Doctoral (PhD) Dissertation

Differences between dialectal interference - the case of Arabic dialects vs. English
A contrastive analysis of the interference of Jordanian urban and rural consonant clusters with English as a foreign language

By

Hala Saed

DOI:10.18136/PE.2024.908

Supervisor: Dr. Szentgyörgyi Szilárd

Multilingualism Doctoral School

Faculty of Humanities and Social Sciences

University of Pannonia

Veszprem, 2024

STATEMENT

This dissertation, written under the direction of the candidate's dissertation committee and approved by the members of the committee, has been presented to and accepted by the Faculty of Modern Philology and Social Sciences in partial fulfillment of the requirements forthe degree of Doctor of Philosophy. The content and research methodologies presented in this work represent the work of the candidate alone.

Hala Saed …,…., 2024

Candidate Date

Dissertation Committee:

_____ …,…., 2024

Chairperson Date

_____

First Reader

_____ …,…., 2024

Second Reader Date

Differences between dialectal interference - the case of Arabic dialects vs. English
A contrastive analysis of the interference of Jordanian urban and rural consonant clusters with English as a foreign language

Thesis for obtaining a PhD degree in the Doctoral School of Multilingualism of the University of Pannonia

in the branch of Applied

LinguisticsWritten by

Hala Saed

Supervisor: Dr. Szentgyörgyi Szilárd

Propose acceptance (yes / no) …….……
(supervisor)

…….…….
(supervisor)

As a reviewer, I propose acceptance of the thesis:

Name of Reviewer: .....yes / no …….…….
(reviewer)

Name of Reviewer: .....yes / no …….…….
(reviewer)

The PhD-candidate has achieved .....% at the public discussion.

Veszprém, ……/……. 2024 …….…….
(Chairman of the Committee)

The grade of the PhD Diploma …..... (……. %)

Veszprém, ……/……. 2024 …….…….
(Chairman of UDHC)

ABSTRACT

Despite the progress made in communication technology, spoken conversation continues to be widespread, highlighting the need for clear pronunciation to engage effectively. This study examines the influence of the native language, namely Jordanian Arabic dialects, on the pronunciation errors prevalent among Arab Jordanian English speakers, with a specific focus on three consonant clusters. This research seeks to explain the reasons behind these errors and provide remedial methods for instruction.

Data was obtained from 28 Jordanian bilinguals who represented the urban and rural dialects (UD, RD) employing a mixed-methods approach. The participants were instructed to pronounce English words containing three consonant clusters. The recordings of their pronunciations were analyzed alongside linguistic background questionnaires. Statistical and linguistic analyses were employed to identify patterns and factors that lead to pronunciation errors.

The results revealed significant differences between speakers of the urban and rural dialects, with the latter demonstrating greater error frequencies that can be attributed to interference from their first language (L1). The occurrence of errors has been identified as being affected by factors such as the linguistic distance between the first language (L1) and second language (L2), the age at which English was acquired, educational levels, and multilingualism. Furthermore, the study emphasized sociolinguistic characteristics such as limited linguistic exposure and educational differences between different regions as significant contributing factors.

The findings indicate that Arab Jordanian learners require targeted teaching strategies that address their individual phonological difficulties. Moreover, these conclusions have an impact on language policy and the creation of educational programs, highlighting the importance of incorporating both oral language ability and written skills in English language instruction. This study enhances our comprehension of pronunciation errors among Arab Jordanian bilinguals by examining both linguistic and sociolinguistic aspects. Additionally, it provides valuable insights for enhancing English language teaching methods.

ACKNOWLEDGMENT

I would like to express my sincere gratitude to Professor Judit Navracsics, the chair of the committee and the dean of the doctoral school, for her support, guidance, advice, and dedication throughout my dissertation and doctoral studies. Her consistent assistance and steadfast efforts have played a key role in this academic journey and the successful completion of this research.

I am deeply grateful to Professor Szilard Szentgyorgy, my academic advisor, for his unwavering support, invaluable guidance, and insightful feedback throughout every stage of this research. His expertise, encouragement, and patience have been instrumental in shaping this dissertation.

I extend my heartfelt thanks to my dissertation committee members, and the examiners for their valuable contributions, constructive criticism, and scholarly insights. Their feedback and suggestions have significantly enriched the quality of this work. Additionally, I would like to extend my sincere gratitude to Dr. Silvia Batyi, Dr. Fabian Gyongyi, and Veronika Schrenk for their commitment to assisting students with their academic and professional knowledge. Their readiness to support and share their expertise has been immensely appreciated and valuable to my academic journey.

I am profoundly thankful to my father Dr. Hussien, my mother Sonia, my sister Helda, and her husband Ahmed, their daughter Mais, her sons Baha'a and Ameer, as well as my sister Hadeel and her sweet daughter Liliana and my beloved sister Dr. Huda for their unconditional love, encouragement, and understanding during this challenging journey. Their unwavering support and belief in my abilities have been a constant source of motivation and strength. I also extend my gratitude to all my friends and colleagues for their encouragement, emotional support, and moments of respite during stressful times.

I acknowledge the financial support provided by Tempus Public Foundation through Stipendium Hungaricum Scholarship that covered 4 years of my PhD study. Their support enabled me to pursue my research goals and complete this dissertation. I would also like to thank the University of Pannonia for providing access to resources, facilities, and academic support services that were essential for conducting this research. The Multilingualism Doctoral School has created a conducive academic environment that fostered my intellectual growth and development.

In conclusion, I am profoundly grateful to all those who have contributed to this dissertation in various capacities. Their support, encouragement, and collaboration have been indispensable, and I am deeply appreciative of their generosity and kindness.

DEDICATION

To my cherished parents, Hussien and Sonia,

Your love and sacrifice have been my compass through life's trials. Your faith in me has fueled my journey, and this dissertation is a heartfelt token of gratitude for your boundless support and belief in my dreams.

I will always be proud to be your daughter.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

UD Urban Dialect

BD Bedouin Dialect

AoA Age of Acquisition

C Consonant

CA Contrastive Analysis

CA Classical Arabic

CC Consonant Cluster

CCC Three Consonant cluster

EA Error Analysis

IPA International Phonetic Alphabet

JD Jordanian Dialect

L1 First Language

L2 Second Language

MSA Modern Standard Arabic

RD Rural Dialect

RP Received Pronunciation

SL Second Language

SLA Second Language Acquisition

TL Target Language

V Vowel

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE: INTRODUCTION

1.1. Research area

Today, English is the leading foreign language in numerous countries with a prestigious position. The need for English worldwide has begun to reach such an extent that it is explicit to most of the world's population that English will contribute to their overall lives. Incidentally, English has much more impact on their lives than the desired effects of functionality, education, and a better job but it also changes cultural values, norms, ideas, and beliefs in social classes and has had a profound impact on younger generations.

Despite the recent quantum leap in the area of communication because of technology and numerous digital devices enhancing written communication, individuals still interact much more in speech than in writing. A significant emphasis must therefore be devoted to pronunciation since it contributes to conveying the proper message in oral discourse. If the idea is not clearly pronounced, pronunciation may often impede interaction or cause confusion concerning what is being said. Zemmermann (2004, p.29) states that 'pronunciation is crucially important, as it is usually the first thing people notice about a language learner's English'.

The effect of the mother tongue has been always a key factor in language acquisition and learning since the fact that a bilingual person's first language may transfer in both positive and negative ways (interference) makes the process of learning either simpler if the sound systems of the two languages are similar or problematic if there are significant differences between them.

Accordingly, numerous research papers have examined the interlanguage of English bilinguals in an attempt to identify the challenges they face by first producing a thorough comparison between the bilinguals' L1 and L2 in order to find the similarities and differences that pave the way to predicting potential errors. The prediction of errors will indeed make it easier for researchers and teachers to detect and analyze the errors made for the sake of finding the reasons behind them and providing remedies. Arabic/English bilinguals are not an exception: they face challenges while speaking, in pronunciation, vocabulary, as well as in writing and spelling (Abu Rass, 2015).

This is one of the contributing factors behind the idea of raising the problem of English pronunciation errors by native Arab speakers as the purpose of this study. In certain contexts, mispronunciation could contribute to misunderstanding and confusion, where the following examples by Zemmermann (2004, p.31) illustrate this impact; "…' will' is often replaced by 'well' and 'park' by 'bark', 'sale' by 'sell' are often confused and so on".

This underlines the fact that English has a system of complex orthography, where the relationship between letters and sounds is not one-to-one. In other words, one sound may be represented by a letter combination – a digraph or trigraph depending on whether it is two or three letters in combination – as <*tio*> is used to make the sound /ʃ/ as in the word *nation*. Another major concern in English orthography is when the same letter, e.g. the letter <a> is used in words such as *fan*, *war*, and *many* others to represent different sound articulations, i.e. /æ/, /ɔ:/, and /e/ respectively.

The Arabic orthographic system, on the other hand, is relatively simple. In Arabic, the letter-to-sound relationships are much more explicit than those in English. In Arabic, words are written almost exactly as pronounced. Particularly, in the case of consonants, almost each letter represents a distinctive sound except in a few limited circumstances. The unusual cases are those of assimilation for instance, when the /n/ is assimilated into [m] due to the following /b/ stop. On the other hand, Arabs are more reliant on their diacritics system to add vowels or stress to words, particularly in connected speech.

The role of L1 transfer has long been a controversial issue in applied linguistics, Second Language Acquisition (SLA), and language teaching (Odlin 1989). The question of the role of L1 cannot be ignored by researchers in these fields because of the clear L1 effects in L2 speakers' language production that indicate the existence of an L1 influence (Whong-Barr2006).

Bilinguals accumulate structural entities of the target language but demonstrate difficulty in organizing this knowledge into appropriate and consistent structures. There appears to be a significant gap between the accumulation and the organization of knowledge. This then raises the critical question: what kinds of language do bilinguals produce in speaking? When speaking the target language L2, bilinguals tend to rely on their native language L1 structures to produce an output. If the structures of the two languages are significantly different, then one could expect a relatively high frequency of errors to occur in L2, thus indicating an interference of L1 on L2 (Dechert 1983) (Ellis 1997).

Bilinguals' first language usually interferes with their second language, and this interference has a positive or a negative effect on their performance in the second language. When speakers start to learn an additional language, which is often controlled by their first language or its dialects such as in the Arabic language case, they would try to apply their first language L1 linguistic knowledge in their L2. As they do, the patterns and structures of their L1 would automatically transfer to their L2. From a phonological point of view, this transfer will result in accents in L2 that seem similar to the speaker's L1 accent or dialect.

This study aims to analyze interlingual errors (due to L1 interference) in the pronunciation of English consonant clusters that may be encountered by Arab Jordanian speakers as non-native speakers of English. Furthermore, it is also to explain the reasons behind these errors and to suggest some remedial methods for teaching English pronunciation. This would likely enable Arabs to avoid the errors that limit their English fluency or pronunciation competence. This study begins with a brief definition of terms, followed by the aims and justification of the study, a discussion of the linguistic background, and an overview of the methodology applied. Then it follows with an overview of the theoretical framework, a comparison of British English Received Pronunciation RP and Modern Standard Arabic MSA sound systems, as well as MSA and Jordanian dialects (the rural dialect RD, and the urban dialect UD). The results are discussed, the interlingual factors behind the errors are mentioned and explained, and finally, some teaching suggestions are proposed.

1.2. Definition of terminology

1.2.1. Errors and mistakes

Corder (1967) produced a fundamental distinction between mistake and error, where he defined a mistake as an unintentional slip in performance that can easily be corrected. On the other hand, he defined an error as a regular violation committed by learners who may not have yet learned the rules of the second language (L2). According to James (2013), mistakes can be self-corrected, but in contrast, errors cannot. Errors are systematic, they happen frequently and can be analyzed (Suhono, 2016). Many classify errors and slips as two distinct types of mistakes. Slips are mistakes that learners commit while being aware they are mistaken; such mistakes are self-corrected. On the other hand, errors are mistakes learners commit due to either a lack of L2 linguistic awareness (knowledge of the grammar and rules of L2) or as a result of L1 interference and transfer. Errors are not self-corrected since learners are not aware they are committing any mistakes (Jonsson, 2015).

To clarify, Liggett (1983) defines errors within the context of Error Analysis (EA) as falling into two main categories: (1) Performance errors, which are those that a student makes because he is tired or nervous, and (2) Competency errors, which are those he makes because he does not know how to apply the grammar rules he is learning. This classification by Liggett complements Corder's and James's distinctions by providing a more nuanced understanding of the underlying causes of errors. Specifically, Liggett's performance errors align closely with what Corder and James describe as mistakes—temporary and correctable issues. In contrast, competency errors correspond to what Corder and James refer to as systematic errors, stemming

from a deeper lack of understanding or knowledge. Thus, integrating these classifications helps in comprehensively addressing the different types of learner mistakes and errors, enhancing the ability to analyze and address them in language teaching (Liggett, 1983; Corder, 1974; James, 2013).

Richards (1971) concluded that error could be classified into two types: interlingual and intralingual errors, as follows:

- *Interlingual* errors are those made by second-language L2 users as a result of interference with their first language.
- *Intralingual* errors are those made by L2 learners, regardless of their native language.

1.2.2. Interlanguage

Interlanguage is a concept used to describe a language that L2 learners develop which lies between the learner's L1 and L2. The idea of interlanguage was the primary theory to explain the process of SLA; therefore, it significantly contributed to the development of numerous other theories of SLA. If errors are systematic, then the new L2 accent must rely on some methodological or personal knowledge. This L2 accent was termed as interlanguage and suggested that such a transitional language would show significant systematic characteristics of L1, L2, and other languages the speaker may be familiar with. In other words, it has a combined or intermediary system. (Mathe, 2017)

Interlanguage is a distinct transitional linguistic system and cannot be viewed as an arbitrary collection of unsystematic errors. Bilingual and multilingual speakers use this language unconsciously due to the lack of L2 linguistic awareness. Researchers consider interlanguage errors as a natural process of language learning and development.

1.2.3. Contrastive analysis CA

Contrastive Analysis CA is defined by Crystal (1997, p. 90) as follows:

> "The phrase contrastive analysis CA identifies a general approach to the investigation of language, particularly as carried out in certain areas of applied linguistics, such as foreign-language teaching and translation. In a contrastive analysis of two languages, the points of structural difference are identified, and these are then studied as areas of potential difficulty (interference or 'negative transfer') in foreign-language learning."

The present contrastive analysis is between British English Received Pronunciation RP and Modern Standard Arabic MSA. Since this distinction is not enough for the goals of this research, we needed to consider the diverse varieties of spoken Arabic from one region to another, in addition to those in the same country giving particular attention to Jordan. English

and MSA sound systems, Arabic dialects in general, and an overview of the Jordanian dialects are presented in detail in chapter three.

1.2.4. Error analysis EA

Corder established and embraced the idea of error analysis, a branch of applied linguistics, in the late 1960s and early 1970s. Learner errors are essential in three manners, as suggested in (Corder, 1974): first, errors might be useful for linguistic studies since they indicate how languages are learned and prove that L2 acquisition is occurring. Secondly, errors can be utilized as teaching instruments to assist learners' L2 linguistic knowledge and to give appropriate feedback. Thirdly, it is believed that analyzing errors can be used for pedagogical purposes to help teachers understand what students have already learned and what they still need to work on, as well as by enlightening them on the efficiency of their classroom instructions and curriculum. (MUIA, 2015)

Crystal (1997, p. 139) defines error analysis EA, as follows:

"In language learning and teaching, error analysis is a technique for identifying, classifying, and systematically interpreting the unacceptable forms produced by someone learning a foreign language, using any of the principles and procedures provided by linguistics."

The process of examining and analyzing errors based on the error analysis proposed by Corder (1974) involves multiple steps: first by error collection, followed by identification and characterizations, explanation, and finally finding solutions to surmount them. These stages were used during the data analysis procedure in the present study.

- **Sources of errors**

According to Richard (1973), errors can be divided into two main categories based on the cause of the errors, in addition to the reason that led the bilingual speakers to commit them while producing L2. The two categories were interlingual errors and developmental errors. Interlingual errors take place at various levels including the transfer of phonological, morphological, and grammatical features from the first to the second language. Interlingual errors are also known as transfer or interference errors since they emerge as a result of the influence of the native language while acquiring the second language, which is considered a significant source of errors for bilinguals. Developmental errors, on the other hand, are errors that appear when a student intends to develop hypotheses about a second language based on his limited knowledge. This type of error occurs because of multiple factors such as inadequate rule application, false hypotheses, over-generalization, and lack of L2 rules and constraints (Al-Khresheh, 2016).

Other sources of errors have been identified in previous research that investigated the reasons for errors when speaking English as a second language. A study conducted by Al-Sobhi (2018) investigated the challenges of English pronunciation among Arab students. His findings show that students faced many significant problems while pronouncing English as an L2 due to a variety of factors including a lack of L2 linguistic awareness, a lack of motivation, and inefficient instructional strategies. Furthermore, Hind (2018) conducted research on the factors affecting the pronunciation of English by Arab bilinguals' pronunciation and it was found that Arab bilinguals were encountering many linguistic difficulties, especially in the areas of phonetics and phonology, due to L1 interference, linguistic distance, as well as the teaching methods and strategies employed when teaching English.

1.2.5. Consonants clusters (CC)

Despite the fact that Arabic has more consonants than English does, MSA and other dialects of Arabic barely use consonant clusters in word-final positions, and never in word-initial positions (Hago and Khan 2015). This fact was also mentioned by Majeed (1999) when claiming that in comparison to English, Arabic is a consonant-heavy language, even though regardless of this, English uses far more consonant clusters when building syllables and words.

Consonant clusters refer to a sequence of consonants or a group of consonants that have no intervening vowel between them. Every language has its own set of phonotactic constraints and languages may differ as to what sequences of consonants they allow in what sort of positions. Many languages are more restrictive than English in terms of consonant clusters, and some even forbid consonant clusters completely. For instance, Arabic does not permit initial consonant clusters at all, and no syllable is allowed to begin with a vowel (Al-Saidat, 2010). In English, the maximum number of consonants allowed at the initial position of a syllable is three, whereas the maximum number allowed at syllable-final position is four. In addition, syllables in English are allowed to start with a vowel. Syllable structures in general and consonant clusters, in particular, are thus regarded by Arabs as a challenging area to learn while learning English phonology.

1.2.6. Strategies

In his article, Paradis (1987) discusses the concept of repair strategies in the field of phonology and outlines the key characteristics of repair strategies, emphasizing their context-free nature, motivation, and their role in preserving phonological constraints. He defines them as operations that are used to correct or repair a violation of a phonological constraint. These constraints can be either universal (applicable across languages) or language-specific. The repair strategy is context-free, meaning it does not rely on the specific linguistic or phonological context. Instead,

it is triggered by the violation of a phonological constraint, and the context in which it is applied is determined by the nature of this constraint.

In his 1987 work, Singh argued that repair strategies are considered "motivated" due to their ability to provide a more efficient description, while also effectively explaining various phonological phenomena. They are not arbitrary rules but serve the purpose of preserving or satisfying phonological constraints. This motivation makes them more economically described in phonological analyses. Moreover, the concept of "functional sameness," as introduced by Kisseberth in 1970, implies that several phonological processes in a language can be seen as serving the same purpose or applying to satisfy the same constraint. This concept helps unify separate facts within a language by showing that different phonological processes can be related by their shared function of satisfying a particular constraint.

To be able to pronounce the words they are learning bilinguals incorporate strategies in their interlanguage stage to help them pronounce words correctly. The repair strategies explain the process by which the target lexical items or phonemes cannot be reached as it is in the source language, by the second language speaker as a result of interference. Thus, they make phonological adjustments that contribute to changes in the structure of the syllables. In this section, a brief description of these repair strategies will be provided as shown below.

- Vowel insertion: this happens when a vowel is inserted between two adjacent members of consonant clusters, but it may occur also by adding a vowel before the first consonant of a consonant cluster which is known as a prosthesis.
- Deletion: is to delete a consonant or several consonants from a cluster.
- Metathesis: is a strategy in which the positions of the phonemes are reversed or swapped.
- Substitution: to replace one sound with another.

1.3. Aims and justification of the study

This section explains the main aim of this research. It also points out the importance of studying the errors made by Arabs in English and the reasons behind them.

The purpose of this study is to examine the role of L1 transfer in the pronunciation errors of native Arabic speakers in English. Studying pronunciation errors requires data collection and categorization of these errors followed by contrastive and error analyses to recognize the errors triggered by L1 transfer, as well as to provide a comprehensive explanation of the underlying processes of the repair strategies that speakers tend to use relying on their dialects. Thus, this study seeks to answer the following research questions:

RQ1: How do various Jordanian Arabic dialects influence the pronunciation of English words containing three consonant clusters, and what are the specific phonological differences observed in these dialects?

RQ2: To what extent does the position (initial or final) of three-consonant clusters in English words affect their pronunciation by speakers of Jordanian Arabic dialects, and how does this influence vary across different dialects?

RQ3: What specific phonological features of the Jordanian Arabic rural (RD) dialect contribute to the higher error rates in pronouncing English words with three-consonant clusters when compared to the Jordanian Arabic urban (UD) dialect?

RQ4: What specific repair strategies are employed by Jordanian Arabic rural (RD) speakers when encountering difficulties in pronouncing English three-consonant clusters and how do these strategies align with their L1 patterns?

RQ5: To what extent does the use of L1-based repair strategies by RD speakers influence the overall intelligibility and comprehensibility of their English speech?

RQ6: How does the age of the English language acquisition (AoA) among Jordanian speakers influence the frequency and type of pronunciation errors observed when producing English three-consonant clusters?

RQ7: Is there empirical evidence to support the claim that multilingual Jordanian speakers exhibit fewer pronunciation errors in English consonant clusters compared to bilingual speakers, and if so, to what extent does this factor contribute to this difference?

RQ8: to what extent do gender-related factors significantly influence the frequency and type of pronunciation errors in English consonant clusters among Jordanian speakers?

- **Hypotheses**

The study was framed by three primary hypotheses as follows:

H1: Jordanian Arabic dialects affect the pronunciation of English words containing three consonant clusters in different ways and degrees.

H1a: Generally, Jordanian Arabic dialects affect the pronunciation of English words containing three-consonant clusters in initial positions more significantly than those in final positions do.

H1b: Jordanian Arabic rural dialect (RD) speakers commit more errors than Jordanian Arabic urban dialect (UD) speakers do when pronouncing English words containing three consonant clusters in both initial and final positions.

H2: Jordanian Arabic rural dialect (RD) speakers and Jordanian Arabic urban dialect (UD) speakers use repair strategies similar to their respective L1 patterns to overcome difficulties in pronouncing English three-consonant clusters.

H3: Multiple factors influence the number of pronunciation errors made by Jordanian speakers when producing English consonant clusters, which can be categorized into the age of acquisition, multilingualism, and gender.

H3a: The age of the English language acquisition (AoA) has a significant effect on the number of pronunciation errors in English consonant clusters and bilingual speakers who acquire English at a later age are more likely to exhibit pronunciation errors in English.

H3b: The number of languages a speaker is proficient in (multilingualism) is associated with the frequency of pronunciation errors in English consonant clusters, so I expect multilingual participants to make fewer pronunciation errors in English than bilingual participants due to their exposure to diverse linguistic structures and sounds.

H3c: Gender has a significant impact on the frequency of pronunciation errors of English among Jordanian speakers, and male speakers are expected to commit more English pronunciation errors than females do.

The findings of this research are clearly of interest to Arab teachers of English who intend to attend to their learners' vulnerabilities as efficient and adequate teaching techniques and procedures helping learners to overcome such problems will follow the discussion. Additionally, this analysis will shed light on the problematic areas in pronunciation to help learners avoid such errors and achieve better overall communicative skills. This study also targets linguists in the field of applied linguistics and psycholinguistics who are interested in the Arabic language and its various dialects. To the applied linguist, errors may reveal how language is acquired or perceived, including the strategies the learner is implementing to produce the language. On the other hand, psycholinguists anticipate that the nature of the mother tongue will either enhance or obstruct learning of particular aspects of L2. Analyzing errors will also offer course developers and language methodologists the data they need to develop a remedial TESL/ TEFL syllabus or workshops that deal with Arabs' distinctive problems with English pronunciation.

1.4. The backgrounds of the study

This section provides the linguistic and theoretical background for this study. The linguistic background covers information about the Arabic language in general and the dialects involved in the study, the Jordanian Arabic dialects (rural, urban) followed by the theoretical background

section which sheds light on the three theories of L2 acquisition used to analyze Arabic speakers' errors in English consonant clusters. These theories include Contrastive Analysis CA (Fries, 1945), Error Analysis EA (Corder, 1967), and Markedness Theory (Eckman, 1977).

1.4.1. Linguistic background

The linguistic background covers the Arabic language and its dialects referred to in the study. There is, then, a section about the effects and the role of English as a Lingua Franca (ELF) in the Jordanian context.

- **The Arabic language:**

Arabic is a South-Central Semitic language spoken by approximately 218 million speakers around the world. It is considered the mother tongue L1 of all the Arabian Peninsula countries, i.e. Bahrain, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine / Israel, Qatar, Saudi Arabia, Syria, the United Arab Emirates, and Yemen, as well as the Arab-African countries, i.e. Algeria, Djibouti, Egypt, Libya, Mauritania, Morocco, Somalia, Sudan, and Tunisia. These countries are commonly referred to as the Arab World solely since the majority of their population speaks Arabic as their L1. It is worth mentioning that, in some countries across Asia (e.g., Iran, Pakistan, India, and Indonesia) and Africa, Arabic is also spoken as a second language L2 (Huthaily, 2003).

Since the form of Arabic that is found in the Holy Qur'an is what is typically referred to as Classical Arabic, Arabs consider Classical Arabic to be the purest, ideal, and most magnificent form of Arabic. Nevertheless, schools, newspapers, and official interactions among educated Arabs from different regions have been using a modified modern, spoken version of the Classical Arabic dialect, known as Modern Standard Arabic MSA. MSA is considered a simpler version of Classical Arabic, in other words, since Classical Arabic in its original spoken form is limited to religious settings, Arabic speakers developed MSA as a sort of descendant spoken form of CA.

