words, a higher level of proficiency could not be the factor accounting for their better performance on NP clusters.

Table 15: Subjects S2 and S5 compared to the rest of the subjects

Subject	Mean performance on P clusters	Mean performance on NP clusters
S2	0.993	0.846
Rest	0.936	0.521
S5	1.00	0.810
Rest	0.935	0.528

It may be necessary to talk briefly in class about consonant clusters in Arabic and about the differences between the Arabic and English syllable structures in order to provide the learners with the background information

necessary to understand the problem (Catford, 1987; Morley, 1994). These talks must be kept brief, however, in order not to turn the class into a class *about* Arabic when it should be a class *in* Arabic.

For example, if the teacher decides to deal with the problem of clusters ending with final /m n l/, he/she would point out to the students the fact that they tend to produce the final /m n l/ as syllabic consonants, which is not the case in Arabic. Following that, the teacher would ask the students to pronounce certain words, which he/she would correct and ask the students to imitate the correct pronunciation. The teacher might find it necessary to deal with each student individually at this stage.

Practice at this stage is dependent on the teacher. Suggested assignments are listening to tape recordings of target words and imitating them. These imitations can be tape recorded so that the teacher would correct them and give feedback to each student individually. Morley (1994) suggests that these imitative practices be used only as necessary.

II. The stage of rehearsed speech practice

The purpose of this stage is to stabilize modified speech-pronunciation patterns introduced or modified in the previous stage. Practice at this stage is guided by the teacher using relatively "fixed" texts. The following techniques are suggested:

1- The first of these suggested techniques is writing "poems". The following are the steps to be followed:

- a) Choose a number of clusters, preferably clusters from the same group (clusters ending with final /m n l/, or clusters ending with final /w y/, or clusters of obstruents), since each group presents a different problem.
- b) Find words ending with the chosen clusters. As much as possible, try to find words that can be related together through some context.
- c) Start writing verses using these words, such that the words occur in pre-pause positions (the difficult positions).
- d) Practice reciting these verses.

To illustrate, the researcher wrote the following lines (the target words are underlined):

الصحراء
هي الحسن
كُلُّ الحسن
أجملُ رسم
الرميل
السماء
الصمت
بل.. السكون
و ذلك النجم
نجم كل مساء

الحُزُن؟

نعم.. و لم لا؟

هي العودة

العودة إلى الأصل

الطفل

Since neither the teacher nor the students are expected to be poets, the outcome of such an activity is expected only to resemble a poem. Because reciting poetry is a real-life task, asking students to practice such lines would be realistic and would also reinforce the pronunciation of other sounds.

2) A similar task is relating a story using the target words. The following are the steps to be followed:

- a) Decide on the clusters to be practiced and choose words containing those clusters.
- b) Start the story with a sentence and then ask each student in turn to add a sentence to the story. The sentence should include the word given by the teacher in final position. The words given by the teacher may include in addition to the target words (words containing the problematic consonant clusters) other vocabulary words that need to be practiced.

c) The students will write down the story after it is finished and practice reading it aloud.

d) The teacher can encourage students to include short dialogues in the story. This would make it possible to act the story out.

The researcher has tried out this task with an elementary Standard Arabic class and found it to be a success. The focus then was on practicing conjugation of certain verbs which the researcher gave the students.

This task integrated pronunciation practice with practicing using vocabulary, grammar, in addition to reading and writing, which conforms to the approach previously recommended in section 5.3.

3) Using pictures is very common in language classrooms. The following is a language game suggested for practicing consonant clusters in class:

a) The teacher will provide the class with pictures of a number of objects which end with the target clusters, e.g. /widn/ 'ear', /habl/ 'rope', /Tifl/ 'child', /riql/ 'leg', /nigm/ 'star', etc..

b) Each student will take one of these pictures.

c) The rest of the class will start asking that student questions about the object in the picture. The only clue given to the students is that the objects in the picture all end with one of the problematic clusters.

The teacher can restrict the number of questions that may be asked

and can also restrict them to yes/no questions to make the game more difficult.

d) When the students find out what the object is, they will pronounce its name. The teacher will give feedback on that pronunciation.