Each Arabic country is distinguished by its Arabic dialect, which may also vary within the same country from one region to another, while each one has its linguistic features. The fact that Arabic has such a substantial number of dialects that differ from MSA in their phonetics, phonology, syntax, semantics, and pragmatics, often leads to failure in communication even between speakers from the same country. Consequently, a great amount of research has investigated these dialects from several angles, especially the interference and transfer of their features with second languages (Huthaily, 2003). The phonetics and phonology of Jordanian Arabic dialects are going to be introduced, compared, and analyzed in the following subsections for the sake of this study.

- **An overview of Arabic dialects in general**

The Arabic language used throughout the Middle East and North Africa, one of the six official languages of the United Nations (United Nations, 2011), includes several dialects classified across geographical areas of the Arab world.

Even though there are political, borders that separate, countries from one another, dialects are not influenced by such geographic and political borders and therefore we find common dialects between two different countries. Levantine Arabic, for example, is used by the people of Jordan, Syria, Lebanon, the West Bank, and Israel. Gulf Arabic is used by the population of the Gulf States, including Saudi Arabia, Kuwait, the United Arab Emirates, Oman, Qatar, and Bahrain. Maghrebi Arabic is a dialect spoken by the people of Algeria, Morocco, Tunisia, and Libya. Egyptian Arabic is spoken by the people of Egypt and many other regions in Sudan.

- **Jordanian Arabic dialects**

Jordanian Arabic (JA) is a dialect that is part of Levantine Arabic; the latter is spoken in Jordan, Syria, the West Bank, Israel, and Lebanon. The term "Jordanian Arabic" is somewhat misleading given that it includes at least three distinct dialects that differ significantly in syntax, morphology, and phonology. These main sub-dialects spread across different geographical regions (Al-Sughayer, 1990; Sakarna, 1999; Al-Deaibes, 2015), and include urban Jordanian Arabic (UD), Bedouin Jordanian Arabic (BD), and rural Jordanian Arabic (RD) (Suleiman, 1985).

Urban Jordanian Arabic (UD), which is spoken primarily in the capital, Amman, and other large cities, is widely regarded as the main dialect and it is considered to serve as a lingua franca. This is mostly because it is used by people of higher social status and is commonly employed in formal and professional situations alongside (MSA).

Bedouin Jordanian Arabic (BD) is largely spoken by Jordan's Bedouin populations and is distinguished by unique linguistic features that reflect the traditional nomadic lifestyle. rural Jordanian Arabic (RD) is spoken in rural areas and small towns and exhibits distinct linguistic characteristics that distinguish it from both urban and Bedouin dialects. In Chapter 3, these dialects will be examined in detail, with a focus on their distinguishing characteristics and the sociolinguistic variables that affect their use.

- **The role of the English language in the Jordanian context**

As the need for English continues to grow, globalization has two main effects on Jordanian citizens. Firstly, in English, a dividing line has been established between the upper and lower classes that provide some type of social prestige. The second effect is that Western cultures increasingly and smoothly dominate the younger generation in Jordan, which causes conflicts

between the new and old generations because of the desire of younger people to escape their culture through being more exposed to the western media.

A Westerner can feel at home in Jordan's richest communities. The majority of Western embassies, including the American and British embassies, are in one of the richest neighborhoods. In these neighborhoods, most of the restaurants and other businesses commonly word their menus in English only. Similarly, in the malls and shops, everything is mainly written in English.

In Jordan, some Arab parents might even communicate in English with their kids in their daily lives rather than using Arabic. Since people from this social class have the financial resources to be educated in the best schools, in general, their English is significantly better than that of most Jordanians and they can show their class by speaking and using English daily. Overall, this forms a Jordanian attitude that English is a sign of wealth and prestige.

For many Jordanians, immigration has become a huge desire. As they learn more about foreign cultures and views, they feel completely detached from the culture around them. Jordanians are not just trying to learn English to improve their job prospects or to communicate in general, but they are also trying to escape their culture as a trap. English opens doors to a new culture and international exploration opportunities.

Consonant clusters in Arabic have always been the topic of different studies by Arab and non-Arab researchers such as Greenberg (1950), Malick (1956), Herdan (1962), Al-Ani (1970), and Abu-Salim (1987). The reason behind this interest could be the variations of the phonological constraints in MSA and other different Arabic dialects that may permit consonant clusters in some varieties but not in others even if the dialects are spoken in the same country. In the Jordanian context, many researchers analyzing different Jordanian dialects addressed the consonant cluster issue; for instance, Al-Sughayer (1990) examined and compared Jordanian Arabic and Modern Standard Arabic initial, medial, and final clusters. El-Badarin and Bani Yasin (1993) conducted a descriptive analysis of the permitted and existing consonant clusters in the initial, medial, and final positions in a Northern Jordanian dialect. AbuAbbas (2003) provided a list of permitted syllable structures in Ajluni Arabic, a dialect of Jordanian Arabic. Btoosh (2006) used the Optimality Theory framework to offer a constraint-based analysis of Jordanian Arabic phonotactics, specifically Karaki Arabic. Abu-Rakhieh (2009) noted in his study that Ma'ani Arabic, another type of Jordanian Arabic, does permit initial consonant clusters caused by the deletion of the low short vowel in an open syllable. He stated that Ma’ani Arabic permits clusters in coda position as long as they obey the Sonority Scale Principle (SSP).

1.4.2. Theoretical background

The present study is an analysis of the pronunciation errors made by Arabic speakers of English as an L2 following three theories of second language acquisition: Contrastive Analysis CA (Fries, 1945), Error Analysis EA (Corder, 1967), and Markedness Theory (MT) (Eckman, 1977).

CA hypothesis explains the major problems of L2 acquisition according to the linguistic distance between L1 and L2, in other words, it is concerned with the similarities and differences between the two languages. It suggests that similar or close features between L1 and L2 are easier to acquire as opposed to those that are different and far ones. Accordingly, errors committed by L2 speakers are the result of negative transfer.

EA claims that L2 learners' errors can be explained by making a comparison between the learner's interlanguage with the L2 norm. It discusses both the interlingual (L1 negative transfer) and intralingual errors, where the latter are not caused by L1 negative transfer but by some other factors to be discussed in the following chapter.

Markedness theory combines contrastive analysis and typological markedness, where the former explains L2 speakers' difficulties and the latter explains the degree (levels) of these difficulties. The markedness differential hypothesis MDH illustrates that L2 features or structures that are both different and more marked than corresponding L1 structures will lead to learning difficulties. Unmarked structures are structures that are considered easier to acquire and need less time to learn than the marked ones. These theories are discussed in detail in Chapter 2: Theories of Second Language Acquisition.

1.5. Methodology

As mentioned previously, the purpose of this study is to examine interlingual errors (due to L1 interference) in English consonant cluster pronunciation that Arab Jordanian speakers may experience as non-native English users. To achieve this goal, the researcher collected data from 28 Jordanian speakers of English, 14 of which were selected from Amman city to represent the urban dialect, and the other 14 were from the city of Al-Ramtha to represent the rural dialect. The researcher asked each participant to read a list of words that each contained three consonant clusters in word-initial and word-final positions and recorded their pronunciation. These recordings in addition to the participants' answers to the linguistic background questionnaire (LBQ) constitute the data for this study. Then statistics and linguistic analysis were used to analyze this data, where the reasons behind the Jordanian speakers' errors in pronouncing words containing consonant clusters in English were explained through the linguistic analysis. On the

other hand, the frequency of these errors is explained by statistical analysis, which illustrates the relationship between the errors, the participants' L1 dialect, the position of the three-consonant cluster in the word, and finally the participants' linguistic background.

1.6. Chapters summary

In this chapter, the key terminologies of the research were defined, including mistake, error, contrastive analysis, error analysis, interference, and interlanguage. The aims and purposes of the present study were summarized. Since this study is an analysis of English pronunciation errors among Jordanian Arabic speakers regarding three consonant clusters in initial and final positions, the aim is to find out about these errors and the reasons behind them, and finally to propose some teaching suggestions. Finally, this chapter introduced the background and the place of this research in linguistics, how it contributes to the field of L2 phonology acquisition, and its justification considered as a solid base for teaching English pronunciation to Arabic speakers.

The second chapter explains three theories of second language acquisition that are related to this study. These theories include Contrastive Analysis CA (Fries, 1945), Error Analysis EA (Corder, 1967), and Markedness Theory (Eckman, 1977), the present study is an analysis of the pronunciation errors committed by Arabic speakers of English as L2 following three theories of second language acquisition: Contrastive Analysis CA (Fries, 1945), Error Analysis EA (Corder, 1967) and Markedness Theory (Eckman, 1977).

The third chapter explains the sound systems (consonants, consonant clusters, and vowels) and syllable structure rules in both English and MSA, as well as the sound systems of MSA and the Jordanian dialects. It also presents a comparison between them and elucidates their implications for L2 English sound production. This chapter encompasses a contrastive analysis that introduces and compares the sound systems of English, Modern Standard Arabic (consonants, consonant clusters, and vowels), and syllable structure rules, along with the Jordanian Arabic dialects, namely: urban (UD), rural (RD), and Bedouin (BD). Note that the urban dialect is considered a typical representative of Jordanian urban dialects, while rural is considered a typical example of Jordanian rural dialects. Furthermore, as this study focuses on Jordanian UD and RD, and both the researcher and previous research have limited background knowledge regarding the Jordanian Bedouin dialect, discussion of this dialect will be limited to only mentioning and listing whatever can be accessed in the literature. Hence, since the urban dialect in general was discussed thoroughly in the literature, a more detailed description of the

rural dialect is provided to facilitate further research on English pronunciation errors related to consonant clusters, as identified by RD speakers, due to L1 interference.

The fourth chapter introduces the methods applied in this research. Twenty-eight Jordanian Arabic participants, whose L1 is Arabic and L2 is English, are selected from two Jordanian regions (rural and urban). The participants were assigned two production tests. The first test was made up of a word list containing 20 words while the second one included 20 sentences selected based on Arabic and English sounds, syllable structure rules, and the expected areas of L1 transfer. Finally, the chapter covers the linguistic background, the Arabic language, the dialects of the study, Jordanian Arabic dialects, and the role of the English language in the Jordanian context.

Chapter five Results and Analysis introduces the study and the methods used, and it provides data about the participants' linguistic background categorizing them into two groups according to their region and spoken dialects (AD, RD), it also presents the participant errors in English three consonantal clusters in initial and final positions and the reasons behind them. Furthermore, it shows the differences in the performance of UD and RD participants in the given tests. It includes five subsections: the first of these shows the results of the production test as the participants' errors in English three Consonant clusters in the initial position and the reasons behind them. The second highlights the participants' errors in English in three consonantal clusters in the initial position and the reasons behind them followed by the repair strategies used and the reasons behind them. The fourth section describes the acoustic analysis to provide an acoustic representation of the committed errors and to compare the performance of the two groups. Finally, the fifth section discusses the statistical analysis used to show the significance of the findings and to test the study hypotheses.

CHAPTER TWO: THEORIES OF SECOND LANGUAGE ACQUISITION

Several theories of second language acquisition have been developed in linguistics over the last three decades to offer justifications for how second language acquisition occurs, to explain the variables that are affecting second language acquisition, as well as provide recommendations to second language teachers. Each theory explores language acquisition from a particular angle, focusing on one and only one aspect of the language development process. As a result, no single explanation of L2 acquisition has yet gained significant acceptance among scholars.

This chapter begins by explaining some L2 acquisition theories, including an overview of each theory and its impact on SLA research. These theories are Contrastive Analysis CA (Fries, 1945), Error Analysis EA (Corder, 1967), Markedness Theory (Eckman, 1977). After that, based on these L2 theories, it offers some predictions for this analysis. The following theories primarily concentrate on L2 phonology, which is more relevant to the present study.

2.1. Contrastive analysis

Numerous studies compare English and Arabic sound systems, where the English language which is considered to be a lingua franca and a universal means of communication has a significant importance among Arabs. On the other hand, the fact that the Arabic language is becoming increasingly important for religious, economical economic and many other purposes continuously increases the number of foreigners who are willing to learn it. Therefore, providing a proper comparison between the phonologies of the two languages will enable learners to master these languages better and more easily.

In his study, Huthaily (2003) examines the phonological challenges encountered by adult native American English speakers when learning Modern Standard Arabic as a foreign language. The study emphasizes identifying Arabic and English segmental phonemes as well as studying the Arabic speech of three American Arabic students, to track LI transfer. The research also examines to what extent the Contrastive Analysis Hypothesis CAH may assist in predicting the pronunciation errors that American students of Arabic are expected to produce in their Arabic speech output.

Ashour (2017) presents a contrastive analysis between Arabic and English pronunciation systems and his study reveals the most problematic issues Arabs experience while speaking English. Based on the assumption that English has a pronunciation system that differs from Arabic, it is observed that English is a stress-timed language whereas Arabic is a language that is syllable-timed. This major distinctive feature affects English stress production for Arab

learners. Additionally, Arabs face difficulties in distinguishing between some consonant sounds such as/p/ and /b/. It is also found that Arabs face difficulty in pronouncing words of English that contain consonant clusters.

Hamad (2014) tries to provide primary sources for learners in the field of Arabic and English phonology to help promote their learning of English and Arabic as a foreign or second language. The study presents learners with the major differences and rules of the sound systems of English and Arabic that the researcher compiled while teaching English to Arabic speakers.

Javed (2013) aims to investigate the major differences and similarities between the sound systems of English and Arabic. To provide Arab EFL/ESL learners or English native speakers learning Arabic as a foreign or second language with a background in both languages' sound systems to help them achieve better pronunciation. Furthermore, it provides solid data about the classification of consonants and the description of both consonants and vowels.

2.1.1. What is the contrastive analysis hypothesis CAH?

In "Linguistics across Cultures" in 1957, Lado began drawing the attention of linguists to the contrastive analysis. However, it was not until the 1960s and 1970s that significant attempts were implemented to explore the difficulties caused by differences in the native language and the target language. Lado defines CAH as a systematic comparison between the L1 system and culture and the L2 system and culture. According to Fisiak, Lipinska, and Zabrocki, (1978), Contrastive Analysis CA is described as a linguistic subfield that focuses on analyzing two or more languages or subsystems of languages to identify both the differences and similarities. On the other hand, Gass and Selinker (2008, p. 96) define contrastive analysis as "a way of comparing languages to determine potential errors for the ultimate purpose of isolating what needs to be learned and what does not need to be learned in a second- language-learning situation."

The abovementioned definitions could imply that linguists who formulated them assumed the areas of similarities would be beneficial and enable the learner to more easily acquire or learn the target language. On the other hand, the areas of differences are believed to be the challenging ones. CA's primary concern, consequently, is to predict areas of difficulty to guide second language learners to avoid errors. Zemmermann (2004) conducted minimal pair lists using /b/ and / p/, which provides a good example of this.

Furthermore, Crystal (1997, p. 90) defined contrastive analysis as follows:

"The phrase contrastive analysis CA identifies a general approach to the investigation of language, particularly as carried out in certain areas of applied linguistics, such as foreign-language teaching and translation. In a contrastive analysis of two languages, the points of

structural difference are identified, and these are then studied as areas of potential difficulty (interference or 'negative transfer') in foreign-language learning."

Most findings in SLA confirm that contrastive analysis is indeed a fundamental tool in transferring findings, especially when augmented by comparisons of participants from different linguistic backgrounds (Ellis 1994).

2.1.2. How to apply the contrastive analysis hypothesis?

CAH assumes that bilinguals are often controlled by their first language, and they tend to apply their L1 linguistic knowledge in their second language. As they do, the patterns and structures of their L1 would automatically transfer to their L2.

According to Lado (1957), CA goes through four stages, namely:

- Description: to give a general description of the languages under study.
- Selection: select the area and forms (rules, structures) for contrast.
- Compare and Contrast: to find out similarities and differences between the two systems.
- Prediction based on the analysis.

2.1.3. Pedagogical implications of CAH

By finding the similarities and differences, contrastive analysis could predict and describe the patterns that will cause difficulty in L2 learning and those that will enhance the L2 learning process. Also, by highlighting first-language interference effects on the second-language learning process, it predicts the potential errors as well as suggests solutions for such problems.

2.1.4. Criticism of contrastive analysis

Although Contrastive Analysis CA initially showed promise in helping second-language learners it ultimately failed to meet linguists' expectations by not effectively identifying all potential sources of errors. One of the main limitations of CA is its theoretical nature, lacking immediate applicability in the classroom setting. Sanders (1976) argued that Contrastive Analysis's results were impractical in the classroom, as using its results directly in the classroom is comparable to presenting a customer in a restaurant with raw ingredients and a recipe. This emphasized the lack of immediate applicability in an educational context.

Contrastive Analysis (CA) consists of a few different versions categorized based on their level of predictability: strict, moderate, and weak. According to Wardhaugh (1970), the strong version of the Contrastive Analysis Hypothesis (CAH) can be defined as the one that asserts the capacity to anticipate difficulty by applying contrastive analysis. It is assumed that the two languages can be compared in advance to anticipate difficulties in learning. According to Wardhaugh (1970, p. 126), contrastive analysis is compelling due to its intuitive nature. Teachers and linguists have effectively utilized the most advanced linguistic knowledge to

explain the challenges found in learning a second language. He described this method of using contrastive analysis for observation as a less strict or weak version of CAH. In this context, the focus changes from the ability to predict difficulties based on relative factors to the ability to explain errors that are observed. The last version has developed into Error Analysis (EA). CAH is a theoretical framework or hypothesis, whereas EA is an assessment or evaluation tool. The weak version emphasizes the subsequent explanation of the causes of errors in language learning rather than the former prediction of linguistic challenges.

The weak version, in contrast to the predictive rigid version, embraces a more adaptable approach. In contrast to the strict version, the weak version does not primarily rely on prediction but can also represent observable errors with no reliance on predicting them. The first version was strictly predictive; yet, this weak version offers a more flexible and thorough explanation for linguistic errors.

Oller and Ziahosseiny (1970) introduced a moderate version of CAH. They discovered that the strong variant is excessively powerful, whereas the weaker version is inadequately efficient. The researchers concentrated on the basic concept of human learning and put forward the moderate version, which can be summed up as follows: The process of learning is based on categorizing abstract and concrete patterns based on their perceived similarities and differences. Thus, when patterns are only slightly different in form or meaning in one or more systems, it can lead to confusion" (p. 186).

The popularity of contrastive analysis has significantly declined due to criticism and the emergence of newly discovered evidence against the theory of the Contrastive Analysis Hypothesis (CAH), leading to a shift from the strong version to the moderate version. Nevertheless, certain scholars persist in evaluating the advantages and disadvantages of CAH.

The strict version of CA relies on predictions and encounters certain challenges. In contrast, the weak version primarily emphasizes the description and analysis of observable errors. This approach offers a greater degree of adaptability, comprehensiveness, and reliance on scientific evidence to comprehend and address errors committed by second language learners.

Despite the criticisms, the weak version of CA offers several advantages:

1. **Empirical Accuracy**:

The weak version is empirically accurate because it is based on learners' actual performance. Analyzing errors as they appear provides real-time insights into learner difficulties, allowing for immediate and context-specific interventions.

2. **Adaptability**:

The need to predict all errors does not constrain this version. Instead, it adapts to the actual learning process, which is often more complex and less predictable than theoretical models suggest. This adaptability makes it a more realistic tool for teachers and linguists.

3. **Comprehensive Error Analysis**:

The weak version encompasses a broader range of errors, including those not directly attributable to L1 transfer. This comprehensive approach is crucial because many errors in L2 learning arise from factors such as overgeneralization, developmental stages, and individual learner differences.

4. **Integration with Other Approaches**:

The weak version allows for integration with other linguistic theories and approaches, such as error analysis (EA), because it is not solely predictive. This integration provides a richer and more multifaceted understanding of learner errors and the overall process of language acquisition.

5. **Practical teaching applications:**

For educators, the weak version offers practical benefits. It supports the development of responsive teaching strategies that can address learners' needs as they arise, rather than relying on potentially inaccurate predictions. This responsiveness can lead to more effective language instruction and improved learner outcomes.

The strict version of CA is based on predictions and has some problems. The weak version, on the other hand, focuses on describing and analyzing errors that can be seen. This is a more flexible, all-encompassing, and empirically-based way to understand and fix errors made by second language learners.

2.2. First language interference and transfer

The role of first language L1 transfer has an extensive record in the area of second language acquisition (SLA) as researchers and linguists have been arguing the issue of transfer in SLA for many years. It is believed that during the process of acquisition or learning a second language, they are often controlled by their first language, the patterns and structures of the first language would be automatically transferred to the target language and according to the phonological structures, this transfer will lead to new accents which seems to be similar to the students' native language accents or dialects. (Lado, 1957) and (Gass and Selinker, 2008).

A general definition of first language transfer was introduced in his book 'Linguistics across cultures' Lado (1957, p. 2), where he stated clearly that:

> "Individuals tend to transfer the forms and meanings, and the distribution of forms and meanings of their native language and culture – both productively when attempting to speak the language and to act in the culture, and receptively when attempting to grasp and understand the language and the culture as practiced by natives."

In addition, according to Faerch and Kasper (1987), transfer is defined as a psycholinguistic process in which L2 speakers employ their existing linguistic knowledge to generate or use their interlanguage. Mahmoud (2010, p. 127) contributes by adding, "transfer may be used as a learning strategy to formulate hypotheses about the target language and as a communication strategy to test these hypotheses."

It can be concluded that the native tongue is often the only source of information a bilingual can use to form a sentence or pronounce a word or even one sound. Therefore, it is a key issue to show the factors why learners switch to the first language in general and why they use it for pronunciation in particular.

2.2.1. Factors affecting L1 interference

Many factors cause first-language interference while acquiring a second language, such as the similarities and differences in the structures of the two languages, the background knowledge of the learner, the proficiency of learners in second languages, and the syllable structures in L1 and L2 which are mentioned by James (1980, p. 146) as follows:

(a) Amount and nature of L2 input: Interference occurs when the L2 input is extremely limited in both 'quantity' and 'scope'. This phenomenon can be manifested especially when L2 is learned in an L1 environment (schools).

(b) Linguistic distance between L1 and L2: Related linguistic systems induce the interference phenomenon to manifest itself. Hence, since the two languages are different, L2 learners tend to translate the features from L1 into L2.

(c) L2 learning stage: Taylor (1975) pointed out that interference phenomena are more frequent among beginners than among advanced learners during the L2 learning process.

(e) Task focus: Interference is common among L2 learners if the focus of L2 is on grammatical forms rather than on 'communicative effectiveness'.

The interaction of languages in the bilingual brain has a continual impact, either positive or negative, influenced by various factors. Among these factors, the linguistic distance between the languages plays a significant role in determining the level of difficulty in acquiring them. Additionally, the native language often serves as the primary source of information for learners, aiding in the construction of sentences, pronunciation of words, and production of sounds. Thus, to show the similarities and differences between the phonologies of MSA and RP as well as to

explore the problems caused by such differences in the L1 and the L2, a contrastive analysis between the sound systems of the languages should be conducted.

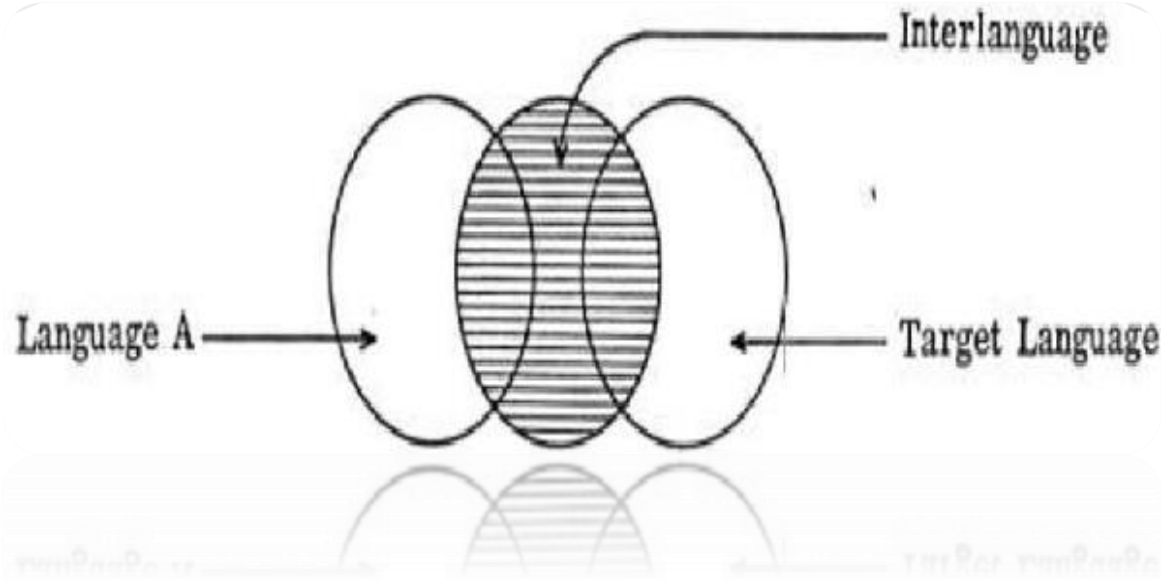
2.3. Error analysis

The criticism pointed at the CA earlier would not in any manner lead us to doubt its value to the improvement of language teaching or linguistics. It was the first leap towards correcting errors. An error analysis EA was therefore another integrative step in the approach to repairing errors.

Dissimilarly to CA, Liggett (1983, p. 34) defines EA as "… the study of learner mistakes…, it starts from the demonstrated student errors." This interpretation affirms that it is more of an analysis of the learner's errors than a mere comparison of two languages without considering the situation of the learner as a significant variable. Gass and Selinker (2008, p. 102) highlight this very same idea to add that EA is a "type of linguistic analysis that focuses on the errors learners make. Unlike contrastive analysis (in either its weak or strong form), the comparison made is between the errors a learner makes in producing the TL and that TL itself." In this case, we examine the errors, as if they were made by a learner, not because we are attempting to predict that learners will commit such errors in the future, as is the situation in CA.

Through their learning process, from native language NL to target language TL, learners seek to hypothesize the target rules, thereby falling into an approximate language structure that is neither the L1 nor the L2. This structure is referred to as interlanguage, (Richards, 1974). These kinds of assumptions are reliant on L1 and lead to errors resulting from first-language transfer. These errors differ significantly according to distinct variables from one learner to another, such as "…learning strategies, different training procedures, individual differences of teachers, textbooks…" (Jain, 1974, p. 189). This interlanguage stage is temporary until the learner enhances his performance that is eventually centered on his improved TL skills. Figure (1) demonstrates the Interlanguage structure adapted from (Corder, 1971)

Figure 1. Interlanguage. Adapted from (Corder, 1971)



Errors have been described as a source of shame for the learner where the good learner is the one who commits no errors. The perception of errors had changed after publishing, "Corder's article entitled "The significance of Learner Errors" (1967) that EA took a new turn." (AbiSamra, 2003). Since then, linguistics has begun to look at errors differently. Gass and Selinker (2008, p. 102) claim that "Errors can be taken as red flags; they provide windows onto a system that is, evidence of the state of a learner's knowledge of the L2." They even continue to defend errors stating that "they are not a reflection of faulty imitation," but "they are to be viewed as indications of a learner's attempt to figure out some system," as demonstrated in Figure (1), most of the errors occur in the interlanguage zone. Gass and Selinker (2008) also stress that errors are indispensable, as they can be seen as a mechanism learners employ to facilitate learning.

Corder (1974) emphasized the importance of Error Analysis EA, asserting that through the systematic examination of language learner errors, instructors can identify and prioritize areas in need of additional reinforcement during teaching. Whereas Liggett (1983, p. 34) adds, "Error analysis equips teachers to deal with what the experts refer to as interlanguage or approximative systems".

It is also worth noting that errors are divided into 2 main categories: (1) Performance errors, which are "those that a student makes because he is tired or nervous". (2) Competency errors, which are "those he makes because he does not know how to apply the grammar rules he is learning" (Liggett, 1983, p. 34).

2.3.1. Aims of error analysis

Several claims clarify what EA is concerned with: Nickel (1972) in German; Lange (1974) in French; and Corder (1973), Svartik (1973), Richards and Sampson (1974), and Schumann and Stenson (1975) in English (Khalifa, 2020). While CA is only focused on the cases of interlingual transfer, EA is engaged with both inter- and intralingual errors. The aims of the error analysis hypothesis are many and vary from the practical to the theoretical Hammarberg (1979, p. 108). Rossipal (1972, p. 110) suggests that EA might offer valuable data within the following areas:

- Contrastive language description, prediction of potential interference
- Improving the description of the target language
- Describing general traits of linguistic errors
- Describing linguistic universals
- Improving language teaching.

2.3.2. The process of error analysis

About second language learning, there are three basic steps to realize the main learning challenges of groups of second language speakers (Corder, 1975):

a) Classification of errors;

b) Evaluation of errors;

c) Explanation of errors.

This is aligned with James (1998, p. 5) who suggests that EA ‘‘involves first independently or ‘objectively’ describing learners’ IL […] and the TL itself, followed by a comparison of the two, to locate mismatches”.

2.3.3. Classification of errors

Traditionally, errors were classified into four categories:

- Errors of deletion
- Errors of addition.
- Errors of substitution.
- Errors of reordering/ metathesis.

Khalifa (2020, p. 42) suggests that such a classification is far from sufficient due to the following reasons:

- The items omitted added, etc. need to be assigned to more general classes: prepositions, tense forms, questions, and so on, to be of benefit to the learner and to explain difficulties.
- It depends on our interpretation whether we regard an error as being one of e.g. omission or substitution. For example, *Dog *is a faithful animal* can be classified under

omission of the definite article: *The dog is a faithful animal* or substitution of singular nouns for plural: *Dogs are faithful animals.*

Corder (1981, p. 36) describes this classification, as follows:

- This superficial classification of errors is only a starting point for a systematic analysis. It is only evidence or data for an analysis.
- It is usual for teachers to go a bit further in their classification.
- They will usually state at what linguistic level the error has been committed.
- A more adequate classification of errors, then, involves assigning them to various levels of linguistic description, i.e., phonological (both speaking and listening), orthographic (spelling and punctuation), syntactic (grammatical), lexico-semantic (choice of vocabulary), and situational or socio-linguistic (appropriacy).
- These levels, in turn, can be sub-classified as systems, e.g., vowel or consonant systems, tense, aspect, number, gender, or case.

While most current classifications refer to errors as violations of grammatical or phonological rules, the current study adapts one focusing on the description of different linguistic levels (phonology). The segmental errors of the Jordanian speakers are classified as errors in English syllable structure and consonant clusters.

2.3.4. Evaluation of errors

There are several linguistic approaches to the evaluation of errors (Khalifa, 2020):

a) James (1974) evaluates to what extent an error differs from the correct TL by counting the frequency and pattern of rules violated.

b) Burt and Kiparsky (1975) suggest a differentiation between two types of errors: global and local.

• Global errors are violations in the overall structure of a sentence.

• Local errors are violations in the structure of constituents of simple sentences and subordinate clauses.

This study evaluates the participants' English consonant cluster errors following James (1974) with a major focus on L1 interference. It is also following Burt and Kiparsky (1975) concerning 'local errors' only, by investigating the Jordanian Arabic speakers' phonological violations regarding English syllable structure focusing on consonant clusters.

2.3.5. Explanation of errors

Richards, J. C. (1971) introduced three major reasons for errors:

• Interlingual causes of error

• Intralingual causes of error

• Faulty teaching techniques or materials

This is in line with Eckman's (2008) statement that "it has been recognized since the early days of Error Analysis (Schachter, 1974) that learners' errors are not the only measure of difficulty, and at times may not even be the most reliable measure." The above-mentioned reasons have been mentioned in Chapter 1. The present study investigates the interlingual factors in detail and the intralingual factors briefly

2.3.6. Models of error analysis

On the one hand, Nickel (1972, p. 11) states that to investigate errors, three major aspects should be taken into account:

a) Description

b) Grading

c) Therapy

On the other hand, Rossipal (1972, p. 109) produced another model of error analysis, as follows:

a) Types of errors

b) Frequency of errors; points of difficulty in the target language

d) Cause of errors

e) Degree of disturbance caused by errors

f) Therapy

In my view, however comprehensive these models may be, they miss a further step: checking the effectiveness of the therapy. This can be done by having a regular reanalysis of learners' errors and a reassessment of the remedial measures. Without this step, the learner will be like a patient given medication without being followed up.

The present study employs Rossipal's model in a different process, as introduced and adapted by Khalifa (2020), analyzing areas of difficulty in the L2 (English) caused by L1 (Arabic) interference and ignoring the extent of disturbance (error gravity) induced by the errors.

Considering Rossipal's model, Khalifa (2020, p. 45) suggested that Arabic speakers' errors in English pronunciation can be analyzed by:

(a) Diagnosing areas and types of English segmental errors among Arabic speakers.

(b) Studying the frequency of the Arabic speakers' interlingual errors.

(c) Finding out the reasons for these errors.

(d) Suggest some teaching recommendations for overcoming these errors.

2.3.7. Criticism of error analysis

Several researchers have criticized error analysis: for instance, Bell (1974, p. 35) introduces his criticism by stating that EA is not more than "a recent pseudo-procedure in applied linguistics". Where he describes EA data as simply poor statistical inference, errors are typically subjectively interpreted, and it lacks predictive power. In his perspective, Schachter (1974), EA does not take into account the avoidance strategy, which states that speakers try all the time to limit the use of particular language items either because they do not know it or because they know if they used it, they would commit errors. Furthermore, Dulay et al (1982, pp. 141-143) criticized EA by stating that 'EA confuses explanatory and descriptive aspects, in other words, the process and the product; and also, that error categories lack precision and specificity'. In his book, Khalifa (2020) quoted from Larson-Freeman and Long (1991, p. 61) that "Error Analysis as a mode of inquiry was limited in its scope and concentrated on what learners did wrong rather than on what made them successful". Lastly, Cook (1993, p. 2) addresses EA as just a "methodology for dealing with data" instead of a theory that helps to explain the second-language acquisition processes.

Nonetheless, even with all the critiques, EA has still been extensively applied, since it has proven to offer a successful strategy for handling the errors of second-language speakers.

2.4. Markedness theory

2.4.1. Definition of markedness

According to Eckman (2008), markedness theory discusses the role of typological markedness in interpreting findings concerning L2 phonology, considering both first-language transfers and language universals (Zampini, 2008). According to Major (2008), markedness universals tackle the frequency and probability of occurrences of phenomena.

Khalifa (2020) – following Chomsky and Halle (1968), Hyman (1975), Greenberg (1978), Hawkins (1984), and Carr (1993) – defined markedness, Major's (2008) definition for instance, employs 'implicational hierarchies: *x* is more marked than *y* if the presence of *x* implies the presence of y but not vice versa'. Similarly, markedness is defined by Eckman (1987, p. 60), as "a phenomenon A in some language is considered to be more marked than a phenomenon B if the presence of A in a language implies the presence of B, but the presence of B does not imply the presence of A".

Eckman (2008, p. 96) introduced the principle of markedness, which proposes that binary oppositions between specific linguistic representations, such as "voiced and voiceless obstruents, nasalized and oral vowels, and open and closed syllables", are not merely viewed

as opposites. Rather, one member of the opposition was assumed to be privileged in that it had a wider distribution, both within a given language and across languages. The member of the opposition, which was more widely distributed than the other, was designated as unmarked, including that it was, in some definable way, simpler, more basic, and more natural than the other member of the opposition, which was in turn defined as the marked member.

Linguistic research has proved that typological markedness can be applied to all types of linguistic expressions, including phonological, lexical, morphological, and syntactic structures (Khalifa, 2020). This part highlights the role of markedness in second-language phonology, especially Eckman's (2008) claim that marked features are much harder to learn than unmarked ones.

2.4.2. Markedness hypotheses

As mentioned earlier in the criticism of CA, predicting and analyzing the areas which L2 learners find difficult during learning L2 phonology, is far more complex than a contrastive analysis of the first and second languages (Zampini, 2008). In that concern, Eckman (1977, 1991) formulated two hypotheses related to L2 phonology applying the idea of typological markedness,

A. Markedness Differential Hypothesis MDH (Eckman, 1977)
B. Structural Conformity Hypothesis SCH (Eckman, 1991)

2.4.3. Markedness Differential Hypothesis MDH

Eckman (1977) reformulated Lado's (1957) Contrastive Analysis Hypothesis CAH by introducing the concept of typological markedness into CAH and referred to it as Markedness Differential Hypothesis MDH. As a result, apart from the CAH, which suggests that distinct L2 sounds would be hard to learn, the MDH assumes that dissimilar sounds are simply hard to learn once they are typologically marked; if these sounds are not typologically marked, they should not cause learning problems. In other words, the more marked a sound, the harder it will be to acquire or learn (Khalifa, 2020).

Eckman (1977, p. 321) introduced the Markedness Differential Hypothesis MDH with the following propositions:

(a) Difficulty in language learning can be anticipated in areas of the target language that deviate from the native language and are more marked than their counterparts are in the native language.

(b) The level of difficulty in areas of the target language that is more marked than in the native language corresponds to the degree of markedness.

(c) Areas of the target language that differ from the native language but are not more marked than their native language counterparts are not expected to pose difficulty for language learners.

According to Khalifa (2020), the MDH indicates that (a) marked L2 patterns are harder to learn than unmarked counterparts, (b) marked L2 patterns that are less marked than L1 patterns are not hard to learn, as well as (c) marked L1 patterns are much less prone to be transferred to L2 than unmarked ones.

The above demonstrates that not every L1-L2 difference would result in similar L2 learning difficulties (Eckman, 2008). Based on the MDH, marked patterns are often harder to acquire than unmarked patterns within the areas of contrast between L1 and L2 (Khalifa, 2020). In the criticism of MDH and its typological markedness approach, Eckman (2008, p. 100) states that

> "the methodological issues that have confronted the MDH in the literature on L2 phonology stem from the fact that the MDH is completely programmatic with the Contrastive Analysis Hypothesis CAH in two important respects. First, both the MDH and the CAH make claims about L2 learning difficulty, and second, both hypotheses base their claims about such difficulty, at least in part, on the areas of difference between the NL and TL".

Khalifa (2020) identified two primary challenges associated with the Markedness Differential Hypothesis MDH. Firstly, there was a question regarding how one could effectively measure learning difficulties. Secondly, as noted by Eckman (2008) certain error patterns observed aligned with markedness principles, yet these errors did not occur in areas where differences existed between the Native Language NL and Target Language TL. While these error patterns seemed to align with the underlying principle of MDH, where more marked structures led to more errors compared to less marked structures, the strict interpretation of MDH prevented it from offering specific predictions in such cases.

Considering the first problem, Khalifa (2020) points out that, the vast majority of L2 phonology research has evaluated difficulty in terms of learner errors; the more errors committed in a structure, the more problematic that structure is interpreted to be. Learner errors, on the other hand, are not really the only, nor the most reliable predictors of difficulty (Schachter, 1974). As a result, Major and Kim's (1996) Similarity Differential Rate Hypothesis tackled this problem by considering the rate of acquisition instead of just difficulty, as a more accurate measurement of learning. As a result, Eckman (2008) proposed an alternative hypothesis, the Structural Conformity Hypothesis SCH, to overcome the first and second problems regarding MDH.

2.4.4. Structural Conformity Hypothesis SCH

Eckman (2008) argues that the Structural Conformity Hypothesis SCH addresses the limitations of the Markedness Differential Hypothesis MDH in two key ways. Firstly, it shifts its focus from predicting learning difficulty to making predictions about the structure of interlanguage grammar. Secondly, it broadens the scope of the hypothesis beyond areas of difference between the Native Language NL and the Target Language TL. The SCH asserts that interlanguage grammars will adhere to the same universal generalizations as primary languages.

In this regard Eckman, (1991, p. 24) stated that in The Structural Conformity Hypothesis SCH: "The universal generalizations that hold for primary languages also hold for interlanguages".

In this regard, Khalifa (2020) added that the greatest piece of evidence proposed supporting the SCH is an interlanguage pattern that is neither NL-like nor TL-like, yet still follows universal patterns present in other languages in the world. Furthermore, he offered examples of this evidence, as in their studies Eckman (1991), Carlisle (1997, 1998), and Eckman and Iverson (1994) investigated the case of consonant clusters in onsets or codas, in which the TL allows both more clusters and more marked clusters than the NL. According to Eckman (2008), these investigations had one thing in common: the IL grammars in each case had cluster types that were more complex than all those permitted by the NL but not as complex as those needed for the TL production. In this regard, the IL structures lay somewhere in between NL and the TL, but still in line with the applicable universal generalizations.

2.4.5. Criticism of markedness theory

According to Khalifa (2020), the Strong Contrastive Hypothesis (SCH) has been used to account for several L2 phonological phenomena. However, other scholars in Second Language Acquisition (SLA) argue that markedness, particularly the SCH, is not a reliable explanatory framework. These two key arguments provide evidence to support this point of view.

The first argument is that markedness is a complicated concept that requires additional explanation and does not simply offer an adequate explanatory framework. According to Archibald (1998), markedness is not clearly defined and lacks empirical support, which makes it challenging to apply across different linguistic contexts consistently. Eckman (2008) argues that markedness theory seeks to categorize phonological features into two categories: marked (less common and more complex) and unmarked (more common and simpler). However, these categories might be vague and depend on the context. For instance, what is recognized as marked in one language may not be recognized as marked in another language, which makes it challenging to apply the idea to different languages and learners.

The second argument is that employing typological universals as explanatory principles leads to further questions rather than providing answers. Gass and Selinker (2001) argue that typological universals, which attempt to describe general patterns observed across many languages, may have limited ability to explain when applied to specific contexts of second language acquisition. Eckman (2008) further elaborates on this by emphasizing that these universal principles frequently fail to account for individual learner differences and different learning environments. The diversity in learners' experiences and the impact of their native languages suggest that markedness and typological universals may not consistently predict or clarify all aspects of second-language phonological acquisition.

Eckman (2008) also questions the empirical basis of markedness theory, highlighting the frequent lack of consistency in the supporting findings. Research has yielded inconsistent results on the ability to predict markedness in second language (L2) acquisition. suggesting that Some learners follow predicted patterns, while others do not, likely due to factors such as cognitive variations, learning approaches, and exposure to the L2.

To summarize, markedness theory and the SCH offer a framework for comprehending certain features of L2 phonology. However, their effectiveness is limited by their complex nature, dependency on certain environments, and the inconsistent empirical evidence supporting them.

With all the previously mentioned criticisms, the Markedness Differential Hypothesis MDH and the Structural Conformity Hypothesis SCH have had a significant impact on the research area of L2 speech production (Zampini, 2008). Furthermore, typological markedness has played a significant role in clarifying facts about L2 phonology, and the markedness theory will indeed be applied to elucidate the problems that Arabic speakers encounter while producing English consonant clusters.

2.5. Factors affecting the learning of pronunciation

In their study, Gilakjani & Ahmadi (2011), provided a review of the primary factors that affect the process of learning pronunciation as follows:

2.5.1. Accent

An accent is defined as “the cumulative auditory effect of those features of pronunciation that identify where a person is from, regionally or socially” (Crystal, 2003, p. 3). Where accentedness, according to (Derwing and Munro, 2005, p. 383) is claimed to be “a normal consequence of second language learning”, as well as a “listener’s perception of how different a speaker’s accent is from that of the L1 community”. Most adult English learners have foreign

accents that identify them as non-native English speakers. Certain linguists argue that a person should begin learning a language before the age of seven to have a native-like accent. That is known as the Critical Period Hypothesis (Lenneberg, 1967). Newer research reveals, however, that environment and motivation might be more crucial factors in the development of native-like pronunciation than age at acquisition (Marinova-Todd, Marshall, and Snow, 2000).

Recognizing the characteristics of learners' accents and their implications on intelligibility can assist teachers in identifying and addressing learner pronunciation problems (Derwing and Munro, 1997). The basic goal is for learners to be understood. This requires proper pronunciation, but not a perfect accent (Harmer, 1991). In support of this perspective, Jennifer Jenkins' Lingua Franca Core (LFC) emphasizes the importance of intelligibility among non-native speakers over the attainment of a native-like accent. The LFC identifies crucial pronunciation features necessary for mutual understanding in international communication, advocating for a focus on these elements in English language teaching while accepting non-native variations as legitimate (Jenkins, 2000, 2002). This approach aligns to ensure learners can communicate effectively and be understood, rather than striving for perfection in accent.

2.5.2. Motivation and exposure

Besides the age of language acquisition, the learner's motivation for learning the L2 and the social environment in which the learner is associated with, influence whether the student develops over time a native-like pronunciation. According to extensive research, having a personal or professional purpose for learning English would impact the urge and desire for native-like pronunciation (Marinova-Todd et al., 2000; Masgoret and Gardner, 2003; Bernaus, Masgoret, Gardner, and Reyes, 2004; Gatbonton et al., 2005).

Marinova-Todd et al. (2000) concluded, based on a review of adult English acquisition literature, that motivated adults can attain high proficiency levels, even reaching a native-like fluency in second languages. Furthermore, Moyer (2007) observed that exposure to the language and a positive attitude towards it eventually prove to be essential factors in acquiring native-like pronunciation. As a result, besides focusing on pronunciation and accent in the classroom, teachers should motivate learners to speak English outside of the classroom and provide them with tasks to do while using the language in different situations and contexts.

2.5.3. Attitude

Some learners are more competent at developing good pronunciation. Since even in a given homogeneous classroom, there is often a huge discrepancy in the pronunciation ability of the learners, several studies have investigated the individual characteristics of learners and how it significantly contributes to their performance in second language acquisition.

In a study on pronunciation accuracy of university students learning intermediate Spanish as a foreign language, Elliot (1995) discovered that the Pronunciation Attitude Inventory (PAI) results of the subjects' attitude towards learning native or near-native pronunciation were the main factor concerning target language pronunciation. In other words, learners tend to pronounce target language sounds more accurately if they are more concerned with their pronunciation of the target language (Elliot, 1995).

It is essential to mention Schumann's (1986) work on acculturation and its function in the process of language learning when examining the attitudes of L2 learners regarding their pronunciation and SLA in general. The extent to which learners acculturate determines how much of the target language they will learn (Celce-Murcia, et al., 1996). Schumann (1986) defined acculturation as the social and psychological interaction between members of a certain group and members of the target culture. The more interaction (i.e., psychological/social proximity) a group has with the target group the more possibilities of L2 acquisition will emerge. Conversely, less interaction (i.e., psychological/social distance) leads to less L2 acquisition. The amount of contact the group has with the target culture affects how much L2 is acquired.

Similar conclusions were found in Sparks and Glachow's work (1991) on personality. They claim that learners who were motivated to learn and had positive attitudes regarding L2 and its users achieved positive outcomes compared to those who did not show such attitudes.

2.5.4. Instruction

Foreign language instruction focuses on four fundamental areas of development: listening, speaking, reading, and writing. Foreign language curricula emphasize pronunciation in the first year of study as it introduces the alphabet and sound system of the target languages, but rarely continues this focus past the introductory level. The lack of emphasis on pronunciation development and considering that the pronunciation of a second language is not particularly important may be due to a general lack of fervour on the part of the second language acquisition researchers, second language teachers, and students. (Elliot, 1995).

Furthermore, Pennington (1994) maintains that pronunciation, which is typically viewed as a component of linguistic rather than conversational fluency, is often regarded with little importance in a communicatively oriented classroom (Elliot, 1995). According to Elliot (1995), teachers tend to view pronunciation as the least useful of the basic language skills and therefore they sacrifice teaching pronunciation to spend valuable class time on other areas of language. Elliot (1995) also suggests that teachers find value in ignoring pronunciation because they believe it is more challenging for elderly foreign language learners to achieve target language

pronunciation skills than other aspects of second language acquisition. Teachers may also simply lack the background or tools to properly teach pronunciation, so it is overlooked.

Teachers have been using pronunciation through repetition exercises on word or phrase level, or by teaching students the norms of pronunciation, such as how the vowel in a CVC sequence says its name when followed by a silent letter <E> at the end. Whenever an e is added to a word like a *bit* (CVC), the pronunciation of the short <I> becomes long and thus "says its name." This sort of teaching is designed to assist students in word recognition for reading rather than pronunciation. For example, students are rarely taught the distinctions between fricatives and non-fricative continuants, or the distinctions between the trilled and flapped /r/ in Spanish and English (Eliot, 1995). This knowledge is commonly left to the students to obtain on their own. Researchers have investigated whether direct instruction benefits these second language learners. Such studies have yielded inconclusive results. Suter (1976) found no link between formal pronunciation teaching and students' pronunciation of English as a Second Language (Eliot, 1995).

2.5.5. Age

Teachers in ESL classrooms regularly observe that younger learners are more likely to develop correct pronunciation of English. They experience less difficulty grasping new sounds and pronouncing them while older learners have greater difficulty improving their pronunciation. The Critical Period Hypothesis (CPH) describes the relationship between language acquisition and the age factor. CPH has long been a source of debate in linguistics and language acquisition. Lenneberg (1967) was the first to establish this concept. Based on CPH, if a learner fails to learn a new language by a specific age, they may never be capable of perfecting their pronunciation of that language to a native-like level. If the learner starts speaking a second language before the age of six, they will often have no accent or just a slight one. Nevertheless, if the learner starts speaking the second language between the ages of seven and eleven, they will be likely to have a small accent. If the student begins speaking the second language after the age of twelve, they will undoubtedly have a foreign accent (Nation & Newton, 2009, p. 78).

The abilities, skills, and cognitive capabilities of learners change, as they get older. It has something to do with brain plasticity as Harmer (2001) stated. As a result, it is concluded that age has a significant impact on English pronunciation. On the other hand, Bialystock (1997), Bongaerts, and Planken have found adult learners and Schils (1997), to be capable of acquiring native-like proficiency in an L2. Nevertheless, according to Avery and Ehrlich (1992), the degree of pronunciation accuracy varies between individuals. Moreover, linguists such as Marinova, Marshall, and Snow (2000), in addition to Johnson and Newport (1989), have

proposed as well that second language learners undergo various stages of development and that their learning is based on cognitive maturity and neurological factors (Bista, 2009). CPH was initially given as the answer to all questions, whereas many academics indicated that it is not the sole factor that determines the acquisition of English as a second language (L2). There are also additional factors to consider.

2.5.6. Personality

Non-linguistic variables such as a person's character and learning objectives, orientation toward the intended language, culture, native speakers, and level of engagement, all of which are beyond the teacher's influence, all play a role in the development of pronunciation capabilities (Miller, 2003). Furthermore, the extent of exposure to and usage of the target language can help or hinder the development of pronunciation skills. Learners who are extroverted, for instance, and engage in interactions with native speakers are more likely to improve their foreign language pronunciation (Avery and Ehrlich, 1992). Conversely, some students find it awkward to experiment with innovative speech rhythm and melody patterns, while others feel foolish when they pronounce 'weird' sounds and eventually conclude that learning English pronunciation is pointless and impossible (Miller, 2003). According to Miller (2003), a student's level of responsibility, amount of practice outside of class, and level of readiness play a role in whether speech patterns change.

2.5.7. Mother tongue influence

According to Avery and Ehrlich (1992), the sound pattern of a learner's first language is transferred into their L2 and is going to result in foreign accents. Non-natives frequently pronounce words incorrectly due to the sounds, rules, stress, and intonation of their native tongue. For instance, numerous authors focused on how non-native speakers acquired English rhythm (Wenk, 1985; Machizuki-Sudo, Kiritani, 1991). These investigations concluded that the learners' production of English-like stress alternation across a phrase was affected by the transfer from their L1. In this regard, Avery and Ehrlich (1992) suggested that the sound system of the first language can affect the pronunciation of bilinguals in a target language in at least three different manners.

First, learners may not be able to produce or even perceive a sound when it exists in the target language but is missing from their native sound inventory. Second, when the phonotactic constraints/rules of the first language are different from those of L2, it will be challenging for bilinguals to combine the sounds producing proper and meaningful L2 words. Thirdly, since the intonation and stress patterns of a language are determined by its rhythm and melody,

learners may transfer these rhythms from their L1 into the target language leading to mispronunciation in some cases.

In conclusion, the factors discussed above may help ESL/EFL teachers in considering the challenges that learners from different backgrounds may encounter when learning English as a second language. They would therefore make it possible for teachers to develop effective pronunciation instruction and adapt their teaching strategies considering the needs of their learners.