This game provides an opportunity for practicing not only the pronunciation of target words, but also for pronunciation in general and for grammar, vocabulary, listening, and reading. In other words, it integrates pronunciation practice with other tasks in the language classroom.

III. The stage of extemporaneous speech practice

The purpose of this stage is to integrate the modified speech pattern into the students' naturally occurring speech. Examples of activities at this stage are partially planned or unplanned talks and panel discussions (Morley, 1994).

The teacher has almost no control over the occurrence of target words (words ending with the difficult clusters) in the students' speech, since the words used by the students will be entirely determined by the context of speech. What the teacher can do, however, is to continue providing feedback on the target words whenever they occur in the students' speech, in order to reinforce the modified speech patterns.

5.4.3. Expected outcome

In a study on the effect of pronunciation teaching on students' production, Yule and Macdonald (1994) found the following different patterns of change in their students' production: Some students showed an immediate improvement and continued the improvement, some improved immediately and maintained the effect, some improved immediately and then deteriorated, some did not improve at all, some deteriorated immediately, and some deteriorated immediately and then improved.

The authors draw teachers' attention particularly to the last pattern of change, which is a deterioration followed by an improvement in students' performance. They warn language teachers against dropping a teaching procedure and considering it a failure if they do not observe an immediate improvement in their students' performance. An immediate deterioration "may actually be evidence of the learning process at work" (p. 115) with an improvement following some time later. They, therefore, recommend that teachers not judge the success or failure of a teaching procedure until it has been applied for a period of time long enough to observe the pattern of change in the students' production.

5.4.4. A sample lesson plan

Sample Lesson Plan

Concepts to be taught:

Pronunciation of the following clusters ⁴: (e.g. ml kl sm dn gl tl
km kn bl gm gn fl)

Instructional Objectives:

When asked, students will be able to pronounce the target clusters
correctly 80% of the time ⁵.

Materials:

Chalk and board.

Procedures:

The story writing technique described in section 5.4.2 on p. 86.

Homework:

Complete the story and practice reading it. In the following class, the
teacher will ask each student to read aloud a part of the story.

Notes to Chapter 5

1. The only example found was the word /hamw/ 'heat', which is a classical word. /ham.wen.nil/ 'heat rash', however, is frequently used. According to the syllable structure of this Idafa construction the consonants /m/ and /w/ no longer occur in one syllable.
2. /lm/ is a cluster permissible in English. No problem was found with the subjects' pronunciation of this cluster.
3. As mentioned in Chapter 2, /wC/ and /yC/ clusters occur in Classical Arabic words only. They do not occur in colloquial words.
4. The teacher may add any other desired concepts, since the class is not intended to be entirely devoted to pronunciation only.
5. Expecting perfect performance at this stage is rather unrealistic.

CONCLUSION AND RECOMMENDATIONS

FOR FURTHER STUDIES

The recent change in language teaching and learning paradigms has resulted in an increased focus on teaching pronunciation in second/ foreign language classrooms. This was accompanied by a revival in the interest of second language acquisition researchers in the acquisition of a second language sound system. Studies investigating interlanguage phonological systems revealed that, in addition to transfer from the native language, other processes play an important role in the process of acquiring a second language sound system. These are first language acquisition processes reactivated in learning to pronounce the second language, and other universal processes that are not traceable to either native language processes or first language acquisition processes, but are rather accounted for by universals of human language. These studies focused on different components of interlanguage phonological systems. Some studied segmental features (the pronunciation of segmental phonemes), while others focused on suprasegmental features (stress, rhythm, intonation, and syllabic structures). All studies found that the different processes influencing interlanguage phonological systems all interact.

The present study focused on the acquisition of consonant clusters by six American L2 learners of Egyptian Arabic and compared the subjects'

production of consonant clusters permissible in their native language (Ps) and consonant clusters not permissible in their native language (Nps). The results indicated that subjects found NP clusters difficult to produce and the implications of these results is that the pronunciation of consonant clusters is an important component that has to be taught in class. Otherwise, students will find the pronunciation of these consonant clusters difficult and this problem will persist even at higher level of language proficiency. Errors also occurred in subjects' production of P clusters, indicating the presence of certain developmental stages in interlanguage phonologies that are independent of native or target languages. It can also be concluded that L1 transfer processes, developmental processes, and universal processes played an important role in the acquisition of a second language sound system.