2.6. Previous studies about the production of English consonant clusters

A substantial number of articles have been written on the complex English syllables that contain consonant clusters (CC) in initial or final positions. Researchers from many backgrounds dedicated great attention to determining the factors that could explain the emergence of interlanguage phonology, the non-native variety produced by L2 learners, especially in the production of Consonant clusters. Consequently, they analyzed L2 learners' errors in pronouncing clusters as well as identifying L2 speakers' repair strategies used. Often these analyses lay a significant emphasis on the impact of transfer in explaining all phonological errors made by L2 learners. A similar incident was highlighted by Jabeen, Mahmood, and Asghar (2012), but about Punjabi, Pakistan's official language. According to these linguists, Punjabi English speakers use phonological strategies such as vowel insertion to overcome the contradiction between native language and target language constraints. It indicated that vowel addition might take place either before clusters as an empathetic vowel or between members of a cluster as an intervening vowel, several studies have reported similar findings as well (e.g. Hago and Khan, 2015; Keshavarz, 2017; Bouchhioua, 2019).

Other investigations, on the other hand, emphasized the importance of markedness. Chen (2011), for example, tested how nine Taiwanese students pronounce the CC- and CCC- patterns. He claimed that the Chinese phonological system does not allow for the CC pattern under any circumstances, therefore participants may face difficulties pronouncing both forms (i.e. CC- and CCC-). participants made many more errors pronouncing the more marked CCC clusters than the less-marked CC clusters despite the fact that neither of these two structures exists in their mother tongue. Al-Yami and Al-Athwar, (2021) concluded that Saudi EFL learners found it more difficult to pronounce English final Consonant clusters than English initial Consonant clusters. Elsaghayer (2014) likewise tested 20 Libyan students at the Misurata University Language Center to examine errors in the production of English Consonant clusters. He concluded that clusters posed difficulties for the participants in general, notably the most

complicated patterns were -CCC coda clusters. He also asserted that the clusters were repaired by inserting /ə/ or /ɪ/ between the consonants.

Naama (2011) and Nogoud (2020) also emphasized the effects of multiple additional non-linguistic factors that yielded pronunciation errors, including incompetent or unqualified teachers, unsuitable teaching aids, and the participants' lack of awareness of their errors. Methods, tools, and programs used to teach English pronunciation might very well be a serious obstacle when it comes to improved pronunciation.

Hansen (2001) found that almost all Korean EFL students tended to utilize the vowel insertion strategy that involves adding a short vowel after the final consonant forming a new syllable. Likewise, Al-Sammer (2014) and Jayaraman (2010) asserted that participants often deleted the final cluster to simplify the pronunciation when a syllable ended with inflectional morphemes, such as a plural. Al-Aqlobi (2013), also observed that Saudi EFL learners found it difficult to pronounce Consonant clusters and that epenthesis was the commonly adopted strategy. For example, the word *sport* starting with a complex onset /sp/was pronounced as [isport], with the short vowel /i/ inserted initially.

Al-Saidat (2010) examined the English phonotactics of Arab language learners in Jordan to identify the distinct types of pronunciation challenges they encountered. The sample included Jordanian Arab students who were asked to read a list of words that the researcher had created for the sake of the study. The data illustrate that Arab English learners unconsciously insert a vowel to the break clusters in onset and coda positions. Results also indicate that the errors of the participants were primarily caused by the effect of their native language.

2.7. Predictions

Predictions for the present research are formed based on three main theories of L2 acquisition. These predictions are going to be examined throughout the discussion and interpretation of the results in Chapter 4 to determine whether they have been proven correct and if the research results confirm any of the above three L2 theories. These theories are Contrastive Analysis CA (Fries, 1945), Error Analysis EA (Corder, 1967), and Markedness Theory (Eckman, 1977).

2.8. Chapter Summary

This chapter has explained three theories of second language acquisition which are related to this study. These theories include Contrastive Analysis (Fries, 1945), Error Analysis (Corder, 1967), and Markedness Theory (Eckman, 1977). The Contrastive Analysis hypothesis explains L2 acquisition major problems according to the linguistic distance between L1 and L2, in other words, it is concerned with the similarities and differences between the two languages. It suggests that similar or close features between L1 and L2 are easier to acquire from those that are different and far. Accordingly, errors committed by L2 speakers are the result of negative transfer. EA claims that L2 learners' errors can be explained by making a comparison between the learner's interlanguage with the L2 norm. It discusses both interlingual (L1 negative transfer) and intralingual errors. Some interlingual errors are not caused by L1 negative transfer but by many other factors that are going to be discussed in the following chapter. Markedness Theory combines contrastive analysis and typological markedness. Where CA explains L2 speakers' difficulties, markedness theory explains the degree (levels) of these difficulties. The Markedness Differential Hypothesis MDH illustrates that L2 features or structures that are both different and more marked than corresponding L1 structures will lead to learning difficulty. Unmarked structures are structures that are considered to be easier to acquire and need less time to learn than marked structures. The three theories and the predictions based on them will be used in Chapter 4 to analyze Arabic speakers' English pronunciation errors and the reasons behind them. The next chapter explains and compares both English and MSA, as well as MSA and Jordanian dialect sound systems - consonants, consonant clusters, and vowels – and syllable structure rules. It also compares them and explains their implications for L2 English sound production.

CHAPTER THREE: CONTRASTIVE ANALYSES

3.1. A contrastive analysis of the sound systems of Modern Standard Arabic MSA and British English Received Pronunciation RP

The present contrastive analysis is between British English Received Pronunciation RP and Modern Standard Arabic MSA. Since this distinction does not satisfy the research goals, we need to consider the diverse varieties of spoken Arabic, in our case, the dialects of Jordanian Arabic will also need to be considered. This chapter will discuss the English RP and MSA sound systems, Arabic dialects in general, and Jordanian dialects in particular.

3.1.1. Languages of the study: a general overview

Although spoken languages may share widespread and universal features, each has its unique linguistic system. In other words, every language has its semantics, morphology, phonetics, phonology, and syntax. In this section, two of the most widely spoken languages of the world, namely English and Arabic, are going to be described generally and then compared considering their sound systems.

3.1.1.1. Arabic

According to Versteegh, K. (2014), during the period following the Islamic conquests, which commenced shortly after the death of the Prophet Muhammad in 10/632, significant transformations occurred in the trajectory of the Arabic language. Within a relatively short span, Arabic speakers expanded across vast territories, compelling the inhabitants of conquered regions to adopt their language. For a more comprehensive understanding of the historical and political evolution of Arabic, including its development and ongoing changes leading to Modern Standard Arabic MSA and its various dialects, readers are directed to Versteegh, K. (2014).

Thohir, Kurjum, and Muhid (2020) mentioned that Classical Written Arabic CWA, Modern Standard Arabic MSA, and Spoken Arabic SA are the three varieties of Arabic that may be learned. CWA is used in the writing of both the Quran and literature in general. MSA is the modern standard language derived from Classical Arabic, the language of the Qur'an and early Islamic literature. It is also known as /ʔal-fusˤħa/ or Literary Arabic. (Abdelali, 2004). MSA with roots dating back centuries, has undergone significant development influenced by cultural and historical factors. It holds a central position in Arabic-speaking countries, serving religious, cultural, and societal functions. Arabic countries often have a diglossic situation, where MSA is used in formal settings, while various dialects are spoken in everyday interactions. Efforts are underway to preserve and promote MSA amidst globalization challenges. For a variety of

factors, estimating the actual number of those who speak MSA is extremely challenging. First, it is taught as a second language in schools and through exposure is limited to radio, television, newspapers, periodicals, and religious settings rather than being acquired as a first language. Second, competence levels in MSA vary greatly, people with higher levels of education are more likely to be fluent in MSA as well as their native regional dialects of Arabic. The proficiency in MSA among the rest of the population varies significantly.

Since the form of Arabic that is found in the Holy Qur'an is what is typically referred to as Classical Arabic, Arabs consider classical written Arabic the purest, most ideal, and most magnificent form of Arabic. Nevertheless, schools, newspapers, mosques, and official interactions among educated Arabs from different regions have been using a modified version of the Classical Arabic dialect, known as Modern Standard Arabic MSA. As mentioned above, MSA is considered a simpler version of Classical Arabic, but it follows its grammar. The major distinctions between Classical Arabic and MSA are that MSA includes a greater (more modern) vocabulary, and it does not use several of the most complex aspects of grammar found in Classical Arabic. In 1974, MSA was selected to become the United Nations' sixth official language. Consequently, once non-native Arabic speakers tend to learn Arabic as a foreign language, they are exposed to this form of Arabic in language organizations (Huthaily, 2003). A detailed sociolinguistic description of these two varieties is given below to cover their regional, social, and stylistic distinctions, offering a comprehensive understanding of Classical Arabic and Modern Standard Arabic.

- **Modern Standard Arabic vs Classical Arabic**

Modern Standard Arabic MSA and classical Arabic are two varieties of the Arabic language that are commonly used in different contexts and for different purposes. It is crucial to realize that Arabic is a diglossic[1] language, which implies that the formal written and spoken varieties can be clearly distinguished from the spoken vernaculars (dialects).

- **Classical Arabic CA**

1. **Historical background:** Classical Arabic, often known as Quranic Arabic, is the Arabic used in the Quran and Classical literature. Its origins can be traced back to the seventh century and the early Islamic period.

[1] The concept of diglossia was first introduced by linguist Charles A. Ferguson in the 1950's to characterize linguistic circumstances in multilingual societies in which two distinct varieties of a language perform different purposes and are used by the population in various domains of society. This linguistic diglossia involves distinctions in grammar, vocabulary, pronunciation, and practice between the two types, and individuals may use either version depending on the social, cultural, or situational setting.

2. **Usage and context**: Classical Arabic is mainly used for religious and literary purposes. It appears in religious texts, classic literature, poetry, formal speeches, and records of historical events. The language is not spoken in everyday interactions, though it is still used in religious contexts for instance during the Islamic Fridays' prayers.

3. **Geographical distribution:** Classical Arabic is a historical and religious form of the language used and comprehended across the Arabic-speaking world and is not associated with any particular region, and since it is not used in spoken form in everyday interactions, it cannot grow different in its pronunciation in the different regions of the Arab world.

4. **Social usage**: People in general do not frequently use it in casual or informal discourse. However, those who have solid experience in Arabic literature and Islamic studies are more likely to make use of it, as are academics, religious leaders, and other experts.

- **Modern Standard Arabic MSA**

1. **Historical background:** having been derived from Classical Arabic, Modern Standard Arabic is a standardized form of Arabic. To serve as a standard written and formal spoken language throughout the Arab world, it developed in the late 19th and early 20th centuries.

2. **Usage and context:** MSA is employed in formal contexts including news broadcasts, speeches given in public, academic publications, literature, formal communications, and diplomatic communication. In addition, it serves as both the medium of instruction and the language of instruction in educational institutions.

3. **Geographical distribution**: MSA is used across the Arab world, which includes the Middle East and North Africa. It is mutually understandable among speakers of various dialects and is the standard version of Arabic spoken in these areas.

4. **Social usage**: MSA is typically not employed in everyday, casual conversations or colloquial circumstances. It is generally used by professionals, educated people, and those participating in formal or public dialogue. It is a uniting linguistic device that helps Arabic speakers from various dialects and geographic backgrounds communicate with one another.

In summary, Modern Standard Arabic serves as a formal written and spoken language that is used in formal, official, and professional contexts around the Arabic-speaking world, whereas Classical Arabic mainly serves as a literary and religious form of the Arabic language with a high historical value. Both are different from the countless regional dialects of Arabic, and they are not commonly used in informal or social contexts.

However, each Arabic country is distinguished by its Arabic varieties, which may vary within the country from one region to another, each having its linguistic features. The fact that

Arabic has a considerable number of dialects that differ from MSA in their phonetics, phonology, morphology, vocabulary, syntax, semantics, and pragmatics, offers an extensive field of research. Accordingly, a vast number of research projects have investigated these dialects from several angles, especially the interference and transfer of such features while learning second languages (Huthaily, 2003).

3.1.1.2. English

In Javed (2013, p. 1), the English language is described as

> "a West Germanic language related to Dutch, Frisian, and German with a significant amount of vocabulary from French, Latin, Greek, and many other languages. Approximately 341 million people speak English as a native language and a further 267 million speak it as a second language in over 104 countries including the UK, Ireland, USA, Canada, Australia, New Zealand, South Africa, American Samoa, Andorra, Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Botswana, British Indian Ocean Territory, British Virgin Islands, Brunei, Cameroon, Canada, Cayman Islands, Cook Islands and Denmark".

No one can dispute the significance of the English language since it is the most widely spoken language in the world. English is the standard language in a wide variety of domains, such as computer coding, international commerce, and higher education. It is therefore regarded as the lingua franca of the globe. Approximately a third of the world's population or around two billion people communicate using English. British Received Pronunciation RP, which has historically been characterized as the Standard English spoken in London and southeastern England, is one of several accents used across the English-speaking world. American English, often known as United States English or U.S. English, is the group of English dialects that are native to the United States, in addition to Australian, Canadian, Indian, Scottish, Irish, New Zealand, and South African English.

As one can indeed note English and Arabic differ in many respects and a major variation is pronunciation and the sound system. In the following section, an overview will be provided based on several sources investigating and analyzing both the Arabic sound system and Arabic dialects. This is going to be followed by a comparison between British English RP and MSA phonologies.

3.1.2. The phonemic analysis

3.1.2.1. Letter-to-sound rules

Since English pronunciation is mostly taught in Jordanian schools by reading aloud, it is important to mention the differences between the orthographic systems of the two languages. On the one hand, English has a system of complex orthography, where the relation between letters and sounds is not one-to-one. For example, one sound can be represented by several different letters or letter combinations – for instance, the sound /iː/ may be represented by the letter <e> as in *meter*, by the digraph <ea> as in *sea*, or by the digraph <ee> as in *see* among others. On the other hand, the very same letter or digraph may regularly represent several different speech sounds – for instance, the letter <a> may regularly represent the vowel /æ/ as in *cat*, the vowel /ɑː/ as in *car*, the vowel /eɪ/ as in *make*, or the vowel /eə/ as in *care* besides having some irregular pronunciations like /e/ in *many* or /ɔː/ in *call*. Yet another problem is caused by silent letters like <r> in words like *shared, mother,* or <e> in *make* and *site*

The Arabic orthographic system, conversely, is simple. In Arabic, the letter-to-sound relationship is much more explicit than in English. In Arabic, words are written almost as they are pronounced, particularly in the case of consonants, where almost each letter represents a distinctive sound except in a few limited circumstances. For instance in the case of the <l> letter of the definite article, which follows the pronunciation of the following sound, or in cases of assimilation, for instance, like when the /n/ is assimilated into /m/ due to the adjacent /b/ stop. However, in the case of connected speech, Arabs are more reliant on their diacritics system to add short vowels or stress to words.

According to Al-Shalabi (2021), every letter of any word is pronounced in Arabic. As a result, native Arabic speakers pronounce foreign words letter-by-letter, even the silent ones, and especially those that are not always silent, such as the letter <r> in RP. In her study, she found that words such as *first, hear, large, pleasure, shirt,* and *word* are frequently pronounced as/feɪrst/, /hiːr/, /lɑːrdʒ/, /blɪdʒər/, /ʃeɪrt/ and /wɔːrd/, respectively. Another case of pronouncing a silent letter is the addition of the consonant /t/which is normally unpronounced by native speakers, as in the pronunciation /kæstɪl/ *castle*.

3.1.2.2. Modern Standard Arabic vowels inventory:

Tables 1 and 2 show the vowel system of MSA indicated by their phonetic symbols, descriptions as well and examples with their English translation, followed by figures 2 and 3 showing the MSA monophthong and diphthong charts, respectively. These are based on charts taken from Thelwall and Sa'Adeddin (1990, p. 38). The MSA vowel system consists of six

monophthongs: three long - /aː/, /iː/, /uː/ -, three short - /a/, /i/, and /u/ - pure vowels, and two diphthongs - /aj/ and /aw/ which are a combination of a short vowel followed by an off-glide.

Table 1. A list of MSA long and short vowels

Vowel Phonetic Symbol	Characteristics	Example/gloss
/aː/	open unrounded vowel (long)	/maːl/ *money*, مال
/iː/	close unrounded vowel (long)	/diːn/ *religion*, دين
/uː/	close rounded vowel (long)	/suːq/ *market*, سوق
/a/	unrounded vowel (short)	/qalam/ *pen*, قَلَم
/i/, /ɪ/	unrounded vowel between close and half-close (short)	/kitaːb/ *book*, كِتاب
/u/	rounded vowel between close and half close (short)	/ħulm/ *dream*, حلم

Table 2. A list of MSA diphthongs

Diphthong Phonetic Symbol	Example/translation
/aj/	/kajf/ *how*
/aw/	/lawn/ *color*

Figure 2. MSA monophthongs chart

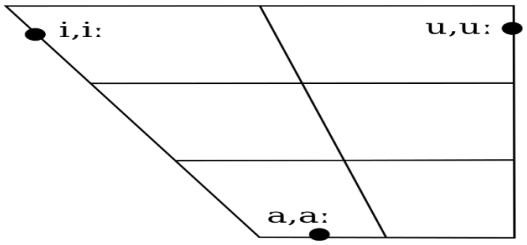
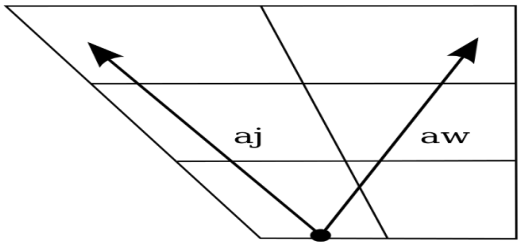


Figure 3. MSA diphthongs chart



As can be seen in Table 1, the three long vowels /aː/, /iː/, and /uː/ are the three long vowels in MSA which are represented in full vowel letters as /ʔalif/, /jaːʔ/, and /waːw/ respectively. These vowels are spelled in Arabic as ا, ي, و e.g. مال/maːl/ *money*, دين/diːn/ *religion*, سوق/suːq/ *market*. On the other hand, the three short vowels, /a/, /u/, and /i/, may be represented in Arabic by diacritical marks, which are written above the letters (in the case of /a/ and /u/) or below the letters (in the case of /i/or/ɪ /). These diacritical marks are called /fatħa/, /damma/, and /kasra/ respectively. These vowels are spelled in Arabic as َ, ُ, ِ as in قَلَم /qalam/ *pen*, حلم/ħulm/ *dream*, and كِتاب/kitaːb/ *book*.

It is crucial to mention that in Arabic phonology, vowel sounds can vary based on dialects, the social background of the speaker, and many other variables. So, one can find that short vowels like [u], [ʊ], [o], [ɔ] are variations of the main vowel /u/, and they often depend on the dialect of the speakers. For example, the word قُلْت *said* can be pronounced as /qɔlt/ in MSA, /qʊlt/, /qolt/ by RD or BD speakers, and /ʔult / by UD speakers. Similarly, short vowels [i], [ɪ], [e], [ɛ] are variations of the main vowel /i/. For instance, the word مِن *from* can be pronounced as [mɪn], [men], or [mɛn] again depending on the dialect of the speakers. And the same can be applied to the representation of long vowels like [oː] and [eː] which are used interchangeably with the long vowels /uː/ and /iː/, respectively, in most Arabic varieties. They are commonly seen as loanwords for example, روماني *Romanian* is pronounced as /roːmaniː/ or /ruːmaniː/ without affecting the meaning of the word.

3.1.2.3. British English Received Pronunciation RP vowel inventory

The British English RP vowel system is more complex than that of Arabic. The RP vowel inventory includes pure vowels or monophthongs which include /ɪ/, /e/, /æ/, /ʌ/, /ʊ/, /ɒ/, /ə/, /ɛ/,/iː/, /ɜː/, /ɔː/, /uː/, /ɑː/, the diphthongs /eɪ/, /aɪ/, /ɔɪ/, /aʊ/, /əʊ/, /ɪə/, /eə/, /ʊə/, as well as the triphthongs /aɪə/, /aʊə/, and /ɔɪə/.

In Tables 3, 4, and 5, the English RP monophthongs (long and short), diphthongs, and triphthongs are introduced with their descriptions and examples.

Table 3. A List of the British English RP short and long vowels

IPA Symbol	**Three-term label**	**Examples**
/ɪ/	front high unrounded short	/bɪt/ *bit*
/e/	front mid unrounded short	/went/ *went*
/æ/	front low unrounded short[2]	/kæt/ *cat*
/ʌ/	central low unrounded short	/fʌn/ *fun*
/ʊ/	back high rounded short	/pʊt/ *put*
/ɒ/	back low unrounded short	/wɒʧ/ *watch*
/ə[3]/	central mid unrounded short (unstressed)	/ˈmʌðəɹ[4]/ *mother*
/iː/	front high unrounded long	/niːd/ *need*

[2] Although /æ/ is physically as long as a long vowel, e.g. /aː/, it is still classified as a short vowel since it shows a distribution identical to that of the latter, e.g. it does not occur word finally.
[3] In this case this vowel is not just a vowel but a vowel followed by a linking r depending on the position.
[4] A word final, so-called Linking-R is indicated in parentheses as its pronunciation depends on whether there is a morpheme or word following it and whether that following morpheme/word starts with a consonant or vowel.

/ɜ:/	central mid-unrounded long	/nɜ:s/ *nurse*
/ɔ:/	back mid-rounded long	/tɔ:k/ *talk*
/u:/	back high rounded long	/lu:z/ *lose*
/ɑ:/	back low unrounded long	/fɑ:st/ *fast*

Table 4. A list of the British English RP diphthongs

IPA Symbol	Type of diphthong	Examples
/eɪ/	closing fronting narrow	/feɪs/ *face*
/ɔɪ/	closing fronting wide	/dʒɔɪ/ *joy*
/aɪ/	closing fronting wide	/maɪ/ *my*
/əʊ/	closing backing narrow	/nəʊ/ *no*
/aʊ/	closing backing wide	/maʊθ/ *mouth*
/ɪə/	centering	/nɪə(ɹ)/ *near*
/eə/	centering	/heə(ɹ)/ *hair*
/ʊə/	centering	/ljʊəd/ *lured*

Table 5. A list of the British English RP triphthongs

IPA Symbol	Examples
/ɑɪə/	/faɪə(ɹ)/ *fire*
/ɔɪə/	/mɔɪərə/ *moira*
/ɑʊə/	/paʊə(ɹ)/ *power*

Figure 4 shows the English RP monophthong chart noting that all long monophthongs are followed by the IPA length symbol /:/. Figure 5 shows the diphthongs of RP English, where the arrows show the direction of tongue movement between two vowels based on Roach (2004, p. 242).

Figure 4. The British English RP monophthong chart

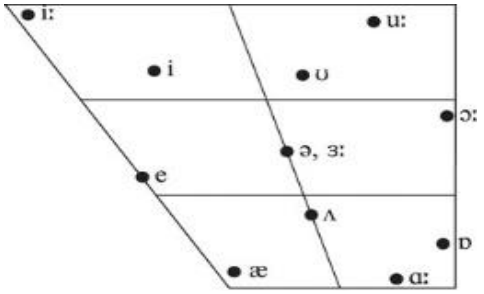
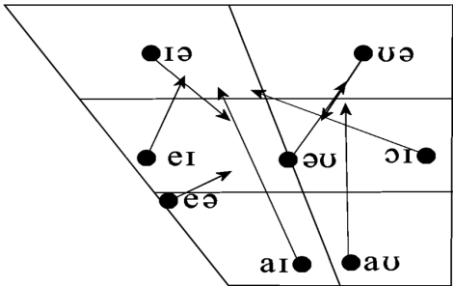


Figure 5. The British English RP diphthong chart



According to Roach (2004), RP English has been characterized as including a large vowel inventory divided into short monophthongs, long monophthongs, and (long) diphthongs (and triphthongs). Diphthongs are either categorized as centering diphthongs (ending in /ə/) or closing diphthongs (ending in /ɪ/ or /ʊ/). It is worth mentioning that some closing diphthongs can have a /ə/ vowel added to them as in /ədˈmaɪə/ *admire*, and the generated complex vowel unit is often classified as a triphthong if pronounced as a single syllable.

3.1.2.4. MSA consonants

The modern standard Arabic spoken in Levantine countries has 28 consonant phonemes each of these is represented by a letter of the alphabet, forming a one-to-one relationship between the letters and consonant phonemes. MSA consonant inventory can be identified by their place, manner of articulation, and voicing, it consists of eight stops /b/, /t/, /d/, /tˤ/, / dˤ /, /k/, /q/, and /ʔ/, thirteen fricatives /f/, /θ/, /ð/, /ðˤ/, /s/, /sˤ/, /z/, /ʃ/, /x/, /ɣ/, /ħ/, /ʕ/, and /h/, one affricate /dʒ/, two nasals /m/ and /n/, one lateral /l/, one trill /r/, and two semi-vowels /w/ and /j/ (Watson, 2002). In Table 6, each MSA consonant is indicated with its phonetic symbol, its place of articulation, manner of articulation, as well as its voiced/voiceless nature.

Table 6. A list of phonetic symbols of the MSA consonants

Phonetic symbol	**Three-term label**	**Example**
/b/	voiced bilabial stop	/baːb/ *door*
/t/	voiceless denti-alveolar stop	/tiːn/ *fig*
/d/	voiced denti-alveolar stop	/diːn/ *religion*
/k/	voiceless velar stop	/kitaːb/ *book*
/tˤ/	voiceless velarised denti-alveolar stop	/tˤaːziʤ/ *fresh*
/dˤ/	voiced velarised denti-alveolar stop	/dˤaɣtˤ/ *pressure*
/q/	voiceless uvular stop	/ʕaql/ *mind*
/ʔ/	voiceless glottal stop	/hawaːʔ/ *air*
/dʒ/	voiced palato-alveolar affricate	/dʒaːʔa/ *he came*

/m/	voiced bilabial nasal	/qamar/ *moon*
/n/	voiced alveolar nasal	/naːs/ *people*
/f/	voiceless labio-dental fricative	/faʔr/ *rat*
/θ/	voiceless inter-dental fricative	θimaːr *fruits*
/ð/	voiced inter-dental fricative	miðyaːʕ *radio*
/s/	voiceless alveolar fricative	/suːq/ *market*
/z/	voiced alveolar fricative	/ziːnə/ *decoration*
/sˤ/	voiceless velarized alveolar fricative	/raqsˤ/ *dance*
/ʃ/	voiceless palato-alveolar fricative	/maʃwi/ *grilled*
/x/	voiceless velar fricative	/xaːl/ *uncle*
/ɣ/	voiced velar fricative	/ɣabi/ *idiot*
/ħ/	voiceless pharyngeal fricative	/ħayaːt/ *life*
/ʕ/	voiced pharyngeal fricative	/ʒuːʕ/ *hunger*
/h/	voiceless glottal fricative	/hadiːjə/ *gift*
/ðˤ/	Voiced velarized denti-alveolar fricative	/ðˤariːf/ *nice*
/r/	voiced alveolar trill	/raml/ *sand*
/l/	voiced alveolar lateral	/lams/ *touch*
/j/	voiced palatal semi-vowel	/jasaːr/ left
/w/	voiced labio-velar semi-vowel	/waqt/ *time*

3.1.2.5. British English Received Pronunciation RP consonants

English consonants can be identified by their place, manner of articulation, and voicing. Forel and Genoveva (2005, pp. 6-7) state that:

> "[c]onsonants are often classified by being given a so-called VPM-label. VPM stands for Voicing, Place and Manner: voicing means that the vocal folds are used; if they are not, the sound is voiceless … - place of articulation is the place where the air flow will be more or less obstructed. - manner is concerned with the nature of the obstruction".

The consonants of English according to their place of articulation are the following: bilabials (/p/, /b/, /m/), labiodentals (/f/, /v/), dentals, (/θ/, /ð/) alveolars (/t/, /d/, /s/, /z/, /n/, /l/), post-alveolars (/t̠ʃ/, /d̠ʒ/, /ʃ/, /ʒ/, /ɹ/), palatal (/j/), labiovelar /w/, velar (/k/, /g/, /ŋ/), and glottal /h/. They are also divided according to their manner of articulation into: stops (/p/, /b/, /t/, /d/, /k/,

and /g/), fricatives (/f/, /v/, /θ/, /ð/, /s/, /z/, /ʃ/, /ʒ/, and /h/), affricates (/ʧ/ and /ʤ/), nasals (/m/, /n/, and /ŋ/), liquids (/l/ and /ɹ/), and semi vowels (/w/ and /j/) (Watson, 2002). Furthermore, it is worth noting that /w/ is often argued to be a labiovelar, or a velar with a secondary bilabial place of articulation. Table 7 provides the phonetic symbols, their place of articulation, manners of articulation, as well as voicing for the British English Received Pronunciation RP consonants.

Table 7. A list of phonetic symbols of the British English RP consonants

Phonetic symbol	**Three-term label**	**Example**
/p/	voiceless bilabial plosive	/peɪpəɹ/ *paper*
/b/	voiced bilabial plosive	/bʊk/ *book*
/t/	voiceless alveolar plosive	/teɪbl/ *table*
/d/	voiced alveolar plosive	/dɔːɹ/ *door*
/k/	voiceless velar plosive	/kami/ *come*
/g/	voiced velar plosive	/gəʊ/ *go*
/ʧ/	voiceless postalveolar affricate	/ʧɜːʧ/ *church*
/ʤ/	voiced postalveolar affricate	/ʤækɪt/ *jacket*
/m/	voiced bilabial nasal	/maɪs/ *mice*
/n/	voiced alveolar nasal	/naʊ/ *now*
/ŋ/	voiced velar nasal	/brɪŋ/ *bring*
/f/	voiceless labiodental fricative	/fɑːðəɹ/ *father*
/v/	voiced labiodental fricative	/vɔɪs/ *voice*
/θ/	voiceless (inter)dental fricative	/θɪəri/ *theory*
/ð/	voiced (inter)dental fricative	/ðeɪ/ *they*
/s/	voiceless alveolar fricative	/siː/ *sea*
/z/	voiced alveolar fricative	/zuː/ *zoo*
/ʃ/	voiceless postalveolar fricative	/ʃaʊəɹ/ *shower*
/ʒ/	voiced postalveolar fricative	/beɪʒ/ *beige*
/h/	voiceless glottal fricative	/haɪ/ high
/ɹ/	Voiced postalveolar approximant	/ɹɛd/ *red*
/l/	voiced alveolar lateral approximant	/leɪt/ *late*
/j/	voiced palatal approximant	/juː/ *you*

/w/	voiced labio-velar approximant	/waɪ/ *why*

As it is clear from the above illustrations, the two languages have both different and similar sounds. For an Arabic native speaker, the differences are considered to be more than the similarities, see Table 8, instance it seems that the sound /r/ occurs in both languages, though it does not since the phoneme /r/ in MSA is an alveolar trill while the consonant /r/ in the English RP is mostly realized as a postalveolar approximant in actual pronunciation (Roach, 2004), to be commonly represented by the symbol [ɹ] in the International Phonetic Alphabet. The symbol /r/ has still been used for RP in the majority of the literature in the field for the sake of convenience and simplicity.

This is not the only issue with the phoneme /r/, since in RP English there is also the silent /r/, which learners consider one of the most problematic features in RP English pronunciation since the /r/ phoneme is only pronounced in RP English when followed by a pronounced vowel. It is not pronounced if the following sound is a consonant, or if no sound follows, as in *sharp, bird, there, horse*, and in words such as *mother, other*, and *sister* – the final /r/ in the latter three words will be pronounced is a vowel initial morpheme or word follows, e.g. *mothering* or *mother*. Note that although the /r/ is silent in these words, it indicates that a long vowel sound occurs in the stressed syllable containing it, cf. *sharp, bird, there, horse,* and a short, weak vowel sound (ə) in the unstressed syllable containing it, cf. *mother, other, sister*. In continuous speech, the principle for silent /r/ is also applied.

3.1.2.6. MSA versus RP consonants and vowels

Table 8. MSA versus RP consonants

Manner of articulation	**MSA**	**British English RP**
Stops	/b/, /t/, /d/, /tˤ/, / dˤ /, /k/, /q/, ʔ/	/p/, /b/, /t/, /d/, /k/ /g/
Fricatives	/f/, /θ/, /ð/, /ðˤ/, /s/, /sˤ/, /z/, /ʃ/, /x/, /ɣ/, /ħ/, /ʕ/, /h/	/f/, /v/, /θ/, /ð/, /s/, /z/, /ʃ/, /ʒ/, /h/
Affricate	/dʒ/	/ʧ/, /dʒ/
Nasals	/m/ /n/	/m/, /n/, /ŋ/
Lateral	/l/	/l/
Trill or Approximant	/r/	/ɹ/
Semi-vowels	/w/ /j/	/w/, /j/

Furthermore, as illustrated in tables 9 and 10, 10 consonant phonemes exist in MSA but have no equivalents in English, /tˤ/, /dˤ/, /q/, /ʔ/, /sˤ/, /x/, /ɣ/, /ħ/, /ʕ/, /ðˤ/. Also, there are several phonemes in the English consonant inventory that do not exist in the MSA sound system like /p/, /g/, /ʧ/, /ŋ/, /v/, /ʒ/.

Table 9. Sounds exist in MSA not in English

IPA phoneme	IPA transcription	Translation	Example
/tˤ/	/tˤaːziʒ/	*fresh*	طازج
/dˤ/	/dˤaɣtˤ/	*pressure*	ضغط
/q/	/ʕaql/	*mind*	قال
/ʔ/	/hawaːʔ	*air*	هواء
/sˤ/	/raqsˤ/	*dance*	رقص
/x/	/xaːl/	*uncle*	خال
/ɣ/	/ɣabi/	*idiot*	غبي
/ħ/	/ħayaːt/	*life*	حياة
/ʕ/	/dʒuːʕ/	*hunger*	جوع
/ðˤ/	/ðˤariːf/	*nice*	ظريف

As for the differences and similarities of vowel inventories of these languages, the comparison shows that many vowels occur in English but not in MSA such as /ɒ/, /ə/, /ʌ/, /ɜː/, /ɔː/, /e/, /æ/, /ɪə/, /eə/, /eɪ/, /ɔɪ/. Accordingly, vowels are considered the most problematic sounds for Arab learners, since in MSA there are only six monophthongs and two diphthongs, and this frequently results in mispronunciation of the English vowels. It is worth mentioning that some vowels exist in MSA not as a separate phonemes but as allophones for the same phoneme. Another essential issue about MSA is that no one is using it in everyday conversations or acquiring it as a native tongue as mentioned in the introduction. Accordingly, to have a more adequate comparison and examples, a detailed analysis should cover a particular dialect or more since there are many distinctions from one to another and these differences affect the pronunciation of L2 as well.

Table 10. Sounds exist in English not in MSA

IPA phoneme	IPA transcription	Example
/p/	/ˈpeɪpə/	*paper*
/g/	/gəʊ/	*go*
/ʧ/	/ʧɜːʧ/	*church*
/ŋ/	/brɪŋ/	*bring*
/v/	/vɔɪs/	*voice*
/ʒ/	/beɪʒ/	*beige*
/e/	/wɛnt/	*went*
/æ/	/kæt/	*cat*

/ʌ/	/fʌn/	*fun*
/ʊ/	/pʊt/	*put*
/ɒ/	/wɒʧ/	*watch*
/ə/	/ˈmʌðəɹ/	*mother*
/ɜː/	/nɜːs/	*nurse*
/ɔː/	/tɔːk/	*talk*
/ɪə/	/nɪəɹ/	*near*
/eə/	/heəɹ/	*hair*
/eɪ/	/feɪs/	*face*
/ɔɪ/	/ʤɔɪ/	*joy*
/aɪ/	/maɪ/	*my*
/əʊ/	/nəʊ/	*no*
/aʊ/	/maʊθ/	*mouth*
/ʊə/	/ljʊəd/	*lured*
/ɑɪə/	/faɪəɹ/	*fire*
/ɔɪə/	/ˈmɔɪərə/	*moira*
/ɑʊə/	/paʊəɹ/	*power*

However, the reasons for English pronunciation problems for Arab ESL learners are many as mentioned earlier in the factors affecting L1 interference. In his book, *A Course in Language Teaching*, Ur (1991) mentioned that learner's pronunciation errors are caused by a variety of factors, the most important of which is the lack of specific sound features or pronunciation rules in the first language. As a result, students tend to substitute the closest equivalent sound or pronunciation rule they are familiar with.

Furthermore, according to Lado (1957), L2 speakers may mispronounce a sound because no comparable sound or phonological rule can be found in their L1 phonemic inventory or phonological system. Numerous phonetic and phonemic studies were conducted to relate the Arabic language interference with the English language, as well as to find out what kinds of phonological repair strategies are used in the output of Arabic speakers of English.

3.1.3. Consonant clusters in English and MSA

Consonant clusters are sequences of two or three consonants that come next to each other in one word, without an intervening vowel separating them. Consonant clusters are a characteristic of several of the languages of the world. Approximately one-third of the monosyllabic words start with consonant clusters in English, while the predominance of clusters can be found in the

word-final position. This dominance is explained by the phonemes /s, z, t, and d/ that can be added in suffixes. According to Ramsaran (1999), debates have arisen regarding what is the most appropriate definition for Consonant clusters, On one hand; the term can only be specifically referred to those consonant clusters that take place within a single syllable. On the other hand, if consonant clusters occur across syllable boundaries, they are more usefully defined. Considering the conservative definition, the longest consonant clusters in the word *extra* would be /ks/ and/ str/ whereas the latter, more liberal view would allow / kstr/. The longest possible initial cluster in English is CCC, as in *spring*, whereas the longest probable final cluster is CCCC, as in *twelfths* as seen previously in table (18), but the possibility of finding final clusters longer than three is extremely limited in practice

Modern Arabic dialects have quite simple syllable types, like those of CV, and CVC as described earlier. Heavy syllables such as CVCC, CCV, and CCVC are primarily limited to MSA or some urban dialects. However, in Most Arabic varieties both initial and final positions of consonant clusters are uncommon and rarely used. Speakers also apply syllable repair strategies, totally controlled by the sonority properties of the single consonants. For example, the Jordanian Arabic urban dialect UD allows the existence of CC in both initial and final, but the Jordanian rural dialect RD does not allow and yet embraces a strategy that breaks up a CVCC cluster by inserting either /i/ or /u/. Therefore, /qalb/ *heart* would become /galʊb/ and /kalb/ *a dog* becomes /kalib/. (Broselow E., 1992).

3.1.3.1. Modern Standard Arabic MSA consonant clusters

Consonant clusters in MSA typically occur within words or at the boundaries of morphemes. MSA has specific rules governing consonant clusters which play a key role in the phonology and morphology of the language. According to Btoosh, M. A. (2006), a syllable in Arabic, regardless of its variety must consist of a vowel (either short or long) and an onset. On the other hand, the coda in the majority of forms of Arabic occurs with zero to two consonants.

However, MSA is considered to have a simple syllable structure compared to English. Hamdi, Ghazali & Barkat-Defradas (2005) stated that in MSA there are three primary syllables CV, CVC, and CVV as well as two more complex syllables CVVC, and CVCC, which only occur in specific circumstances such as before a pause. They added that according to a data set of 100,000 syllables, the probability of the occurrences of CV, CVC, and CVV are 49.7%, 23.9%, and 17%, respectively. Where if hamzas were considered full-fledged consonants, the frequency of occurrences of CVVC and CVCC syllables combined hardly represent 1% of all syllables.

Al-Ani (2014) mentioned that in MSA, there are five distinct syllable patterns: CV, CVC, CVV, CVVC, and CVCC. These patterns can occur at the beginning, middle, or end of words. The most frequently encountered pattern is CV, while the least common is CVVC. The fifth pattern, CVCC, is only observed at the end of words or in isolation. He also observed that medial clusters are more prevalent than final clusters in MSA.

Differences in the phonetic features among different Arabic dialects result in varying approaches to resolving complex consonant clusters caused by new phonetic contexts. Reflects the diverse ways in which Arabic varieties manage constraint interactions.

- **Initial clusters:**

Initially, MSA permits only single consonants:

/C/ /ka.li.ma/ *word*

/ki.ta:b/ *book*

- **Medial clusters:**

Medially, MSA permits single consonants, yet two-member consonant clusters can exist in a word as long as they belong to separate syllables.

/CVCVC/ /ka:.tib/ *writer*

/CVCCVCV/ /mad.ra.sa/ *school*

- **Final clusters:**

Word finally, MSA also permits both single consonants and two-consonant clusters. However, a final consonant cluster is not allowed to be pronounced even if it happens to occur in continuous speech within a syllable, for example in a phrase or a sentence the cluster will be broken when adding the diacritic (short vowels) before or after the final cluster to break the cluster and separate them to different syllables. E.g. if the word /qabl/ *before* is followed by the word /qalɪ:l/ *some* it is pronounced as /qab.la qa.lɪ:l/.

/C/ /ka.rɪ:m/ *generous*

/CC/ /fahm/ *understanding*

3.1.3.2. British English Received Pronunciation RP consonant clusters

The English language allows various consonant combinations, as long as they follow the sonority sequencing principle SSP[5].

- **Initial clusters:**

[5] The sonority sequencing principle (SSP): is a linguistic principle that describes the pattern of sounds in a syllable based on their sonority levels. Sonority refers to the loudness or intensity of a speech sound and is typically associated with the openness of the vocal tract during articulation. The sonority sequencing principle suggests that sounds within a syllable tend to follow a specific pattern of increasing or decreasing sonority from the onset (the beginning) to the nucleus (the peak) and then to the coda (the end) of the syllable. (Selkirk E, 1984)

In English, a word may have a single initial consonant or an initial consonant cluster of two or three consonants - note that any single consonant is allowed initially except for the velar nasal /ŋ/:

/C/ *pie, tie, kite, name, man, sit, zip*

Initial two-consonant clusters are allowed typically if they have increasing sonority in the two consonants – note that the fricative /s/ is a regular exception as it may violate the SSP:

/CC/ *plane, sleep, pray, great, spare, dream*

Initial three-consonant clusters are always formed starting with /s/ to be followed by a plosive and a liquid or glide – note that /stl/ and /spw/ homorganic combinations are not allowed:

/CCC/*string, spring, scream, street, splash*

- **Medial and final clusters:**

English permits a medial and final consonant cluster of two, three, or four consonants as follows:

- **Medial**

/CC/ *thinking, curfew*

/CCC/ *language*

/CCCC/ *prankster*

- **Final clusters:**

/CC/ *grasp, lamp, act, help*

/CCC/ *camps, words, strength*

/CCCC/ *tempts, texts, twelfth, sixths*

3.1.4. Sequential constraints in clusters

The study of consonant combinations in language, commonly known as phonotactics, encompasses a broad spectrum of linguistic phenomena, such as clusters, sequences, distributional constraints, and permissible syllable patterns (Lass, 1984, p. 21). It provides invaluable insights into how phonemes, the smallest sound units in a language, interact and combine to form words. Within the realm of phonotactics, it becomes evident that languages impose specific limitations on the sequences of phonemes, allowing only a select set of combinations to occur. This is a widely accepted notion, emphasizing that not all conceivable phoneme combinations are realized in language. Furthermore, it is important to recognize that phonotactic constraints exhibit significant variation across languages, even when they share similar phonemes (McMahon, 2002). Likewise, as proposed by Carr (1993, p. 105), “certain rules include, not only feature-changing rules but also rules expressing both language-specific and universal restrictions”

Additionally, when considering an utterance, it is essential to view it as a set of discrete segments that are complexes of phonetic parameters following a set of principles of phonetic combination (within the segment) and sequencing (between successive segments). Such principles serve as phonetic constraints regulating segment structure and sequential manner. Among the sequential constraints, some languages impose limitations on the maximum length of consonant clusters, with these constraints varying from one language to another. Each phonetic system within a language possesses a specific set of representations that account for its segmental processes (Chomsky and Halle, 1968). Moreover, both phonetically universal and language-specific constraints play a vital role in determining segment and feature arrangements. For example, Japanese restricts syllabic nasals to word-final positions, while German and Dutch only allow word-final occurrence of voiceless, but not voiced obstruents (Shibatani, 1973).

Consonant clusters often have a highly complicated structure. It would seem reasonable to assume that there are no two languages in the world that have the very same cluster inventory. English clusters are not arbitrarily formed; hence, there are some strict rules for their formation. Some researchers have established rules according to their experiences and empirical research. For instance, if a word starts with three consonants, then the sequence must always be /s/+ {/p/,/t/,/k/} + {/l/, /r/, /j/, /w/}; some of these clusters are excluded by independent constraints on clusters containing two subsequent non-continuant consonants or homorganic consonants, such as * /stl/, * /spw/ (Hyman, 1975).

Al-Ani (2014) categorizes consonant clusters in MSA based on their occurrence within words, distinguishing between medial and final positions. In terms of place of articulation, these clusters are further divided into front and back consonants.

Front consonants, which include bilabial, labiodental, dental, alveolar, and palatal sounds, form clusters with both front and back consonants in both medial and final positions. Specifically, the bilabial /b/ and labiodental /f/ exhibit compatibility with all consonants except for a few exceptions. Additionally, the sonorants /w/ and /j/, along with the fricative /ʕ/, freely combine with all consonants in both positions.

Back consonants, encompassing velar, uvular, pharyngeal, and laryngeal sounds, also demonstrate distinct patterns of cluster formation. For instance, while velar consonants such as /k/ and /q/ do not occur together, neither do uvular consonants like /χ/ and /ɣ/. Furthermore, back consonants such as /h/, /ʔ/, and /ħ/ do not readily combine.

However, Al-Ani's (2014) findings shed light on the complex phonological structure of consonant clusters in MSA, particularly emphasizing their distribution within words rather than syllables. It's important to note that MSA's phonological structure is influenced by the dialects

spoken by its users. Therefore, these observations cannot be universally applied to the standard spoken variety of Arabic, which varies across regions and is influenced by diverse dialectal forms. The following are compatible medial and final two consonant clusters in MSA, as identified by Al-Ani (2014, pp. 80-81):

3.1.4.1. Compatible medial two consonant clusters in MSA

1. Stop + Approximant: These clusters combine a stop consonant (e.g., /b/, /t/, /d/, /k/) with an approximant consonant (e.g., /w/, /j/).
2. Voiceless Fricative + Approximant Clusters: Clusters like /fw/, /sj/, /ʃw/ combine a voiceless fricative (e.g., /f/, /s/, /ʃ/) with an approximant (e.g., /j/, /w/).
3. /s/ + Voiceless Stop: Clusters such as /st/, and/sk/ combine the /s/ sound with voiceless stops (/t/, /k/).
4. /s/ + Nasals other than /ŋ/: Clusters such as /sm/, and/sn/ combine the /s/ sound with nasal consonants (/m/, /n/).

3.1.4.2. Compatible final two consonant clusters in MSA

1. Nasal + Voiceless Stop: Clusters ending with a nasal consonant (e.g., /m/, /n/) followed by a voiceless stop (e.g., /t/, /k/) are common.
2. Nasal + Fricative: Clusters ending with a nasal consonant (e.g., /m/, /n/) followed by a fricative consonant (e.g., /s/, /θ/) are found.
3. Voiceless Fricative + Voiceless Stop: Clusters ending with a voiceless fricative consonant (e.g., /θ/, /s/) followed by a voiceless stop (e.g., /t/, /k/) are permissible.
4. Two Voiceless Stops: Clusters with two voiceless stops (e.g., /pt/, /kt/) are allowed.
5. Liquid + Stop: Clusters ending with a liquid consonant (e.g., /l/, /r/) followed by a stop (e.g., /b/, /t/) are permissible.
6. Liquid + Fricative: Clusters ending with a liquid consonant (e.g., /l/, /r/) followed by a fricative consonant (e.g., /f/, /ʃ/) are possible.

On the other hand, Baloghné & Szentgyörgyi (2006) claim that English consonant clusters (CC), regardless of whether they appear in initial or final positions of words, usually involve phonetically compatible sounds. Phonetic compatibility means that the sounds in a cluster share similar or compatible articulatory features and are easy to pronounce in sequence. They present major English phonotactic constraints, where the most common combinations of sounds in either initial or final positions of English are mentioned. Below are some examples of compatible initial and final two-member (CC) combinations in English:

3.1.4.3. Compatible initial two consonants cluster in British English

1. Stop + Approximant: These clusters combine a stop consonant (e.g., /p/, /b/, /t/, /d/, /k/, /g/) with a liquid or glide consonant (e.g., /l/, /r/, /w/, /j/). Clusters like /pl/ (e.g., *place*), /bl/ (e.g., *blow*), /tr/ (e.g., try), /dr/ (e.g., *dress*), and/tw/ (e.g., *twin*) are common in English.

2. Voiceless Fricative + Approximant Clusters: like /fj/ (e.g., fju:) /fl/ (e.g., *floor*), /fr/ (e.g., *free*), /sl/ (e.g., *sleep*), /sw/ (e.g., *swing*) combine a voiceless fricative /f/, /s/, /θ/, /ʃ/, /h/consonant with a liquid consonant /l/, /r/, /w/.

3. /s/+ Voiceless Stop: Clusters like /sp/ (e.g., *speed*), /st/ (e.g., *stand*), /sk/ (e.g., *skip*) combine /s/ with voiceless stops like /p/, /t/, /k/.

4. /s/+ Nasals other than /ŋ/: Clusters like /sm/, (e.g., *smile*), and/sn/ (e.g., *snack*) combine the /s/ sound with a nasal consonant.

3.1.4.4. Compatible final two consonants cluster English

1. Nasal + Voiceless Stop: Clusters that end with a nasal consonant (e.g., /m/, /n/) followed by a voiceless stop (e.g., /p/, /t/, /k/) are common in English. As in /mp/ e.g., *jump,* /nt/ (e.g., *hunt*), and /ŋk/ *sink* (note that /ŋ/ is a velar nasal sound).

2. Nasal + Fricative: Clusters that end with a nasal consonant (e.g., /m/, /n/) followed by a Fricative consonant (e.g., /f/, /s/, /θ/, /ʃ/) are found in English words such as the combination of /ns/ in *months.*

3. Voiceless Fricative + Voiceless Stop: Clusters that end with a voiceless fricative consonant (e.g., /f/, /s/, /θ/, /ʃ/, /h/) followed by a voiceless stop (e.g., /p/, /t/, /k/) are permissible, as in /ft/ (e.g., *left),* /st/ (e.g., *best*).

5. Stop + Fricative: Also, clusters that end with a stop /p/, /t/, /k/, /g/, /d/, /b/, followed by a fricative consonant (/f/, /v/ /s/, /z/, /θ/ /ð/, /ʃ/, /h/) are possible combinations in English. /pθ/, /ps/, /tθ/, /dθ/, /ðz/, /ks/ *depth, lapse, eighth, width, clothes, box.*

4. Two Voiceless Stops: Such cluster is allowed in English as in the combination of /pt/ in (e.g., *opt*) and /kt/ in (e.g., *act*).

6. Liquid + Stop: Clusters that end with a liquid consonant /l/, /r/, followed by a stop /p/, /t/, /k/, /b/, /d/, /g/ are permissible. As in *help, bulb, belt, hold, belch, indulge, milk, large, mark.*

7. Liquid + Fricative: Clusters that end with a liquid consonant /l/, /r/, followed by a fricative consonant are possible in English. As in the combination of /lf/, /lv/, /lθ/, /ls/, /lz/, /lʃ/, /lð/ in *golf, solve, wealth, else, bells, Welsh* and /rv/, /rθ/, /rð/, /rs/, /rz/, /rʃ/ in words like *carve, north, birth, force, Mars, marsh.*

8. Liquid + Nasal: Clusters that end with a liquid consonant /l/, /r/, followed by a nasal are permitted in English and can be found as in /lm/, /ln/ in *film*, and /rm/, /rn/ *arm, born*.

9. Two or three voiceless fricatives: Such combinations are commonly used in final clusters in English and can be found as in the combination of /fθ/ or /fθs/ in *fifth*, and *fifths*, respectively but typically in suffixed forms.

Universally and in English three consonant clusters (CCC) are less common than two consonant cluster CC clusters, and the permissible CCC clusters are generally limited to specific patterns and involve phonetically compatible sounds. Baloghné and Szentgyörgyi (2006, p. 67) state, "The maximal number of syllable-initial consonants in English is three. The three-member sequences are, however, heavily constrained: they always begin with /s/ (again, it is /s/!), which is followed by a legitimate two-member cluster…" Below are some examples of compatible initial CCC clusters in English:

3.1.4.5. Compatible initial three consonants cluster English

• /s/+ plosive + approximant: Clusters like /spl/ (e.g., *splash*), /str/ (e.g., *street*), /scr/ (e.g., *scrap*), /skw/ (e.g., *square*), and /stj/ (e.g. *student*) combine the consonant /s/ with a plosive (e.g., /p/, /t/, /k) and a liquid consonant (e.g., /l/, /r/, /w/, /j/).