In order to deal with the problem of consonant clusters in class, a number of pronunciation teaching practices were proposed. Three types of practices were recommended: imitative speech practice, rehearsed speech practice using fixed texts, and extemporaneous speech practice in partially planned or unplanned talks and panel discussions. The three types of practice are important. While the first one serves to bring the pronunciation problem to the awareness of the language learners in order to modify their speech-pronunciation patterns, the aim of the second type is to stabilize these newly introduced or modified speech-pronunciation patterns. The

aim of the third type of practice is to help learners integrate the newly learned patterns into their naturally occurring speech.

The following are some recommendations for further studies:

- a) Repeating the study using a different data collection technique to elicit the learners' natural speech and compare the output to the more formal speech styles. It is difficult to control learners' production in less formal speech styles, however, focusing on one particular group of clusters, rather than on all clusters as was the case in this study, may make the researchers' task easier.
- b) Repeating the study with native speakers of other languages and comparing the results of all studies should reveal interesting results about the interaction of developmental and transfer processes in the acquisition of a second language sound system.
- c) Conducting research to observe or measure the effect of different pronunciation teaching practices on the learners' production of consonant clusters.

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Appendix A

Consonant Chart

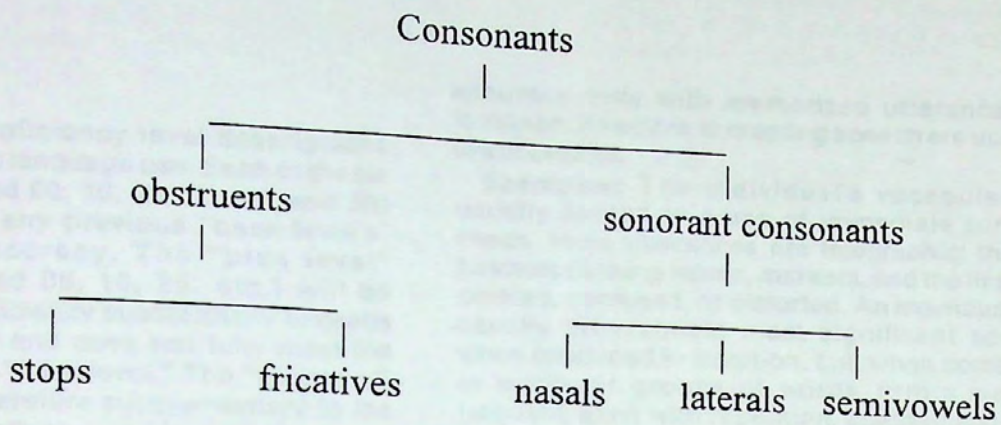
Consonant Chart: Egyptian Colloquial Arabic and Standard English

Point of articulation Manner of articulation	Bilabial		Labio-dental		Inter-dental		Dental		Alveolar		Palatal		Velar		Uvular		Pharyngeal		Glottal		Laryngeal			
	A	E	A	E	A	E	A	E	A	E	A	E	A	E	A	E	A	E	A	E	A	E		
Stops	-	p	-	-	-	-	t	-	-	t	-	-	-	-	k	k	q	-	-	-	ʔ	-	-	-
	b	b	-	-	-	-	d	-	T	d	-	-	-	-	g	g	-	-	-	-	-	-	-	-
Fricatives	-	-	f	-	-	θ	-	-	s	s	ʃ	ʃ	-	-	-	-	x	-	h	-	-	-	h	h
	-	-	-	v	-	ð	-	-	S	-	-	z	-	-	-	-	ɣ	-	ε	-	-	-	-	-
	-	-	-	-	-	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Affricates	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nasals	m	m	-	-	-	-	-	-	n	n	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laterals	-	-	-	-	-	-	-	-	l	l	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trill	-	-	-	-	-	-	-	-	r	r	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semivowels	w	w	-	-	-	-	-	-	-	-	y	y	-	-	-	-	-	-	-	-	-	-	-	-

Source: adapted from Kennedy (1960)

Appendix B

Consonant Classification



Appendix C

FSI Oral Proficiency Level Descriptions

Preface

The following proficiency level descriptions characterize spoken language use. Each of the six "base levels" (coded 00, 10, 20, 30, 40, and 50) implies control of any previous "base level's" functions and accuracy. The "plus level" designation (coded 06, 16, 26, etc.) will be assigned when proficiency substantially exceeds one base skill level and does not fully meet the criteria for the next "base level." The "plus level" descriptions are therefore supplementary to the "base level" descriptions.