3.1.4.6. Compatible final three-member combinations of English

1. Two voiceless stops + s: Clusters as /pts/ e.g., *opts*), /kts/ (e.g., *acts*) combines two of the voiceless stops consonants /p/, /t/, /k/ with a fricative consonant (/f/, /v/ /s/, /z/, /θ/ /ð/, /ʃ/, /h/).

2. Lateral Approximant + Two or Three Consonants: Are clusters that begin with a lateral approximant (/l/) followed by two or three consonants which can be found in words like *filmed* /lmd/, *sculpt* /lpt/, *alps* /lps/, *twelfth* /lfθ/, *waltz* /lvð/, *whilst* /lvfθ/, *belts* /lts/, *whilst* /lst/, *milked* /lkt/, *and calx* /lks/.

3. Nasal + Homorganic Stop + Stop or Fricative: English also features clusters with a nasal consonant (/m/, /n/, /ŋ/) followed by a homorganic stop (/p/, /t/, /k/) and either a stop or fricative consonant. Examples include *prompt* /mpt/, *glimpse* /mps/, *chintz* /nts/, *thousandth* /ntθ/, *distinct* /ndð/, *jinx* /ŋkt/, *lengths* /ŋks/, and *length* /ŋkθ/, in some varieties).

4. Nasal + Homorganic Stop + Two Fricatives: A nasal consonant followed by a homorganic stop can also be followed by two fricatives, as seen in the word *thousandths* /ndðz/.

5. Three Obstruents: Clusters with three obstruent consonants (/k/, /s/, /θ/) are seen in English words like *sixth* /ksθ/ and *next* /kst/.

6. Four Obstruents: In certain words, English permits clusters of four obstruent consonants, as found in *sixths* /ksθs/, and *texts* /ksts/ but only in suffixed forms.

In conclusion, the contrast between the syllable structures in MSA and English reveals a profound distinction in the phonological characteristics of these languages. MSA follows a relatively simple syllable structure, typically adhering to the CV (V) (C) (C) format, in which consonants are crucial in the initial syllables of words, but their presence at the final position of syllables is merely optional. The simplicity of MSA extends to the spoken dialects, although variations exist. As, the Jordanian Arabic rural dialect requires that no word should end in a consonant cluster. This situation may lead one to conclude that vowel insertion, consonant deletion, substitution plus other strategies, can be found in word-final clusters and other cluster types in EFL spoken by RD learners. More about the sound systems of Jordanian dialects is going to be explained in detail in a separate section.

Conversely, English exhibits a notably complex syllable structure, with syllables that can be expressed by the intricate formula (C) (C) (C) V(C) (C) (C) (C). This complexity arises from the fact that English allows extensive consonant cluster structures, both in initial and final positions. English syllables feature diverse clusters, some of which include up to three or even four consonants. Such clusters are phonetically compatible, facilitating their occurrence within English words.

This linguistic divergence in syllable structure, with English allowing more complex and varied consonant clusters, often poses a significant challenge for Arabic speakers learning to pronounce English words accurately. As a result, understanding these differences is crucial for language learners and linguists alike to appreciate the phonological intricacies that underlie each language, enabling more effective teaching and learning strategies. This comparative analysis emphasizes the substantial dissimilarities in syllable structures between MSA and English, reflecting the remarkable diversity present in the world's languages.

3.1.5. The syllable structures in Modern Standard Arabic MSA and British English Received Pronunciation RP

Phonologically, the syllable is a suprasegmental unit that is used to determine the distributions or possibilities of phonemes occurring sequentially (Robins, 1964, p. 139). A description of the phonemes and the positions they occupy is typically included in the phonological description of languages. Abercrombie (1967, p. 38) provides a perspective on the "texture" of a syllable by assuming that the syllable can be obtained by decomposing it into its constituent segments (vowels and consonants).

It is worth noting that syllables do not serve any meaning-signaling function in language; they exist only to make speech easier for the brain to process. Universally, the smallest word in

any language consists of at least one syllable, which consists of a central peak of sonority (usually a vowel) and the consonants around the central peak, also known as the nucleus, which is a syllabic segment that forms the core of a syllable. The onset which is the beginning segments of the syllable; the ones preceding the nucleus, while the coda is the name of the position containing the segments that follow the nucleus in the same syllable. The rhyme is the unit containing both the nucleus and the coda of the syllable.

It is necessary to have a quick look at the syllable structures in MSA and in the English language to see the differences between the rules and constraints of the two languages that usually are the reason behind many major pronunciation problems. According to Al-Saidat (2010) syllable structure in MSA can be explained with the following formula: CV (V) (C) (C), i.e. every syllable in Arabic starts with a single consonant to be followed by a vowel – or optionally two vowel qualities, i.e. a diphthong – to be closed by zero, one, or two optional consonants. According to Watson (2002), MSA syllable structures have five possible types of syllables. The simplest necessary construction of the MSA syllable is CV, and the most complex one is CVCC (Al-Ani, 1970). Therefore, the following syllables below are acceptable, note that these types of syllables are considered unmarked syllables in world languages.

Table 11. MSA syllable structure

Syllable Type	**MSA example**	**Gloss**
CV	/la/	*no*
CVV	/ħaj/	*alive*
CVC	/na:r/	*fire*
CVCC	/rasm/	*painting*

However, there are some differences between MSA syllable structure and that of the different spoken dialects, for instance, the Jordanian urban dialect of Arabic, where the CCVC structure is allowed unlike in MSA. On the other hand, English syllable structures are considered more complex than those of Arabic dialects. The syllables CV, CVC, and CVCC are common in the two languages. However, Table (18) indicates that English has fourteen syllable templates more than MSA. In contrast to MSA, English permits both initial and final consonant clusters with higher numbers of consonants. In addition, an English consonant cluster can be formed by a combination of two, three, or four consonants (Treiman, 1989). English syllables may be expressed by the formula: (C) (C) (C) V(C) (C) (C) (C). Therefore, the following syllables shown in Table 12 are considered acceptable:

Table 12. British English Received Pronunciation RP syllable structure

Syllable Type	English example	Transcription
CV	*tea*	/ti: /
CCV	*spy*	/spaɪ/
CCCV	*spray*	/spreɪ/
VC	*am*	/æm/
VCC	*ant*	/ænt/
VCCC	*ants*	/ænts/
VCCCC	*pre-empts*	/priɛmpts/ (the second syllable)
CVC	*man*	/mæn/
CVCC	*best*	/bɛst/
CVCCC	*bands*	/bænds/
CVCCCC	*sixths*	/sɪksθs/
CCVC	*brag*	/bræg/
CCVCC	*brags*	/brægz/
CCVCCC	*plants*	/plænts/
CCCVC	*spring*	/sprɪŋ/
CCCVCC	*sprint*	/sprɪnt/
CCCVCCC	*splints*	/splInts/
CCCVCCCC	*strengths*	/streŋkθs/

3.2. Contrastive analysis between the sound systems of MSA and Jordanian dialects

3.2.1. An overview of Arabic dialects in general

As mentioned in Chapter 1, Arabic, a prevalent language across the Middle East and North Africa, holds official status within the United Nations as one of its six recognized languages (United Nations, 2011). In Arab societies, dialectal variations of Arabic reflect not only geographical distinctions but also social aspects and cultural identities. These regional dialects are deeply intertwined with societal structures, reflecting the history, traditions, and values of local communities. Despite the presence of political boundaries between countries, these dialects often transcend geographic distinctions, illustrating the interconnectedness of Arabic-speaking populations across borders.

Moreover, the flexibility of dialectal boundaries is apparent in instances where a dialect may stretch beyond a country's borders into neighboring nations. This phenomenon underscores the ever-changing nature of language and the impact of historical exchanges, trade routes, and migration on the spread of linguistic traits. As a result, people from various countries in the Arab world might exhibit comparable dialectal characteristics, contributing to a feeling of linguistic and cultural kinship across a range of Arab communities.

Geographically close dialects (e.g. Levantine dialects, Gulf dialects, etc.) could have certain similar linguistic characteristics, but there are still several significant differences between them. On syntactic, phonological, and morphological levels, the political boundaries between the regions where these dialects are spoken, do not have any effect on the placement of the lines on the dialect map to mark them as having different linguistic features, but major variations indeed do exist (Horesh, 2014, p. 13). In other words, the regional dialects of Arabic do not follow borders between countries, i.e. one dialect may reach over the border into neighboring countries as well.

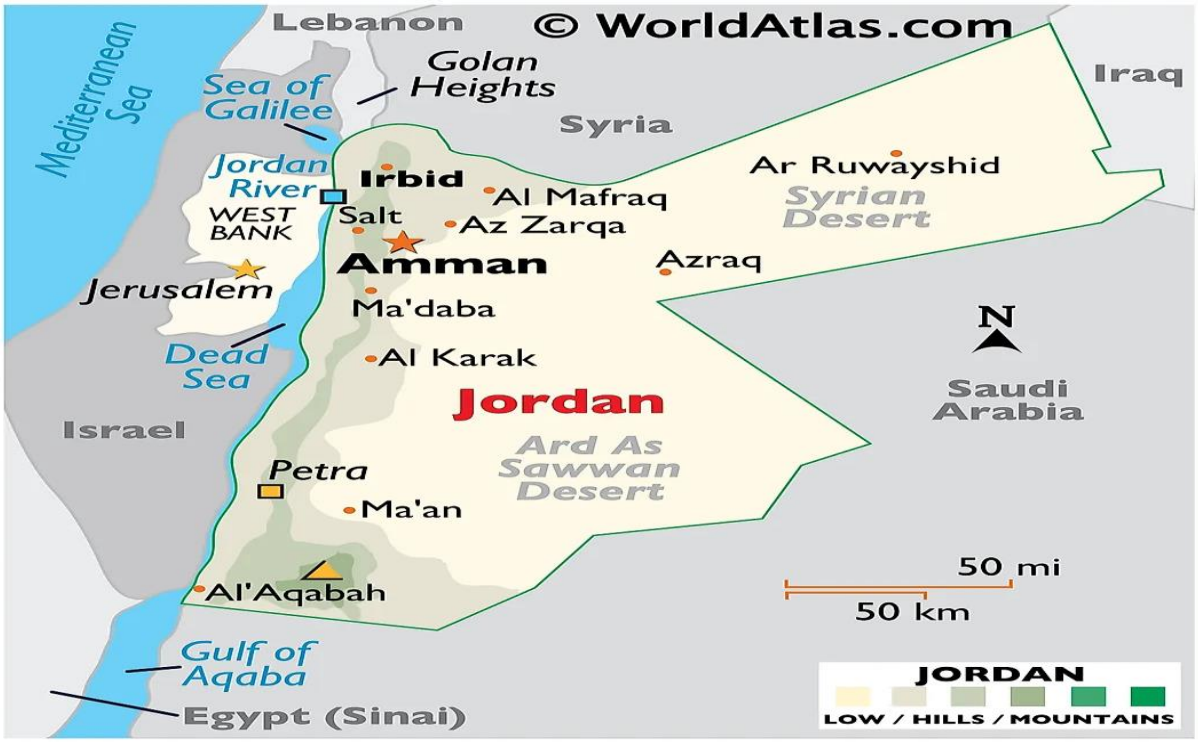
Nonetheless, in some of the countries mentioned earlier in this study, many sub-dialects are considered to be very distinct phonetically, lexically, and syntactically from one another. These dialects are spoken by different communities originating from various countries and regions, mostly as a result of the language contact between people living in regions that are close to the borders of other countries, where there are no sharp geographical boundaries. Thus, one may notice a shared dialect spoken by speakers from two or more cities in two different countries that are more homogeneous than those in cities within the same country. For example, the people residing in the southern part of Syria and the people living in the northern part of Jordan speak the same dialect because of the geographical proximity of the two regions known as the Houran Plains, including the Jordanian Ramtha and the Syrian Diraa.

3.2.2. Jordanian Arabic dialects

This part aims to offer a broad idea of the different dialects in Jordan and the difficulty of the classification of such dialects. Jordanian Arabic (JA) is considered as a dialect group and one of the dialects used in the Levantine region of Jordan, Syria, the West Bank, Israel, and Lebanon. The term *Jordanian Arabic*, like the expression of *the Arabic language*, is ambiguous, since it includes at least three distinct dialects that are quite different on several levels: at the level of syntax, morphology, and phonology. Al-Wer (2007) argues that to fully comprehend the dialect geography in Jordan, researchers must understand how the political borders of 1920 were placed, as the northern borders involve hundreds of villages and cities extending into Syria reaching the Houran Plains, and Badiyat Ash-Sham. On the other hand, the southern borders

extend to the Hijaz region of Saudi Arabia and include the cities of Aqaba and Maan. The eastern borders extend to the Al Bidiya Ash-Sharqiyya (Eastern Desert) which is divided between Jordan and Iraq, whereas the western borders stretch to the Jordan Valley which is shared between Jordan, the West Bank, and Israel. These political borders as well as the main cities in Jordan are shown in figure 6.

Figure 6. The map of Jordan[6].



Three major sub-dialects of spoken JA are divided into geographical areas (Al-Sughayer, 1990; Sakarna, 1999, Al-Deaibes, 2015). These subdialects are known as Urban Jordanian Arabic UD, Bedouin Jordanian Arabic BD, and rural Jordanian Arabic RD (Suleiman, 1985). UD operates as a lingua franca or dominant dialect alongside MSA in Jordan as it is regarded more prestigious than other dialects since it is spoken by educated people of higher social status.

Jordanian dialects differ from one region to another, and one can spot these differences very easily and decide which region a speaker is originally from. For example, (R) stands for rural areas consisting of the villages of Irbid, Al-Ramtha, Jerash, and Ajlun in northern Jordan; (U) stands for urban areas of the cities of Irbid, Zarqa, and Amman in northern and central Jordan; (B) stands for Bedouin, which includes the desert of Mafraq, Maan, Kerak and Tafila in southern Jordan.

[6]. Source: World Atlas.

UD is primarily spoken in major cities (Amman, Zarqa, and Irbid) and by urban dwellers who are either Palestinians or Syrians, who have immigrated to Jordan in the last two hundred years due to conflicts, expulsions, and political instability, whether as a result of the British occupation, the Ottoman rule, or the Israeli-Palestinian conflict. Therefore, it is important to note that UD is not the whole picture of Jordanian Arabic. Since its speakers come from other societies, UD is similar to several other dialects, i.e., those in Syria, Palestine, and Lebanon (Ibrahim, 1984). On the other hand, Bedouin Jordanian Arabic is spoken by desert dwellers (nomadic tribes) in the northern, eastern, and southern areas of Jordan in the counties of Mafraq, Kerak, Maan, and Al-Badiya Al-Shamaliya. According to Sakarna (1999), there are five Bedouin dialects in Jordan spoken by five different Bedouin tribes: the Bani Hasan tribe dialect, the Bani Sakher tribe dialect, the Al-Huwaitat tribe dialect, the Al-Ajarma tribe dialect, and the Al-Abady tribe dialect. Finally, the rural dialect is primarily spoken by villagers (farmers) who live in the suburbs and small towns of northern Jordan, such as the districts of Al-Ramtha, Bani Kanana, Bani Ebeid, and Al-Koura, and the town of Deraa and its villages in Syria.

3.2.3. Social dynamics in Jordanian Arabic: exploring variations across dialects

This section provides an overview of the sociolinguistic landscape of Jordan, Highlighting the distinct characteristics of the three primary dialects: urban, rural, and Bedouin as well as elucidating their distinct characteristics in terms of regional, social, and stylistic aspects. Through a detailed analysis, this section underscores the complex interplay of factors such as geography, socioeconomic status, and cultural heritage in shaping language variation in Jordan. By exploring these dialectal nuances, the section contributes to a broader understanding of the multifaceted nature of linguistic identity and communication in Jordan's sociolinguistic context.

Based on previously mentioned information, the dialects that exist in Jordan have a distinct and complex status due to the diversity resulting from the diverse origins of its speakers. For example, RD is primarily spoken in northern Jordan but has also been adopted in the southern Syrian town of Deraa, demonstrating the impact of geopolitical position. Similarly, UD is common in major cities such as Irbid, Zarqa, and Amman, which have had significant influxes of immigrants from the West Bank, mainly as a result of the Israeli-Palestinian conflict, and from Syria as a result of the Syrian civil war. This (UD) dialect is closer in pronunciation to Damascus or Jerusalem dialects than to RD or BD dialects.

Studying dialects should not solely rely on national borders as they overlook the significant influence of geographical proximity and historical interactions on language development. For instance, the rural dialect should be viewed as a continuous linguistic spectrum stemming from the historical connections among villages across political boundaries in Jordan and neighboring.

Regional dialects, irrespective of geopolitical divisions, offer a more comprehensive understanding of linguistic variation compared to categorizing dialects based solely on political affiliations, such as Jordanian Arabic or Syrian Arabic.

The difference between the above three varieties is mainly phonetic, although it may also be lexical (see Zuraiq and Zhang, 2006; Jarbou and Al-Share, 2012; Al-Deaibes, 2015a). For instance, phonetically, the word coffee is pronounced as /gahwa/ in RD and as /ghiwa/ with a two-consonant cluster at the onset of the syllable, in BD, while UD speakers pronounce it as/ʔahwi/.

MSA is the main language of the government in Jordan and is used on television, in written media, on radio stations, in government settings, official speeches, laws, sermons, etc. Individuals speak their dialects in their daily dialogues, depending on their area of residence or geographic origin. Consequently, Jordan (like other Arabic-speaking regions) is in a diglossic situation where MSA is applied exclusively to formal contexts (Ferguson, 1959 and El-Hassan, 1977) and other varieties are spoken in everyday-life discourse.

It is crucial to keep in mind that sociolinguistic variation is overly complex and can be affected by a variety of factors such as age, gender, ethnicity, and personal preferences. In Jordan, the usage of particular dialects can be an indicator of identity, and individuals may prefer to emphasize their geographical, social, or stylistic affiliations in their speech. Furthermore, the linguistic landscape is dynamic, and how languages are used may change over time as a result of factors such as migration, urbanization, and media exposure. Jordanian Arabic varies sociolinguistically due to geographic, socioeconomic, and stylistic influences, giving rise to three distinct dialects: urban, rural, and Bedouin.

3.2.3.1. Urban dialect

- **Regional aspect**: The urban dialect is mainly associated with urban centers, particularly Amman, the capital city, and other significant cities such as Zarqa and Irbid. As a result of the diverse population of urban centers, it is characterized by a mix of influences from multiple regional dialects.
- **Social aspect**: This dialect has often been associated with highly educated and well-off populations. Individuals with higher degrees of academic achievement and those working in professional and business environments are more likely to use it. It also is considered as a more prestigious form of language since it is used by the upper classes of society, which can be a reason behind it being used by female speakers even in communities that do not use it, to indicate a softer and more prestigious manner.

- **Stylistic aspect**: Depending on the context, the urban dialect may switch across formal and informal styles. In formal or professional settings, speakers may employ a more standardized and formal variety that closely corresponds to Modern Standard Arabic MSA. In casual settings, a more colloquial and easygoing tone emerges.

3.2.3.2. Rural dialect

- **Regional aspect**: The rural dialect is common in rural and less urbanized parts of Jordan, including smaller towns and villages, such as the rural dialect introduced in this research.
- **Social aspect**: It is often associated with individuals working in traditional and agricultural regions vocations, as well as those with lower incomes. Older generations and those with less formal education are more likely to use the rural dialect. It is crucial to note that this is just a stereotype about this dialect as individual differences may affect it, for instance, you can find rich or highly educated people in villages, yet they use the rural dialect, so it is more associated with the environment more than social status. It is also used more frequently by males to indicate masculinity even in big cities where urban dialect is used.
- **Stylistic aspect**: The rural dialect is distinguished by a closer adherence to standard language features and vocabulary. It is believed that it maintains older linguistic components and is considered to be less influenced by present colloquial language changes.

3.2.3.3. Bedouin dialect

- **Regional aspect**: The Bedouin dialect is commonly used by Bedouin populations, who are traditionally nomadic or semi-nomadic and live predominantly in Jordan desert landscapes.
- **Social aspect**: It is associated with the Bedouin population's unique social and cultural identity. The dialect is widely used throughout Bedouin society to preserve their distinct heritage and traditions.
- **Stylistic aspect**: The dialect spoken by the Bedouin people reflects their nomadic way of life, desert surroundings, and adherence to traditional values. Mainly used by Bedouins, their linguistic choices serve as clear indicators of their social identity, highlighting the cultural significance of their social groups. These linguistic features, typically used in informal contexts, show minimal variation in style within Bedouin society, emphasizing their unique role as markers of social belonging and heritage

Understanding and considering different dialects is critical for efficient communication and relationship building in Jordan's complicated sociolinguistic environment. It is crucial to

remember that language use is flexible, and people may code-switch or employ a blend of different dialects depending on the circumstance, context, and interlocutors.

3.2.4. Phonetic Variations in Jordanian Arabic Dialects

This section delves into some of the phonetic differences observed among various Arabic dialects, focusing particularly on the rural (RD), Bedouin (BD), and urban (UD) varieties. These dialects exhibit distinct variations in the pronunciation of specific phonemes, as highlighted in Table 13. The analysis explores how phonetic features differ across these dialects, shedding light on the intricate nuances of Arabic phonology within different speech communities.

Phonetically speaking, as illustrated in Table 13, significant phonetic variations exist among the rural, Bedouin, and urban dialects. In some cases in RD and BD, the /k/ sound is realized as /ʧ/ depending on its position and the surrounding sounds, whereas in UD, it is realized always as /k/. Similarly, the voiceless uvular plosive sound /q/ is pronounced as /g/ in RD and BD, but replaced by the /ʔ/ sound in UD. Furthermore, while /θ/ remains /θ/ in RD and BD, it is pronounced as /t/ in UD. Additionally, variations are observed in the pronunciation of /đ/, /ð/, and /ʤ/, with RD and BD maintaining /ð/, /ð/, and /ʤ/ respectively, while in UD, these are pronounced as /đ/, /z/, and /ʒ/ respectively.

Table 13. Examples of phonetic differences between the JA varieties

Word in MSA	**RD**	**BD**	**UD**	**Gloss**
/kalb/	/ʧalıb/	/ʧalb/	/kalb/	*dog*
/qalb/	/galub/	/galb/	/ʔalb/	*heart*
/kufu:f/	/ıʧfu:f/	/kufu:f/	/kfu:f/	*gloves*
/đarb/	/ðarub/	/ðarıb/	/đarıb/	*to hit*
/ıða/	/ıða/	/ıða/	/ıza/	*if*
/ʤar/	/ʤar/	/ʤar/	/ʒar/	*neighbor*

These phonetic differences reflect the diverse phonological landscapes of the Arabic varieties, as noted by Suleiman (1985). Notably, RD exhibits distinct phonotactic constraints compared to other varieties, particularly in its treatment of consonant clusters. RD does not allow word-initial consonant clusters, whereas UD permits two-consonant clusters. Furthermore, word-final consonant clusters are accepted in MSA and UD but not in RD. In RD, a vowel is often inserted between consonants to facilitate pronunciation, resulting in two separate syllables. For example, the word /ık.fu:f/ is pronounced as /ık.fu:f/ instead of /kfu:f/, and /ða.rub/ instead of / đarb/. These dialects serve as the primary native language variants for

individuals, commonly used in daily communication and, more recently, in written forms with the advent of social media. In informal written communication, Roman letters are often used instead of Arabic script, with numbers occasionally replacing sounds lacking equivalents in the English alphabet (Al-Deaibes, 2016).

3.2.5. An overview of the RD sound system

This section thoroughly examines the vowel and consonant inventory of the RD compared to those of UD and MSA. It also provides a comparison between Modern Standard Arabic MSA and the distinctive characteristics of syllable structure in RD and UD. It presents particular phonological processes in RD and UD as well as highlighting how these linguistic features differ from or overlap with those in MSA. This analysis helps explain the features that distinguish RD and offers a perspective on its phonological structure compared to the other dialects in this study.

3.2.5.1. Vowel and consonant inventories in RD

RD has a total of nine vowels, four short vowels /i/, /u/, /e/, /a/, as well as five long vowels /iː/, /uː/, /eː/, /aː/, /oː/. The three vowels that are not shared with MSA are the long mid-front vowel /eː/, the short mid-front vowel /e/, and the long mid-back vowel /oː/. The mid-front long vowel /eː/ can be found in RD in words like /seːr/ *traffic* and /weːn/ *where* while in MSA, respectively as /sajr/ and /ʔajn/. The mid-back long vowel /oː/ can be found in words like /loːz/ *almonds* and /loːħ/ *board* in RD, which are pronounced in MSA as /lawz/ and /lawħ/, respectively. At the end of nouns and adjectives, the mid-front short vowel /e/ operates as a feminine marker, as in /tˤaw, le/ *table*, /ka.biːre/ *big*, which are pronounced as /tˤa.wil.a/ and /ka.biː.ra/, respectively, in MSA.

Several minimal pairs provided by RD speakers were analyzed for the sake of investigating the vowel inventory of RD and to compare it with MSA, and it was concluded that RD speakers use three more vowels in addition to the original six vowels that are found in the vowel inventory of Standard Arabic MSA. The three extra vowels are mostly the long mid-front/eː/, the short mid-front /e/, and the long mid-back/oː/. These three vowels also act as allophones of the phonemes listed above used in words such as /sˤeːd/ *hunting* instead of /sˤaɪd/, /roːħ/ *soul* instead of /ruːħ/.

- **Consonants in RD**

For RD, the consonant inventory varies slightly from MSA in the manner that MSA has 28 consonants, while RD has 29 consonants. Tables 14 and 15 present the consonants of the RD and MSA inventories.