A skill level is assigned to a person through an authorized language examination. Examiners assign a level on a variety of performance criteria exemplified in the descriptive statements. Therefore, the examples given here illustrate, but do not exhaustively describe, either the skills a person may possess or situations in which he/she may function effectively.

Statements describing accuracy refer to typical stages in the development of competence in the most commonly taught languages in formal training programs. In other languages, emerging competence parallels these characterizations, but often with different details.

Unless otherwise specified, the term "native speaker" refers to native speakers of a standard dialect.

"Well-educated," in the context of these proficiency descriptions, does not necessarily imply formal higher education. However, in cultures where formal higher education is common, the language-use abilities of persons who have had such education is considered the standard. That is, such a person meets contemporary expectations for the formal, careful style of the language, as well as a range of less formal varieties of the language.

Speaking 0 (No Proficiency)

Unable to function in the spoken language. Oral production is limited to occasional isolated words. Has essentially no communicative ability. (Has been coded S-0 in some nonautomated applications.) [Data Code 00]

Speaking 0+ (Memorized Proficiency)

Able to satisfy immediate needs using rehearsed utterances. Shows little real autonomy of expression, flexibility, or spontaneity. Can ask questions or make statements with reasonable

accuracy only with memorized utterances or formulae. Attempts at creating speech are usually unsuccessful.

Examples: The individual's vocabulary is usually limited to areas of immediate survival needs. Most utterances are telegraphic; that is, functors (linking words, markers, and the like) are omitted, confused, or distorted. An individual can usually differentiate most significant sounds when produced in isolation, but, when combined in words or groups of words, errors may be frequent. Even with repetition, communication is severely limited even with people used to dealing with foreigners. Stress, intonation, tone, etc. are usually quite faulty. (Has been coded S-0+ in some nonautomated applications.) [Data Code 06]

Speaking 1 (Elementary Proficiency)

Able to satisfy minimum courtesy requirements and maintain very simple face-to-face conversations on familiar topics. A native speaker must often use slowed speech, repetition, paraphrase, or a combination of these to be understood by this individual. Similarly, the native speaker must strain and employ real-world knowledge to understand even simple statements/questions from this individual. This speaker has a functional, but limited proficiency. Misunderstandings are frequent, but the individual is able to ask for help and to verify comprehension of native speech in face-to-face interaction. The individual is unable to produce continuous discourse except with rehearsed material.

Examples: Structural accuracy is likely to be random or severely limited. Time concepts are vague. Vocabulary is inaccurate, and its range is very narrow. The individual often speaks with great difficulty. By repeating, such speakers can make themselves understood to native speakers who are in regular contact with foreigners but there is little precision in the information conveyed. Needs, experience, or training may vary greatly from individual to individual; for example, speakers at this level may have encountered quite different vocabulary areas. However, the individual can typically satisfy predictable, simple, personal and accommodation needs; can generally meet courtesy, introduction, and identification requirements; exchange greetings; elicit and provide, for example, predictable and skeletal biographical information. He/she might give information about

business hours, explain routine procedures in a limited way, and state in a simple manner what actions will be taken. He/she is able to formulate some questions even in languages with complicated question constructions. Almost every utterance may be characterized by structural errors and errors in basic grammatical relations. Vocabulary is extremely limited and characteristically does not include modifiers. Pronunciation, stress, and intonation are generally poor, often heavily influenced by another language. Use of structure and vocabulary is highly imprecise. (Has been coded S-1 in some nonautomated applications.) [Data Code 10]

Speaking 1+ (Elementary Proficiency, Plus)

Can initiate and maintain predictable face-to-face conversations and satisfy limited social demands. He/she may, however, have little understanding of the social conventions of conversation. The interlocutor is generally required to strain and employ real-world knowledge to understand even some simple speech. The speaker at this level may hesitate and may have to change subjects due to lack of language resources. Range and control of the language are limited. Speech largely consists of a series of short, discrete utterances.

Examples: The individual is able to satisfy most travel and accommodation needs and a limited range of social demands beyond exchange of skeletal biographic information. Speaking ability may extend beyond immediate survival needs. Accuracy in basic grammatical relations is evident, although not consistent. May exhibit the more common forms of verb tenses, for example, but may make frequent errors in formation and selection. While some structures are established, errors occur in more complex patterns. The individual typically cannot sustain coherent structures in longer utterances or unfamiliar situations. Ability to describe and give precise information is limited. Person, space, and time references are often used incorrectly. Pronunciation is understandable to natives used to dealing with foreigners. Can combine most significant sounds with reasonable comprehensibility, but has difficulty in producing certain sounds in certain positions or in certain combinations. Speech will usually be labored. Frequently has to repeat utterances to be understood by the general public. (Has been coded S-1+ in some nonautomated applications.) [Data Code 16]

Speaking 2 (Limited Working Proficiency)

Able to satisfy routine social demands and limited work requirements. Can handle routine work-related interactions that are limited in scope. In more complex and sophisticated work-

related tasks, language usage generally disturbs the native speaker. Can handle with confidence, but not with facility, most normal, high-frequency social conversational situations including extensive, but casual conversations about current events, as well as work, family, and autobiographical information. The individual can get the gist of most everyday conversations but has some difficulty understanding native speakers in situations that require specialized or sophisticated knowledge. The individual's utterances are minimally cohesive. Linguistic structure is usually not very elaborate and not thoroughly controlled; errors are frequent. Vocabulary use is appropriate for high-frequency utterances, but unusual or imprecise elsewhere.

Examples: While these interactions will vary widely from individual to individual, the individual can typically ask and answer predictable questions in the workplace and give straightforward instructions to subordinates. Additionally, the individual can participate in personal and accommodation-type interactions with elaboration and facility; that is, can give and understand complicated, detailed, and extensive directions and make non-routine changes in travel and accommodation arrangements. Simple structures and basic grammatical relations are typically controlled; however, there are areas of weakness. In the commonly taught languages, these may be simple markings such as plurals, articles, linking words, and negatives or more complex structures such as tense/aspect usage, case morphology, passive constructions, word order, and embedding. (Has been coded S-2 in some nonautomated applications.) [Data Code 20]

Speaking 2+ (Limited Working Proficiency, Plus)

Able to satisfy most work requirements with language usage that is often, but not always, acceptable and effective. The individual shows considerable ability to communicate effectively on topics relating to particular interests and special fields of competence. Often shows a high degree of fluency and ease of speech, yet when under tension or pressure, the ability to use the language effectively may deteriorate. Comprehension of normal native speech is typically nearly complete. The individual may miss cultural and local references and may require a native speaker to adjust to his/her limitations in some ways. Native speakers often perceive the individual's speech to contain awkward or inaccurate phrasing of ideas, mistaken time, space, and person references, or to be in some way inappropriate, if not strictly incorrect.

Examples: Typically the individual can participate in most social, formal, and informal interactions; but limitations either in range of contexts, types of tasks, or level of accuracy

Kind of effectiveness. The individual may be ill at ease with the use of the language either in social interaction or in speaking at length in professional contexts. He/she is generally strong in either structural precision or vocabulary, but not in both. Weakness or unevenness in one of the foregoing, or in pronunciation, occasionally results in miscommunication. Normally controls, but cannot always easily produce general vocabulary. Discourse is often incohesive. (Has been coded S-2+ in some nonautomated applications.) [Data Code 26]

Speaking 3 (General Professional Proficiency)

Able to speak the language with sufficient structural accuracy and vocabulary to participate effectively in most formal and informal conversations on practical, social, and professional topics. Nevertheless, the individual's limitations generally restrict the professional contexts of language use to matters of shared knowledge and/or international convention. Discourse is cohesive. The individual uses the language acceptably, but with some noticeable imperfections; yet, errors virtually never interfere with understanding and rarely disturb the native speaker. The individual can effectively combine structure and vocabulary to convey his/her meaning accurately. The individual speaks readily and fills pauses suitably. In face-to-face conversation with natives speaking the standard dialect at a normal rate of speech, comprehension is quite complete. Although cultural references, proverbs, and the implications of nuances and idiom may not be fully understood, the individual can easily repair the conversation. Pronunciation may be obviously foreign. Individual sounds are accurate; but stress, intonation, and pitch control may be faulty.