Table 14. A list of phonetic symbols of the RD consonants

Phonetic symbol	Three-term label	Example
/b/	Voiced bilabial plosive	/bab/ *door*
/t/	Voiceless denti-alveolar plosive	/tiːn/ *fig*
/d/	Voiced denti-alveolar plosive	/diːn/ *religion*
/k/	Voiceless velar plosive	/bukra/ *tomorrow*
/g/	Voiced velar plosive	/ʕa.gil/ *mind*
/l/	Voiced alveolar lateral	/la.mis/ *touch*
/m/	Voiced bilabial nasal	/ga.mar/ *moon*
/n/	Voiced alveolar nasal	/naːs/ *people*
/f/	Voiceless labio-dental fricative	/faːr/ *rat*
/θ/	Voiceless inter-dental fricative	/θɔːb/ *traditional dress*
/ð/	Voiced inter-dental fricative	/ɔið.rib/ *hit it*
/s/	Voiceless alveolar fricative	/suːg/ *market*
/sˤ/	Voiceless velarised alveolar fricative	/ra.gisˤ/ *dance*
/z/	Voiced alveolar fricative	/zɔ.lɔm/ *men*
/ʃ/	Voiceless palato-alveolar fricative	/ma.ʃwiː/ *grilled*
/ʤ/	Voiced palato- alveolar affricate	/ʤɔːrə/ *hole*
/ʧ/	Voiceless palato- alveolar affricate	/ʃlɔː.nɪʧ/ *how are you for a female*
/x/	Voiceless velar fricative	/xaːl/ *uncle*
/ɣ/	Voiced velar fricative	/ɣabiː/ *idiot*
/ħ/	Voiceless pharyngeal fricative	/ħɔr/ *free*
/h/	Voiceless glottal fricative	/haːðˤ/ *this*
/r/	Voiced alveolar trill	/ra.mɔl/ *sand*
/ʕ/	Voiced pharyngeal fricative	/ʒuːʕ/ *hunger*
/j/	Voiced palatal semi-vowel	/jasaːr/ *left*
/w/	Voiced labio-velar semi-vowel	/wa.rɪd/ *flowers*
/tˤ/	Voiceless velarised denti-alveolar plosive	/fatˤ.bɔːl/ *football*
/ðˤ/	Voiced velarised denti-alveolar fricative	/ha.ðˤɔːl/ *these*
/ʔ/	voiceless glottal stop	/ɔɪsə/ *now*

Table 15. A list of phonemes that only occur in one dialect but not in the other

Phonetic symbol	**RD**	**MSA**
/đ/		/đ/
/q/		/q/
/ʧ/	/ʧ/	
/g/	/g/	

On the grounds of tables 13, 14, and 15 there were only two consonants that occur in MSA but not in RD. These consonants are the voiced velarized denti-alveolar plosive /đ/, as in MSA /đaɣtˤ/ *pressure*, which is pronounced as /ðˤ/ in /ðˤaɣitˤ/ in RD, as well as the voiceless uvular plosive /q/, as in MSA /ʕaql/ *mind* that is pronounced as /g/ in /ʕagil/ in RD. This leads to the fact that the RD consonant inventory includes the voiced pharyngeal plosive /g/ in contrast with MSA and UD. Similarly, the voiceless palato-alveolar affricate /ʧ/ is used instead of the sound /k/ in some cases as in /ʧaf/ instead of /kaf/; it also exists in RD but not MSA and UD.

- **Vowels in RD**

Table 16 provides a detailed overview of the vowel sounds present in the RD dialect. The dialect contains a variety of vowel sounds similar to Modern Standard Arabic MSA. These include front open unrounded long vowels like /aː/, front close unrounded long vowels such as /iː/, and back close rounded long vowels like /uː/. Additionally, short vowels like central open unrounded /a/, front unrounded half-close /ɪ/ or /i/, and back rounded vowels between close and half close /u/ are also present.

Moreover, the dialect exhibits diphthongs, like the fronting closing wide diphthong /aj/ and the backing closing wide diphthong /aw/. Notably, the RD dialect seems to have a broader range of vowels, both short and long, as well as diphthongs, compared to MSA which contributes to the unique phonological characteristics of this dialect, but these are considered as allophones of the same phonemes, and they do not change the meaning of a word as mentioned earlier. For instance, the /eɪ/ diphthong is seen in the word / ʕeɪn/. It is important to acknowledge that while Table 16 offers valuable insights, there are limitations due to the lack of research and challenges in providing comprehensive phonetic and phonological descriptions of dialects, including variations in vowels. Dialects are changing over time and are influenced by various environmental factors, making it difficult to capture a static representation. Further research and ongoing study are crucial to gain a more in-depth understanding of the vowel inventory in this dialect.

Table 16. RD vowel inventory

Phonetic symbol	**Three-term label**	**Example/translation**
/aː/	Front open unrounded vowel (long)	/ ɪħmaːr / *donkey*
/eː/	Front mid unrounded vowel (long)	/weːn/ *where*
/e/	Front mid unrounded vowel (short)	/bedɪʧ/ *do you want? for a female*
/oː/	Back mid-rounded vowel (long)	/loːz/ *almonds*
/iː/	Front close unrounded vowel (long)	/diːn/ *religion*
/uː/	Back close rounded vowel (long)	/suːq/ *market*
/a/	Central open unrounded vowel (short)	/qalam/ *pen*
/ɪ/ or /i/	Front unrounded half close vowel between (short)	/gɪrɪd/ *monkey*
/u/	Back rounded vowel between close and half close (short)	/ruz/ *rice*
/aj/	Fronting closing wide diphthong	/mukayɪf/ *air conditioning*
/aw/	Backing closing wide diphthong	/lawɪn/ *color imperative verb*

3.2.5.2. A brief description of phonological processes in RD

In this section, a brief introduction to some of the phonological processes of RD, namely vowel epenthesis to break up consonant clusters, the core interest of this dissertation, will be presented. Such consonant clusters can be found in MSA, UD, and sometimes also in BD.

As previously stated, RD includes four short vowels and five long vowels. Only short vowels are used as epenthetic vowels, specifically the vowels /i/ and /u/. The process of vowel epenthesis in RD and MSA is not the same even when compared with the other two JA dialects, UD and BD. In RD, the syllable structure does not allow for a cluster of two or more consonants in the onset or the coda as indicated by RD speakers often trying to break up every sequence of two or more consonants by inserting the /i/ or /u/. As mentioned earlier, these constraints occur at the level of the syllable. Conversely, when it comes to the word level, a consonant cluster is permitted, considering that one consonant belongs to the coda of a syllable and the other one to the onset of the subsequent syllable. A two-consonant cluster can therefore occur medially in a word as in the word /mɪlsɪn/ *talkative*, yet the two consonants /l/ and /s/ belong to different syllables.

Concerning vowel epenthesis, Hall (2011, p. 1576) has stated that in most cases, the function of vowel epenthesis is to repair an input that does not meet a language structural requirement.

In particular, vowel epenthesis allows the surfacing of consonants that underlying appear in phonotactically illegal contexts Tables 17 and 18, provide some examples that demonstrate the repair strategies used in both UD and RD and how they differ from that of MSA.

Table 17 provides a clear illustration of the phonological differences between urban dialects (UD), Modern Standard Arabic MSA, and rural dialects (RD) in terms of their treatment of consonant clusters (CC). In UD, consonants are allowed, meaning that two or more consonants can occur together without vowels in between. This is evident in the UD pronunciation for words like كفوف *paws*, كبير *big*, and طويل *tall*, where CC is present in UD pronunciation as /kfuːf/, /kbiːr/, /tˤwiːl/. In contrast, MSA strictly maintains vowel segments between consonants, as seen in its pronunciations for the same words. It does not allow CC, thus, MSA pronunciation has /kufuːf/, /kabiːr/, /tˤawiːl/.

Furthermore, the table demonstrates that UD deletes the vowel that exists in MSA, resulting in an initial CC. For instance, in MSA, كفوف is pronounced as /kufuːf/ with vowels, while in UD, it becomes /kfuːf/ without vowels. This deletion of vowels is a distinctive feature of UD, allowing CC to emerge. Unlike UD, RD does not permit consonant clusters similar to Modern Standard Arabic MSA, as indicated in the table.

Table 17. Different Arabic varieties pronunciation of initial CC

MSA Pronunciation	**UDPronunciation**	**RD Pronunciation**	**Arabic word**	**English Gloss**
/kufuː**f/**	/kfuːf/	/ɪʧfuːf/	كفوف	*paws*
/kabiː**r/**	/kbiːr/	/kabiːr/	كبير	*big*
/tˤawiː**l/**	/tˤwiːl/	/tˤawiːl/	طويل	*tall*
/samiː**k/**	/smiːk/	/samiːʧ/	سميك	*thick*
/bısurʕa/	/bsurʕa/	/ɪbsurʕa/	بسرعة	*quickly*
/rafiːʕ**/**	/rfiːʕ/	/rafiːʕ/	رفيع	*thin*
/ħımaː**r/**	/ħmaːr/	/ɪħmaːr/	حمار	*donkey*

Table 18 provides a clear illustration of the phonological differences between Modern Standard Arabic MSA, (UD), and (RD), particularly in their treatment of final consonant clusters. It is demonstrated that Both MSA and UD allow for final CC in their pronunciation. This means that in words where a CC occurs at the end, they pronounce these clusters without the insertion of additional vowels. In contrast, RD, as shown in the table, does not allow for a final CC. Instead, it uses repair strategies like vowel insertion to avoid having CC at the end of words which is evident in several examples such as the word *sea* and *sun* the MSA and UD

pronunciations are /baħr/ and /ʃams/, respectively, while they are pronounced as /ba.ħur/ and /ʃa.mɪs/ by RD speakers.

This shows that RD employs vowel insertion as a repair strategy to avoid final CC, while MSA and UD allow final CC to remain in their pronunciation. The differences in how final CC is treated in these varieties highlight some important phonological distinctions between them.

Table 18. The pronunciation of final CC clusters in different Arabic varieties

MSA Pronunciation	**UD Pronunciation**	**RD Pronunciation**	**Arabic word**	**English Gloss**
/baħr/	/baħr/	/baħur/	بحر	*sea*
/qɪrd /	/ʔɪrd /	/gɪrɪd /	قرد	*monkey*
/ʃams/	/ʃams/	/ʃamɪs/	شمس	*sun*
/nazɪlt/	/nzɪlt/	/ɪnzɪlɪt/	نزلت	*I went down*
/laʕɪbt/	/lʕɪbt/	/ɪlʕɪbɪt/	لعبت	*I played*
/bard/	/bard/	/barɪd/	برد	*cold*
/farɪħt/	/frɪħt/	/ɪfrɪħɪt/	فرحت	*I was happy*

In RD, every word's initial consonant cluster is either preceded by an epenthetic vowel to separate them into different syllables, or the CC is broken up by inserting a vowel between the consonants to break this sequence. RD speakers use such strategies in addition to other strategies such as deletion, to achieve smoother pronunciation because of the RD constraints that any consonant cluster occurring in one syllable has to be broken up by a vowel to assign the consonants to two different syllables.

Concerning the choice of vowels /ɪ/ and /u/ as epenthetic vowels over others, it seems that this is restricted to RD only, since in UD and BD, speakers use /a/, /ɪ/, and /u/ if they break up a word-final consonant cluster. The vowel /a/, for instance, is used to break the consonant sequences of /ħ/ and /r/ that occurs in the MSA word /baħr/ sea to become /baħar/, while RD speakers tend to use the vowel /u/ to produce /baħur/. However, this behavior cannot be overgeneralized, as we do not have enough evidence, so the fact that it did happen in this one word does not necessarily mean that it always happens this way in this context. In addition, it does not mean that only this vowel may be inserted in this context since there are no accredited sources for every aspect of these phenomena about each dialect. The available sources are often very limited either to one particular behavior without a thorough description of the whole process or describing only one dialect without a comparison with the others.

This overview and categorization of the English and Arabic consonants, vowels, and consonant clusters given above is essential for a better understanding of the nature of the phonological categories of the two languages. The comparison between the two languages mentioned illustrates several significant differences and similarities between the two sound systems. The vowel and consonant inventories in RD were analyzed and compared/contrasted with those in Modern Standard Arabic and other JA dialects, namely UD and BD. Furthermore, some phonological processes regarding consonant cluster reduction in RD were briefly introduced. Hence, such a comparison is assumed to predict Jordanian Arabic EFL learners' errors in English pronunciation in general and consonant clusters in particular.

3.3. Chapter Summary

This contrastive analysis introduced and compared the sound systems of British English, Modern Standard Arabic, as well as Jordanian Arabic dialects, namely urban, rural, and Bedouin. A more detailed description of the rural dialect will be introduced later for the sake of this study which might explain English pronunciation errors in three consonant clusters committed by RD speakers due to L1 interference in the light of three theories of L2 acquisition: Contrastive Analysis, Error Analysis, and Markedness Theory.

CHAPTER FOUR: METHODOLOGY

The methodology employed in this research involved a comprehensive data collection process, focusing on pronunciation errors made by Jordanian speakers while attempting to pronounce words containing consonant clusters in English. The data collection encompassed various components, including production test materials, word, and sentence lists, as well as recorded speech samples. To ensure the rigor and reliability of our analysis, the subsequent data analysis was conducted using a two-fold approach, which comprised linguistic and statistical analyses.

The linguistic analysis undertaken in this study delved into a detailed examination of the errors made by Jordanian speakers in their English pronunciation of words containing consonant clusters. This examination aimed to elucidate the underlying reasons behind these errors, shedding light on both the phonological and phonetic aspects that contribute to pronunciation difficulties. Furthermore, the linguistic analysis was dedicated to categorizing the types of pronunciation errors observed, offering a nuanced understanding of the distinct challenges faced by the participants.

Concurrently, the statistical analysis was instrumental in quantifying the prevalence of these errors within the dataset. It explored the proportions of specific pronunciation errors and their correlation with the native Jordanian Arabic dialects of the participants. Additionally, the analysis considered the influence of the position of the consonant cluster within the word, providing valuable insights into whether the errors were more frequent at the beginning, middle, or end of words. This multifaceted approach not only enhances the academic rigor of our research but also enables a comprehensive exploration of the factors influencing the English pronunciation challenges encountered by Jordanian speakers.

4.1. Data collection

4.1.1. Materials

The main study consisted of two parts (see Appendix 2 and 3) the first part was made up of two tests: a word list and a sentence list that included words with three consonant clusters in initial and final positions, the second part was a linguistic background questioner (LBQ).

4.1.2. Data collection instrument

40 English words were selected from the British National Corpus (BNC) database to select the most frequent words for the sake of the study. Afterwards, they were categorized into two types according to the positions of the CC clusters, namely: initial and final positions. Each category consisted of 20 words which were divided into two test types: the first was presented in the form of a word list, while the second was presented in short phrases or sentences, which

included the selected words; hence, each test contained 20 words either in themselves or incorporated in a sentence. The subjects were individually presented with the PowerPoint slides containing the words and phrases/sentences, then they were recorded while reading them aloud. All words and sentences in the PowerPoint slides were written with white color on a dark blue background with font size 100 Arial, centered at landscape orientation. Each slide in the word list test only had one single word that appeared automatically for 5 seconds and then faded away. As for the phrase and sentence test, each slide only had one phrase or sentence that appeared automatically for 15 seconds and then faded away.

4.2. Sample

4.2.1. Research setting

The sample of this study was categorized according to two criteria: one is the region of the participants (urban, rural), and the other is gender. Therefore, the study was carried out in both regions; i.e. in the capital city of Amman and the other in the city of Al-Ramtha. It is worth mentioning that the researcher had a personal relationship with the participants, to avoid RD females faking the urban dialect, as a way of showing higher social status and being more prestigious since among Jordanian dialects, the linguistic status of UD is considered to be higher than that of RD as mentioned earlier.

The participant selection for this study entailed two primary criteria: regional origin (urban or rural) and gender. Consequently, the investigation was conducted in both areas, specifically in the capital city of Amman and the city of Al-Ramtha. It is pertinent to note that the researcher established personal relationships with the participants to avoid potential biases that could arise from female participants from Al-Ramtha endeavoring to imitate the urban dialect. This phenomenon might serve as a means of signaling elevated social status and prestige, given the hierarchical linguistic status attributed to the urban dialect within the spectrum of Jordanian dialects.

4.2.2. Sample size

28 Jordanian adults above 19 years old with no known history of either speech or hearing impairments and whose L1 is Arabic and L2 is English, were selected from the rural and urban regions. 14 participants were selected from the capital city of Amman, 7 males and 7 females. The other 14 participants were selected from Al-Ramtha city in the same manner. For more accurate results, the participants were not informed of the specific purpose of the study to make the production of words more natural and unbiased. To protect the confidentiality of the participants and to meet research ethics, a consent form was distributed to the participants

before collecting the data to seek their permission to record the speech material of the study as well as to assure them that their identity would not be revealed in any way. Table 19 presents the regions, the gender, and the number of participants in the study.

Table 19. Profile of the participants in the sample

Participant group	Region	Female	Male
Group (1)	Urban	7	7
Group (2)	Rural	7	7

4.2.3. Sampling Method

Each participant was assigned a number. The presentation of the data took place in one room. Each participant was presented with both tests in the same session. As mentioned in the previous section, each word and phrase/sentence was written on a single slide. The interval between the fading of a word or a phrase/sentence and the appearance of the next was 5 seconds. Each participant was asked to read each word and phrase while being recorded wearing a Sennheiser headset that was attached to the laptop to maintain audio clarity and quality.

4.3. Data analysis

4.3.1. Linguistic analysis

The data of the present study were analyzed following three theories of second language acquisition, namely: Contrastive Analysis (Fries, 1945), Error Analysis (Corder, 1967), and Markedness Theory (Eckman, 1977).

These theories have been discussed in detail in Chapter 2. Moreover, a CA of the English and Arabic sound systems and consonant cluster rules was used to analyze the question of L1 Arabic interference (negative transfer) in the acquisition of L2 English. Lado (1957, p. 72) states that "the list of problems resulting from the comparison of the foreign language with the native language […] must be considered a list of hypothetical problems until the final validation is achieved by checking against the actual speech of students".

As for the first step, the recordings were examined by a native speaker of English, to decide whether the words were pronounced right or wrong and label them with (0, 1) respectively for the sake of the following procedure. Following the labeling, all the errors were singled out and tables showing transcriptions of the correct (RP British English[7]) and incorrect (Jordanian

[7] British English RP (Received Pronunciation) was selected as the phonetic reference standard in this study due to its widespread adoption within Jordan's educational institutions, providing a recognized foundation for the analysis of Jordanian speakers' pronunciation. Its established role as an educational benchmark for pronunciation assessment justifies its application in this research, where it serves as the basis for evaluating the phonetic proficiency of Jordanian speakers.

accented) forms were created as shown in Chapter 4. Error analysis in this study was mainly conducted according to the Rossipals model of error analysis as mentioned in Chapter 2. This model covers six steps as follows:

- Types of errors
- Frequency of errors
- Degree of difficulty in the target language
- Cause(s) of errors
- Therapy

The analysis of errors in English pronunciation among Jordanian Arabic speakers was conducted using a methodology adapted from the Rossipals approach, which can be summarized as follows:

- Identifying the types of errors committed by Jordanian Arabic speakers while pronouncing English words containing three consonant clusters
- Analyzing the frequency of interlingual errors by Jordanian Arabic speakers
- Explaining the reasons behind these errors
- Suggesting teaching recommendations to overcome these errors

Lastly, inter-judge reliability was employed in this study: the recordings of the participants were transcribed independently by the researcher, who is a native Arabic speaker, and by a second transcriber, who is a native English speaker with transcription expertise. The two transcriptions were then compared, and any contradictions were settled by the two transcribers. Lastly, because acoustic issues need acoustic analysis, PRAAT was used to provide reliable evidence for the issue at hand.

4.3.2. Statistical analysis

To be able to better evaluate and compare the errors in English pronunciation made by the participants of this study, it was necessary to check the frequency of the different types of errors. A frequency measure was conducted by calculating the percentage of the target population that got the item wrong. Using the R Studio software, means, descriptive statistics, and different types of inferential statistics (e.g. Two Sample T-test, Spearman Rank Correlation Test) were applied in this study – the former to summarize the characteristics of the participants, and the latter to test the hypothesis.

4.4. Ethical considerations

Since ethical issues are a fundamental part of conducting research and cannot be ignored, the researcher took into consideration that the participants of this study have rights that must be protected. The following ethical considerations were applied before the study was conducted:

- As mentioned earlier in the research setting section, permission had been obtained individually from the participants of both regions where the study was conducted before the data was collected to gain their trust.
- As mentioned earlier in the participants section, a consent form was distributed among participants to do the following:
  - To let the participants know that their participation is voluntary and that they have a right not to participate
  - To let the participants know that they have the right to ask questions about the study and their role in the study
  - To inform the participants about the purposes of the study
  - Not to allow the participants to experience physical or emotional distress as a result of participating in the study
  - To protect the confidentiality of all data that was going to be collected
  - Not to divulge the identity of anyone in the study, pseudonyms or identification numbers rather than the real names of the participants were used
  - To offer to inform the participants of the results of the study
- A copy of the written consent form can be found in the appendix of the dissertation so that readers can see exactly what the participants agreed to

4.5. Chapter Summary

The method applied in this research was elicitation. 28 Jordanian Arabic participants, whose L1 is Arabic and L2 is English, were selected from two Jordanian regions (rural and urban). The participants were assigned two production tests. The first test was made up of a word list (20 words) while the second one included 20 sentences which were selected based on Arabic and English sounds, syllable structure rules, and the expected areas of L1 transfer.

CHAPTER FIVE: RESULTS

5.1. Introduction

Researchers have been deeply interested in the complexities of language acquisition and pronunciation, especially within the realms of bilingualism and second language learning. In today's interconnected world, where cross-cultural communication is increasingly prevalent, understanding the challenges faced by speakers of different linguistic backgrounds in acquiring new languages is of paramount importance. Arabic, known for its historical significance and linguistic diversity, stands as one of the world's most widely spoken languages, with intricate dialectal variations reflecting its rich cultural heritage. Among these, Jordanian Arabic emerges as a group dialect, that includes three major dialects each characterized by its phonological features and regional variations that can be identified when investigating Jordanian Arabic speakers' pronunciation challenges, presenting a compelling case study for exploring the complexities of second language phonology as well as offering valuable insights into the interference between their native language and English.

This study examines how Jordanian Arabic speakers, particularly those from the urban and rural dialects, pronounce English words with three consonant clusters. It explores how these dialects affect pronunciation and the strategies used to overcome challenges in English phonology. Three hypotheses were tested: RD speakers make more errors than urban speakers, Jordanian Arabic dialects influence pronunciation differently in initial and final positions, and RD speakers use repair strategies based on their native phonological rules. The findings confirm these hypotheses, highlighting the impact of Jordanian Arabic dialects on English pronunciation the strategies employed by participants, and the factors that lead to L1 interference, as outlined by James (1980). These factors include the transfer of L1 syllable structure rules, which serve as potential explanations for the incorrect patterns of pronunciation committed by participants.

This chapter provides a comprehensive analysis of the research results, revealing the impact of the Jordanian Arabic dialects on the pronunciation of English consonant clusters and the strategies employed by participants to navigate the intricate realm of English phonology. The following sections will delve into the findings in detail, offering insights into the linguistic challenges faced by Jordanian Arabic speakers as they endeavor to master English pronunciation.

5.2. The study

The study involved a comprehensive examination of English pronunciation errors among Jordanian Arabic speakers. Participants underwent two production tests, comprising a word list

of 20 items and 20 sentences carefully selected to illuminate potential pronunciation challenges. These selections were made based on differences in phonetic systems, syllabic structures, and anticipated first language transfer effects.

Initial linguistic analysis entailed assessment by a native English speaker to identify correct and incorrect pronunciations of words. This evaluation was complemented by subsequent error analysis, predominantly following Rossipal's model. To ensure methodological rigor, inter-judge reliability was upheld through independent transcription by bilingual researchers, with discrepancies resolved collaboratively. Acoustic analyses using PRAAT software provided further validation of sound segment identification.

Quantitative evaluation of error frequencies was conducted to identify patterns among participants. Descriptive statistics, such as means, alongside inferential techniques including Two Sample T-tests and Spearman Rank Correlation Tests, were employed to summarize participant characteristics and test hypotheses.

The data collection instrument encompassed a word list, a sentence list, and a linguistic background questionnaire. Forty English words were categorized by the presence of consonant clusters in initial and final positions, with particular attention paid to the potential challenges posed by three-consonant clusters. As the following:

- **Initial Consonant Clusters (20 words)**

The initial three-consonant cluster word list included the following:

string, students, stream, stupid, stretch, screen, squeeze, screw, scratch, square, squad, scrub, scrap, splash, split, splendid, sprite, spray, spring, spread.

- **Final consonant clusters (20 words)**

The final three-consonant cluster word list included the following:

marked, students, parked, filmed, films, helped, thanks, worked, conflicts, tasks, launched, widths, attempt, linked, asked, context, divorced, branched, stormed, changed.

5.3. The participants

28 Jordanian adults, all Arabic/English bilinguals, were selected from two Jordanian regions (rural and urban).14 were selected from the capital city of Amman; 7 males and 7 females. The other 14 were selected from Al-Ramtha city in the same manner.

- **The linguistic background of the participants**

As mentioned in the methodology part, a linguistic background questionnaire was distributed among the participants before conducting the study to analyze the differences among them and to try to find the relationship between the intralingual factors and the findings of the actual

pronunciation study. Tables 20 and 21 show the participants' linguistic background – group 1 in table 20 contains the UD speakers while group 2 in table 21 contains the RD speakers.

Table 20. Group (1) linguistic background

Participant	Dialect	Education	Age of Acquisition	Bi/multilingual	Gender	Age
P1	AD	Bachelor	2	Multilingual	Female	24
P2	AD	Master	6	Bilingual	Female	28
P3	AD	Master	6	Bilingual	Female	30
P4	AD	Bachelor	4	Multilingual	Female	23
P5	AD	Bachelor	4	Multilingual	Female	31
P6	AD	High school	5	Bilingual	Female	20
P7	AD	High school	2	Bilingual	Female	35
P8	AD	Master	3	Multilingual	Male	26
P9	AD	Master	5	Multilingual	Male	28
P10	AD	Master	5	Multilingual	Male	26
P11	AD	Bachelor	5	Multilingual	Male	35
P12	AD	Bachelor	6	Bilingual	Male	25
P13	AD	Bachelor	5	Multilingual	Male	25
P14	AD	High school	9	Bilingual	Male	35

As illustrated in Table 20 the study included 14 UD speakers, 7 males, and 7 females, their ages ranged from 20 to 35, and the age of their English language acquisition AoA ranged from two to 6. Almost half of the UD speakers held master's degrees and the others held bachelor's degrees. Finally, the table shows that 8 out of 14 participants were multilingual and the rest were bilingual.