Examples: Can typically discuss particular interests and special fields of competence with reasonable ease. Can use the language as part of normal professional duties such as answering objections, clarifying points, justifying decisions, understanding the essence of challenges, stating and defending policy, conducting meetings, delivering briefings, or other extended and elaborate informative monologues. Can reliably elicit information and informed opinion from native speakers. Structural inaccuracy is rarely the major cause of misunderstanding. Use of structural devices is flexible and elaborate. Without searching for words or phrases, the individual uses the language clearly and relatively naturally to elaborate concepts freely and make ideas easily understandable to native speakers. Errors occur in low-frequency and highly complex structures. (Has been coded S-3 in some nonautomated applications.) [Data Code 30]

Speaking 3+ (General Professional Proficiency, Plus)

Is often able to use the language to satisfy professional needs in a wide range of sophisticated and demanding tasks.

Examples: Despite obvious strengths, may exhibit some hesitancy, uncertainty, effort, or errors which limit the range of language-use tasks that can be reliably performed. Typically there is particular strength in fluency and one or more, but not all, of the following: breadth-of lexicon, including low- and medium-frequency items, especially socio-linguistic/cultural references and nuances of close synonyms; structural precision, with sophisticated features that are readily, accurately, and appropriately controlled (such as complex modification and embedding in Indo-European languages); discourse competence in a wide range of contexts and tasks, often matching a native speaker's strategic and organizational abilities and expectations. Occasional patterned errors occur in low frequency and highly-complex structures. (Has been coded S-3+ in some nonautomated applications.) [Data Code 36]

Speaking 4 (Advanced Professional Proficiency)

Able to use the language fluently and accurately on all levels normally pertinent to professional needs. The individual's language usage and ability to function are fully successful. Organizes discourse well, using appropriate rhetorical speech devices, native cultural references, and understanding. Language ability only rarely hinders him/her in performing any task requiring language; yet, the individual would seldom be perceived as a native. Speaks effortlessly and smoothly and is able to use the language with a high degree of effectiveness, reliability, and precision for all representational purposes within the range of personal and professional experience and scope of responsibilities. Can serve as an informal interpreter in a range of unpredictable circumstances. Can perform extensive, sophisticated language tasks, encompassing most matters of interest to well-educated native speakers, including tasks which do not bear directly on a professional specialty.

Examples: Can discuss in detail concepts which are fundamentally different from those of the target culture and make those concepts clear and accessible to the native speaker. Similarly, the individual can understand the details and ramifications of concepts that are culturally or conceptually different from his/her own. Can set the tone of interpersonal official, semi-official, and non-professional verbal exchanges with a representative range of native speakers (in a range of varied audiences, purposes, tasks, and

settings). Can play an effective role among native speakers in such contexts as conferences, lectures, and debates on matters of disagreement. Can advocate a position at length, both formally and in chance encounters, using sophisticated verbal strategies. Understands and reliably produces shifts of both subject matter and tone. Can understand native speakers of the standard and other major dialects in essentially any face-to-face interaction. (Has been coded S-4 in some nonautomated applications.) [Data Code 40]

Speaking 4+ (Advanced Professional Proficiency, Plus)

Speaking proficiency is regularly superior in all respects, usually equivalent to that of a well-educated, highly articulate native speaker. Language ability does not impede the performance of any language-use task. However, the individual would not necessarily be perceived as culturally native.

Examples: The individual organizes discourse well, employing functional rhetorical speech devices, native cultural references and understanding. Effectively applies a native speaker's social and circumstantial knowledge. However, cannot sustain that performance under

all circumstances. While the individual has a wide range and control of structure, an occasional non-native slip may occur. The individual has a sophisticated control of vocabulary and phrasing that is rarely imprecise, yet there are occasional weaknesses in idioms, colloquialisms, pronunciation, cultural reference or there may be an occasional failure to interact in a totally native manner. (Has been coded S-4+ in some nonautomated applications.) [Data Code 46]

Speaking 5 (Functionally Native Proficiency)

Speaking proficiency is functionally equivalent to that of a highly articulate well-educated native speaker and reflects the cultural standards of the country where the language is natively spoken. The individual uses the language with complete flexibility and intuition, so that speech on all levels is fully accepted by well-educated native speakers in all of its features, including breadth of vocabulary and idiom, colloquialisms, and pertinent cultural references. Pronunciation is typically consistent with that of well-educated native speakers of a non-stigmatized dialect. (Has been coded S-5 in some nonautomated applications.) [Data Code 50]

SPEAKING PERFORMANCE LEVELS

	BLOCKING	DYSFUNCTIONAL	INTRUSIVE	ACCEPTABLE	SUCCESSFUL	SUPERIOR	RAW SCORE	
							ESR	TSR
COMPRE- HENSION	Misunderstanding of very simple language. 0-4	Examine recognizes non-understandings which are quite frequent. 5-9	Difficulties in comprehension slow down the interaction. 10-14	Exhibits understand- ing quickly when clarification, repara- tion or paraphrase is given. 15-19	Understanding is limited by cultural background. 20-24	Understanding is essentially complete. 25		
DISCOURSE	Unable to produce continuous discourse. 0-4	Minimally elaborate performance. 5-9	Performance shows lack of cohesion. 10-14	Discourse is cohesive. 15-19	Discourse is well- organized. 20-24	Good, flexible control of functional, rhetorical devices. 25		
STRUCTURE	Structural accuracy is largely random. 0-5	Miscommunication arises frequently due to lack of control of structure. 6-11	Inconsistent accuracy in relatively high frequency areas. 12-17	Structural inaccuracy is rarely the major cause of misunderstanding. 18-23	Range and control of the structure is great. 24-29	Structural accuracy and flexibility approach bilingual competence. 30		
LEXICA- LIZATION	Lexicalization is inaccurate and narrow. 0-5	Lexicalization range is narrow and highly unnatural. 6-11	Lexicalization is unusual and/or imprecise. 12-17	Lexicalization is clear and relatively natural. 18-23	Very imprecise lexicalization. 24-29	Lexicalization is precise. 30		
FLUENCY	Examinee speaks with difficulty. 0	Fluency is irregular. 1-3	Examinee speaks relatively but not fluently. 4-5	Examinee speaks relatively, suitably filling in blanks. 6-8	Performance is fluent. 9	The flow of speech is effortless and smooth. 10		

Appendix D

The Instrument

أولاً: اقرأوا كل جملة من الجُمْل التالِية ثلاث مرّات:

- ١- في بيتي خزانة، جميلة الشكل، كبيرة الحجم، و خفيفة الوزن.
- ٢- قبل الغزو، كان يعيش مع البدو وكان عنده كلب، وجدي، وظبي.
- ٣- جلستُ في صمت فأنا لُجب الشمس و أحب الرمل.
- ٤- هذا المكان جَدب و ليس فيه عُشب.
- ٥- لا بد من الهدم لنصل إلى القبو. هناك سنجِد الكنز.
- ٦- على هذا الرِدْف عنده وشم.
- ٧- يُحب كثيراً العدس و الفجل و الخبز.
- ٨- اشترى من الكُشك زجاجة من المسك وقِطعة من السِلك بهذا السُك وحقِيبَة من الجِلد.
- ٩- يعمل مثل العبد ليحقق المُجد.
- ١٠- صدر الحُكم، ودخل السِجن بتهمة القتل (القتل العمد) وأيضاً النشل، وبعد ١٠ سنوات صدر قرار العفو.
- ١١- إنه طفل لذلك فهو يُحب الرِسم كما يُحب العزف.
- ١٢- بعد الجنّي يكون الغسل. استعمل الماء من هذا الدلو بعد المزج.
- ١٣- أعرفُ هذا النجم، فقد شاهدته في الحُلم، وكان شديد الحُسن.
- ١٤- يوم السبت زار الرئيس مصنع الغزل والنسج و التقى بالحشد و توقّفت الحياة في المدينة لما سببه ذلك من ربك.
- ١٥- لا أحبّ هذا الهزل.
- ١٦- رَغم كل هذا الكسب، فهو كثير الشكو.

- ١٧- التقى الرئيس بالوفد. هذا الوفد يمثل الحلف و يمثل أيضا الحزب. ناقش
الجميع قضايا الأمن و كذلك أحداث العُنف و أكدوا على أنه يجب أن
نتعامل مع تلك الموضوعات بكل حزم.
- ١٨- في المتن وجدتُ الكلمة ووجدتُ أيضا العكس.
- ١٩- أسنانه تؤلمه لسقوط الحشو، وأيضا لديه التهاب في الجفن.
- ٢٠- بدأ يمارس رياضة المشي، والقفز، والرمي، مُنذ أن كان يعمل في الهند.
- ٢١- الحبس لم يكن من العدل.
- ٢٢- لا يشعر بالعجز مع أنه من البكم.
- ٢٣- من فضلك توقف عن الشتم، واللكز، والغمز!
- ٢٤- لحق بالركب، وهناك وجد الابن.
- ٢٥- بعد النسف ارتفعت الأصوات بالشجب ولكن هذا لا يضع نهاية لذلك
السفك للدماء والهتك للأعراض.
- ٢٥- أصبحت الشركة أحسن بعد الدمج.

ثانياً: اقرأوا كل جملة من الجمل التالية (بالعامية المصرية) ثلاث مرّات:

- ١- هَدومي اتوسّخت من الشّوي وكمان من القلي.
- ٢- أنا مش باحبّه لأنه جَلَمَف، مع إنه في الأوّل مَابَانَش.
- ٣- الحمد لله مَامَاتَش. الرُصاص اللي في المسدس كان فِشِنِك.
- ٤- مش عايزة أكل. مَالِيش نَفَس، لكن عايزة بيبسي ومعها تلج.
- ٥- دُخِل أوضة العمليات بعد الكَشَف، وهناك أخذ بِنَج، ودلوقتي هو كويس زي البُمب.
- ٦- الدنيا كانت برد قُوي عشان كدا مَاعَامَش.
- ٧- كان زعلان عشان كدا مَأخرَجَش، ومَأقَعَدَش، وماشربَش، وماضحكَش. مش عارفة ليه مَأقالَش.
- ٨- قُلْتُ له: لو عُزِت حاجة قُول لي، لكن هو مَاعازَش.
- ٩- قُلْتُ له دوس فَرامل لكن هو مَادَأَسَش، و عَمَل حادثة علشان مَأشأَفَش.
- ١٠- شَعري كان طويل لِحدِّ الكِتَف، دلوقتي بَقِيَ لِحدِّ الودن.

ثالثاً: اقرأوا الفقرة التالية ثلاث مرات:

امبارح أنا اللي كان عَلَيَّ الكَنَس. خَدَت المَقَشَّة وكنَّست. كنَّست كل التُّراب
اللي كان في البلكونة خصوصاً اللي كان في الرُّكن. بعد كدا لِبِست، وخرَجت.
رجِعت البيت بعد ساعة. التليفون رَن. واحد صاحبي كان بيسألني لو كُنْتُ عايز
حاجة، قُلْتُ: "شكراً، حاقُول لك لو عُزت." بعد كدا شِلت التليفزيون وخرجت
في البلكونة. فرَشْت سِجادة على الأرض. بعد ما فرَشْت قَعَدت. حُطَّيت
التليفزيون قُدامي و اتفرَّجت على برنامج سَخيف جداً كل اللي فيه هُبل، وكل
الكلام اللي كانوا بيَقولوه هَلَس. شُفت البرنامج و ضحِكت. بعد كدا كان فيه فيلم
رُعب. لما شُفْتَه حُفْتُ. دي كانت أول مرة أشوف فيها فيلم زي دا من أول ما
سِكنت.

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