Table 21. Group (2) linguistic background

Participant	Dialect	Education	Age of Acquisition	Bi/multilingual	Gender	Age
P15	RD	Bachelor	11	Bilingual	Male	32
P16	RD	Bachelor	11	Bilingual	Male	28
P17	RD	Bachelor	13	Bilingual	Male	34
P18	RD	High school	13	Bilingual	Male	35
P19	RD	Bachelor	15	Multilingual	Male	31
P20	RD	Bachelor	11	Bilingual	Male	22
P21	RD	Bachelor	11	Bilingual	Male	32
P22	RD	Bachelor	6	Bilingual	Female	19
P23	RD	Bachelor	5	Bilingual	Female	20
P24	RD	Bachelor	4	Bilingual	Female	19
P25	RD	Bachelor	5	Bilingual	Female	21
P26	RD	Bachelor	5	Bilingual	Female	19
P27	RD	Bachelor	7	Bilingual	Female	21
P28	RD	High school	6	Bilingual	Female	18

As illustrated in Table 21, the study included 14 RD speakers, 7 males, and 7 females, their ages ranged from 19 to 35, and their age of English language acquisition AoA ranged from four to 15). Almost all of the RD speakers held bachelor's degrees while two held the high school

Tawjihi certificate. Finally, the table shows that 13 out of 14 participants were bilinguals and only one is multilingual.

The difference between the participants' education levels is visible in Tables 20 and 21, as it shows that group (1) holds higher educational levels than group (2). People living in urban areas in Jordan tend to have higher levels of education than those living in rural areas. According to the Jordan Department of Statistics, which provides data on literacy rates and educational attainment in Jordan, broken down by urban and rural areas, the literacy rate in urban areas is around 98%, while in rural areas it is around 91%. Additionally, data from the same source shows that the percentage of individuals who have completed higher education (bachelor's degree or higher) is higher in urban areas (22%) than in rural areas (7%). This may be due to factors such as better access to educational institutions, more opportunities for employment and higher salaries in urban areas, and more exposure to information and technology. However, it is important to note that there are exceptions to this trend and that there are individuals with high levels of education and skills in both urban and rural areas of Jordan.

5.4. Error analysis of Jordanian bilinguals in the pronunciation of English consonant cluster in initial and final positions

5.4.1. Word group 1: errors in three-consonant clusters in the initial position

This section shows the total number and percentage of all the subjects' errors in English consonant clusters in Word Group1, (initial three-consonant clusters[8]), as in table 22.

Table 22. The frequency of errors in word group (1)

Dialect	Total words	No. of Errors	% of Errors
AD	280	15	5.35%
RD	280	151	53.92%

The total number of words and the percentages of errors when pronouncing English consonant clusters in word group 1 show that urban Jordanian dialect speakers mispronounced 5.35% of the clusters with only 15 errors made. This is considered a very small ratio compared to speakers of the rural Jordanian dialect, who mispronounced 53.92% of the clusters with 151 errors. Furthermore, the participants' productions of English initial three-consonants clusters confirm the research hypothesis that RD speakers make more errors than UD speakers and use their L1 patterns (L1 negative transfer) for the English clusters unattested in their native Arabic dialects. Table 23 compares the correct pronunciations of Word Group 1 with the most frequent incorrect pronunciations produced by Jordanian speakers from both regions.

[8] The groups contain data both from the word list and the sentence list, since the test type did not have a significant effect on the pronunciations of the participants.

Table 23. Errors in the initial CCC position

Tested Word	Correct Pronunciation	Incorrect Pronunciation	No.of Errors RD	No.of Errors AD
string	/strɪŋ/	/ɪstrɪng/	1	3
students	/stjuːdənts/	/stuːdaːnt/, /ɪstuːdaːnt/	2	0
stream	/striːm/	/sɪtriːm/	3	0
stupid	/stjuːpɪd/	/stuːbɪd/, /ɪstjuːbɪd/	11	3
stretch	/strɛʧ/	/sɪtrɪʧ/	6	0
screen	/skriːn/	/sɪkriːn/	5	0
squeeze	/skwiːz/	/sɪkwiːz/	8	0
screw	/skruː/	/sɪkru/	10	0
scratch	/skræʧ/	/sɪkræʃ/	9	0
square	/skweə/	/sɪkwer/	7	0
squad	/skwɒd/	/sɪkwaːd/, /ɪskwaːd/	7	0
scrub	/skrʌb/	/sɪkrab/	11	0
scrap	/skræp/	/sɪkraːb/	8	0
splash	/splæʃ/	/sɪplaːʃ/	11	0
split	/splɪt/	/sɪblɪt/	13	2
splendid	/splɛndɪd/	/sɪblɪndɪd/	8	4
sprite	/spraɪt/	/sɪbrajt/	7	0
spray	/spreɪ/	/sɪbrej/, /ɪsɪbre/	8	0
spring	/sprɪŋ/	/sɪbrɪng/	8	1
spread	/sprɛd/	/sɪbrɪd/	8	2

According to O'Connor (1967), sequences of three or more consonants do not occur in many forms of Arabic. Smith (1987) mentions that the range of consonant clusters occurring in English is much wider than in Arabic. Also, as mentioned in the contrastive analysis part, RD does not accept word-initial two-consonant clusters or ones with higher numbers of consonants, while in UD and BD two- or three-consonant clusters are possible in both positions. Table 23 confirms and shows the number of errors for each word in word group 1 with initial three-consonant clusters and compares the number of the errors committed by speakers of the two dialects, as well as shows the repair strategies they used to break the CCC by transferring their L1 rules and patterns that lead to incorrect English pronunciations.

The most frequent patterns observed in the data involved vowel insertion, either occurring before the first consonant or between the first and second consonants within a consonant cluster, as seen in examples such as /ɪsɪbreɪ/ and /sɪbreɪ/ respectively, instead of the expected form /spreɪ/. Approximately 91.09% of the epenthesis occurrences involved the insertion of the /ɪ/ vowel between the first and second consonants of a consonant cluster, while approximately 8.91% involved the insertion of the /ɪ/ vowel before the first consonant of a consonant cluster. These repair strategies are explained more thoroughly in the general discussion. Most of the words constituted a pronunciation difficulty for the RD participants but the most frequent form

that caused errors was the /spl/ cluster in/splɪt/, /splæʃ/, /splɛndɪd/, where the RD participants committed the errors most frequently. Thirteen RD participants pronounced the word /splɪt/ as /sɪblɪt/ while only two UD participants did so. Eleven UD participants pronounced the words /splæʃ/ and /skrʌb/as /sɪplaːʃ/ and /sɪkrab/ respectively and none of the UD participants committed this error. Where eight RD participants pronounced the word /splɛndɪd/ as/sɪblɪndɪd/, only four UD participants did the same. The participants showed different degrees of difficulty pronouncing the /stj/cluster in the word /stjuːpɪd/. Eleven out of fourteen RD speakers and three out of fourteen UD speakers pronounced it incorrectly either as /stuːbɪd/ or /ɪstjuːbɪd/, and there was no explanation why they did not insert epenthetic vowels between the consonants but before the cluster, where none of the participants pronounces it as /sitjubid/ or as /sitijubid/.

5.4.2. Word group 2: errors in three-consonant clusters in the final position

This section shows the total numbers and percentage of all the subjects' errors in English consonants in word group 2, (final three-consonant clusters), as in table 24.

Table 24. The frequency of errors in word group (2)

Dialect	Total words	No. of Errors	% of Errors
AD	280	5	1.78%
RD	280	85	30.35%

The total number of words pronounced and the percentage of errors when pronouncing English consonant clusters in Word Group 2 show that speakers of the urban Jordanian dialect mispronounced 1.78% of the clusters with only 5 errors out of 280 tokens. This may be considered a very small number as compared to speakers of the rural Jordanian dialect, who made an error in the clusters in 30.35% of the words with 85 errors. Furthermore, the participants' production of English final three-consonant clusters confirms the research hypothesis claiming that RD speakers make more errors than UD speakers and use their L1 patterns (L1 negative transfer) for the unfamiliar English clusters, as they do when they try to break the English final three-consonant clusters resulting in incorrect pronunciations.

Table 25, compares the correct pronunciations of the words in Word Group 2 with the most frequent incorrect pronunciations produced by the Jordanian speakers from both dialects, RD and UD.

Table 25. Errors in the final CCC position

Tested Word	Correct Pronunciation	The Cluster	Incorrect Pronunciation[9]	No.of Errors RD	No.of Errors AD
marked	/mɑːkt	/rkt/	/maːrkɪd/	6	0

[9] The following are just examples from the most common and frequent errors, hence they do not represent all of the listed number of errors.

students	/stjuːdənts/	/stj/	/stuːdaːnt/	2	0
parked	/pɑːkt/	/rkt/	/baːrkɪd/	7	0
filmed	/fɪlmd/	/lmd/	/fɪlmɪd/	6	0
films	/fɪlmz/	/lmz/	/fɪlɪmz/, /fɪlmɪz/	3	0
helped	/hɛlpt /	/lpt/	/hɪlbɪd/	2	1
thanks	/θæŋks/	/ŋks/	-	0	0
worked	/wɜːkt/	/rkt/	/woːrkɪd/	3	0
conflicts	/kɒnflɪkts/	/kts/	/konɪflɪkt/	8	0
tasks	/tɑːsks/	/sks/	-	0	0
launched	/lʌnʧt/	/nʧt/	/lanʃɪd/	5	2
widths	/wɪdθs/	/dθs/	/wɪdθɪs/	4	0
attempt	/ətɛmt/	/mpt/	/ətɪmbɪd/	6	1
linked	/lɪŋkt/	/ŋkt/	/lɪnkɪd/, / lɪnkɪt/	5	0
asked	/ɑːskt /	/skt/	/aːskɪd/	4	0
context	/kuntɪkst/	/kst/	/kuntɪks/	0	1
divorced	/dɪˈvɔːst /	/rst/	/dɪvorsɪd/	3	0
branched	/brɑːnʧt/	/nʧt/	/braːnʧɪd/, /ɪbraːnʃɪd/	5	0
stormed	/stɔːmd/	/rmd/	/stoːrmɪd/, /struːmd/	8	0
changed	/ʧeɪnʤd/	/nʤd/	/ʧeɪnʒ/	8	0

The participants had difficulty pronouncing three-consonant clusters that occurred word-finally. As shown in Table 25 the RD participants often add a short vowel between the last two consonants to make the final three consonant clusters easier to pronounce, which confirms OConnors (1967) and Smiths (1987) claims. In addition, they also used different ways and strategies to break the three- final clusters by deleting the final segment from the word as in /ʧeɪnʒ/, /kuntiks/, /koniflikt/ instead of /ʧeɪnʤd/, /kuntɪkst/, /kɒnflɪkts/ respectively.

The most frequent patterns used were vowel insertion as in /maːrkɪd/, /baːrkɪd/ instead of /pɑːkt/, /mɑːkt/. All the above-mentioned repair strategies will be explained more thoroughly in the general discussion section below. Words containing the final three consonant clusters constituted a pronunciation difficulty for the RD participants. They committed errors more frequently while pronouncing the words /kɒnflɪkts/, /stɔːmd/, and /ʧeɪnʤd/ –eight RD participants out of fourteen pronounced them incorrectly as /konɪflɪkt/, /stɔːrmɪd, struːmd/, /ʧeɪnʒ/ respectively. It is worth mentioning that even though in some cases the British pronunciation of a word does not have a three-consonant cluster, as in /stɔːmd/, /pɑːkt/, /mɑːkt/. some participants were pronouncing English words the way they are spelled following the same rules of their other tongue mostly letter-to-sound pronunciation, and/or as a consequence of a lack of awareness of English pronunciation rules. Accordingly, these participants pronounced the word /stɔːmd/ first, they committed an error by pronouncing the silent /r/, and then by adding the vowel /i/ to break the three-consonant cluster they were facing.

Six RD participants pronounced the word /ətɛmpt/as [ətɪmbɪd], the word /fɪlmd/as [fɪlmɪd], and /mɑːkt/ as [maːrkɪd] while none of the UD participants did so except for once while

pronouncing the word /ətɛmt/. Seven RD participants pronounced the word /pɑːkt/ as [baːrkɪd] and none of the UD participants committed this incorrect pronunciation. There were instances where none of the participants found it difficult to pronounce the final three consonant clusters in the words /θæŋks/ and /tɑːsks/, which can be explained according to the familiarity degree of the words for the participants. These words are used in Jordanian daily conversations and can be considered as loan words that are easy to pronounce for both groups.

5.5. Repair strategies

As mentioned in the contrastive analysis between English, MSA, and Jordanian dialects, English allows for longer consonant clusters in initial and final positions compared to MSA and UD, while RD does not permit consonant clusters in these positions at all. Accordingly, the phonology of RD is even more different from English than those of MSA and UD, and as a result, the data showed that they tend to commit more errors than UD participants. Applying the rules of their L1, RD participants utilize repair strategies to make these words easier to pronounce and closer to their L1. In other words, the differences between syllable structures of L1 and the L2 can be a reason for L2 errors and lead to syllable repair strategies which bring the L2 syllable structure into conformity with the L1. That can be linked to interlingual factors such as L1 interference and other intralingual factors that will be discussed later.

According to Paradis (1987), a repair strategy as compared to a rule is an action that applies to a phonological unit or structure for repairing violations of a universal or language-specific structural or segmental phonological constraint. This is context-free, the context being determined by the very constraint that validates its application. Besides being represented more economically, repair strategies are motivated in that they justify phonological phenomena (Singh 1987).

To be able to pronounce the words they are learning bilinguals incorporate such strategies in their interlanguage to help them pronounce such words more easily. Those repair strategies explain the process by which the target lexical items or phonemes are avoided. Thus, they make phonological adjustments that contribute to changes in the structure of the syllables. Examples of these strategies used by Jordanian speakers while producing English CCC clusters were provided earlier see Chapter (3). As well as a further acoustic analysis of the English consonant cluster errors produced by the Jordanian speakers is provided in the following section revealing a variation of the acoustic differences between RD and UD speakers offering an effective insight into the issue at hand.

5.5.1. Vowel insertion

As mentioned earlier this type of error happened when a vowel was inserted into a consonant cluster. This strategy appeared most often in the recordings, and it was found to be the most widely applied one throughout all of the cases of English CCC errors made by JD speakers in general, and even more so by RD speakers in particular. By inserting the vowel /ɪ/ between the first and second members of the clusters in the initial CCC and between the last two consonants in the final Consonant clusters, the RD participants tend to break the three consonant clusters into two. As listed in tables 26 and 27, [sɪkrab], [sɪkraːb], [sɪplaːʃ] are examples of errors committed by the RD participants when producing English initial CCC. On the other hand, [hɪlbɪd], [woːrkɪd], and [lanʃɪd] are examples of RD participants' errors when producing English final CCC clusters.

Table 26. Vowel insertion examples in initial CCC

Tested Word	Correct Pronunciation	Incorrect Pronunciation
stream	/striːm/	/sɪtriːm/
stretch	/strɛʧ/	/sɪtrɪʧ/
screen	/skriːn/	/sɪkriːn/
squeeze	/skwiːz/	/sɪkwiːz/
screw	/skruː/	/sɪkru/
scratch	/skræʧ/	/sɪkræʃ/
square	/skweə/	/sɪkwer/
squad	/skwɒd/	/sɪkwaːd/
scrub	/skrʌb/	/sɪkrab/
scrap	/skræp/	/sɪkraːb/
splash	/splæʃ/	/sɪplaːʃ/
split	/splɪt/	/sɪblɪt/
splendid	/splɛndɪd/	/sɪblɪndɪd/
sprite	/spraɪt/	/sɪbrajt/
spray	/spreɪ/	/sɪbrej/, /ɪsɪbre/
spring	/sprɪŋ/	/sɪbrɪng/
spread	/sprɛd/	/sɪbrɪd/

Table 27. Vowel insertion examples in the final CCC

Tested Word	Correct Pronunciation	Final CCC
marked	/mɑːkt	/maːrkɪd/
parked	/pɑːkt/	/baːrkɪd/
filmed	/fɪlmd/	/fɪlmɪd/
films	/fɪlmz/	/fɪlmɪz/
helped	/hɛlpt /	/hɪlbɪd/
worked	/wɜːkt/	/woːrkɪd/
launched	/lʌnʧt/	/lanʃɪd/
widths	/wɪdθs/	/wɪdθɪs/

attempt	/ətɛmt/	/ətɪmbɪd/
linked	/lɪŋkt/	/lɪnkɪd/, / lɪnkɪt/
asked	/ɑːskt /	/aːskɪd/
divorced	/dɪˈvɔːst /	/dɪvorsɪd/
branched	/brɑːnʧt/	/braːnʧɪd/,
stormed	/stɔːmd/	/stoːrmɪd/,

5.5.2. Prosthesis

This type of error happens when the speakers insert a vowel at the beginning of a syllable containing a consonant cluster. As produced in Table 28, [ɪstjuːbɪd] instead of /stjuːpɪd/ and [ɪskwaːd] instead of [sɪkwaːd] *are* examples of RD participants errors when producing English initial CCC. However, there were instances where they tended to insert a vowel at the beginning of a syllable besides inserting another one between the first and the second consonants as in /ɪsɪbreɪ/.

Table 28. Vowel prosthesis examples in initial CCC

Tested Word	Correct Pronunciation	Incorrect Pronunciation
string	/strɪŋ/	/ɪstrɪng/
students	/stjuːdənts/	/ɪstuːdaːnt/
stupid	/stjuːpɪd/	/ɪstjuːbɪd/
squad	/skwɒd/	/ɪskwaːd/
spray	/spreɪ/	/ɪsɪbre/
splendid	/splɛndɪd/	/ɪsɪblɪndɪd/
splash	/splæʃ/	/ɪsblaːʃ/
stream	/striːm/	/ɪstrɪm

5.5.3. Deletion

This type of error happens when the speakers delete a consonant – or sometimes a vowel, too – from the original English word. As can be illustrated from the examples in tables 29 and 30, RD participants used this strategy to make the clusters shorter and thus easier to pronounce e.g. [stuːbɪd] instead of /stjuːbɪd/ in examples of RD participants errors when producing English initial CCC, and [taːsk], [ʧeɪnʒ] instead of /taːsks/, /ʧeɪndʒd/ respectively, are examples of RD participants errors when producing English final CCC.

Table 29. Sound deletion examples in initial CCC

Tested Word	Correct Pronunciation	Incorrect Pronunciation
students	/stjuːdənts/	/stuːdaːnt/, /ɪstuːdaːnt/
stupid	/stjuːpɪd/	/stuːbɪd/, /ɪstjuːbɪd/
stretch	/strɛʧ/	/srɪʧ/

Table 30. Sound deletion examples in the final CCC

Tested Word	Correct Pronunciation	Incorrect Pronunciation

conflicts	/kɒnflɪkts/	/konɪflɪkt/
students	/stjuːdənts/	/stuːdaːnt/
changed	/ʧeɪnʤd/	/ʧeɪnʒ/, /ʧɜnʤ
divorced	/dɪˈvɔːst /	/dɪvorsɪd/

5.5.4. Metathesis

This strategy was used by RD speakers when the positions of the sounds were swapped. It can be illustrated in Tables 31 and 32 that such errors might result in changing the word so much that in some cases it will lead to misunderstandings because they can be categorized as non-English words. This type of error can be presented in the pronunciation of the RD participants of words like /skræʧ/, /spraɪt/ /stɔːmd/ which were pronounced as [skaːrʧ], [sbaɪrɪt], and [struːmd] respectively.

Table 31. Sounds metathesis examples in initial CCC

Tested Word	Correct Pronunciation	Incorrect Pronunciation
scrub	/skrʌb/	/skarb/
screw	/skruː/	/sɪkjuːr/
scratch	/skræʧ/	/skaːrʧ/
sprite	/spraɪt/	/sbaɪrɪt/

Table 32. Sounds metathesis examples in final CCC

Tested Word	Correct Pronunciation	Incorrect Pronunciation
stormed	/stɔːmd/	/struːmd/, /strɒdmɪd/

5.5.5. Substitution

This strategy occurred when the JD speakers replaced a consonant or a vowel with another one from their L1. For instance, this repair strategy took place when RD participants replaced the sound /s/ with /z/ as in [zɪblaːʃ] instead of /splaːʃ/ which was combined with vowel insertion. Such phenomena contravene the predictions of the CA, as it states that similarities between L1 and L2 facilitate the acquisition and learning of L2. However, it seems that the fact that both sounds exist in Arabic did not facilitate the pronunciation of the English words. In other words, it was visible that when the sound /p/ was substituted by /b/ and an epenthetic vowel was added between the /s/ and /p/, the similarity of the sound inventory between the two languages did not prevent the application of this repair strategy related to voicing (see table 33). Another example of substitution is replacing the /ʤ/ in /ʧeɪnʤd/ with/ ʒ/ as in [ʧeɪnʒ] and [ʧeɪnʒd] (see table 34). Since this sound occurs in the MSA and urban dialects but not in the rural dialect, this error does not follow the predictions of either the CAH or Markedness Hypothesis.

The last type of substitution was the replacement of the /t/ sound in words like [maːrkɪd], [baːrkɪd], and [askɪd] instead of the correct English /maːkt/, /paːkt/, and /askt/. The reason

behind such instances might be the lack of linguistic knowledge of L2, vowel insertion, or Arabic letter-to-sound rules (see Table 34).

Table 33. Sounds substitution examples in initial CCC

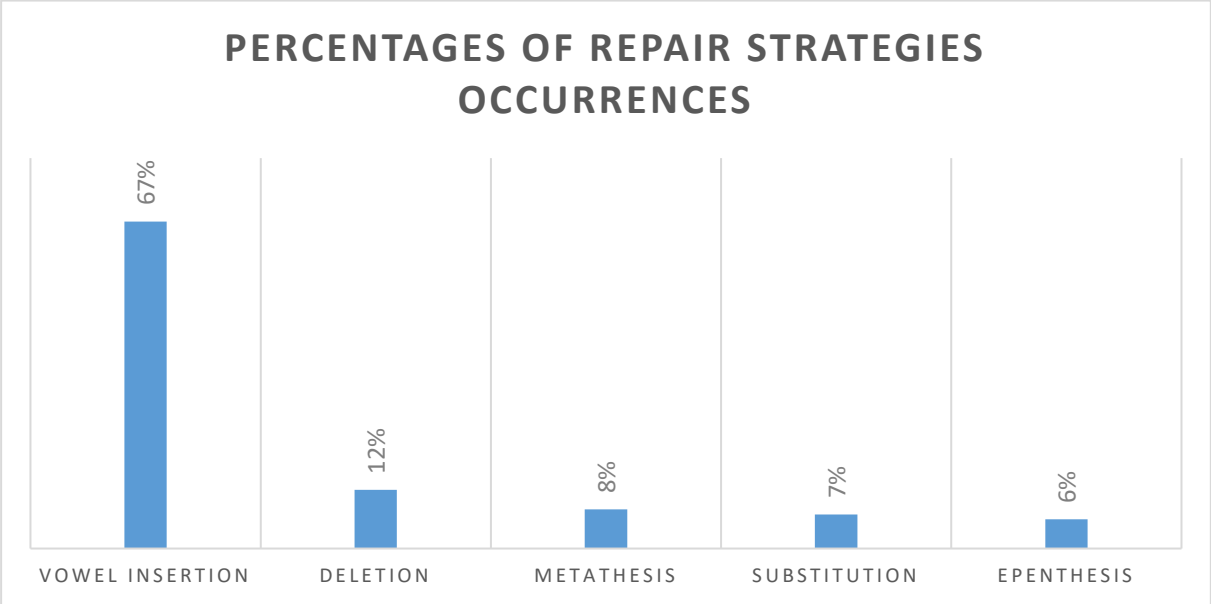
Tested Word	Correct Pronunciation	Incorrect Pronunciation
split	/splɪt/	/sbɪld/
spray	/spreɪ/	/zɪbreɪ/
splash	/splæʃ/	/zɪbla:ʃ/

Table 34. Sounds substitution examples in the final CCC

Tested Word	Correct Pronunciation	Final CCC
marked	/mɑ:kt	/ma:rkɪd/
parked	/pɑ:kt/	/ba:rkɪd/
helped	/hɛlpt /	/hɪlbɪd/
worked	/wɜ:kt/	/wo:rkɪd/
launched	/lʌnʧt/	/lanʃɪd/
attempt	/ətɛmpt/	/ətɪmbɪd/
linked	/lɪŋkt/	/lɪnkɪd/,
asked	/ɑ:skt /	/a:skɪd/
divorced	/dɪˈvɔ:st /	/dɪvorsɪd/
branched	/brɑ:nʧt/	/bra:nʧɪd/,
changed	/ʧeɪnʤd/	/ʧeɪnʒ/,

The participants of this study, and more commonly the RD participants, transferred some rules from their L1 dialect to English in most of the cases. Furthermore, it can be demonstrated in the results that they also lack proper L2 linguistic knowledge, which led them to overgeneralize some rules on the one hand, and substituting from their mother tongue on the other. Most of the errors were recognized to fall under the vowel insertion strategy, where the L1 dialect influence was significantly obvious in the frequency of this type of error, the place of the intervening vowel, and the /ɪ/ vowel used. The second highest frequent error used the deletion strategy. Other strategies were not used frequently and the reason behind them might again be evidence of L1 dialect rules transfer or recognized as lack of L2 linguistic awareness in addition to other influencing factors. Figure 7 shows the percentages and frequency of each repair strategy used by the participants.

Figure 7. Percentages of the repair strategies occurrences in RD Errors



5.6. The acoustic analysis

The purpose of the study focuses on the pronunciation problems of English consonant clusters that are experienced by JD speakers. This part attempts to provide acoustic accounts for acoustic problems with the English consonant clusters that were produced mostly by the RD participants. As well as to be evidence for the differences between the pronunciation of the same words by RD and UD speakers. Findings based on this analysis support the hypothesis that RD speakers have difficulties with the pronunciation of English consonant clusters compared to UD speakers. In this section, I present the acoustic analysis results in both initial and final positions according to the repair strategy used. It is divided into two sections according to the position of the cluster.

5.6.1. Initial CCC errors acoustic analysis

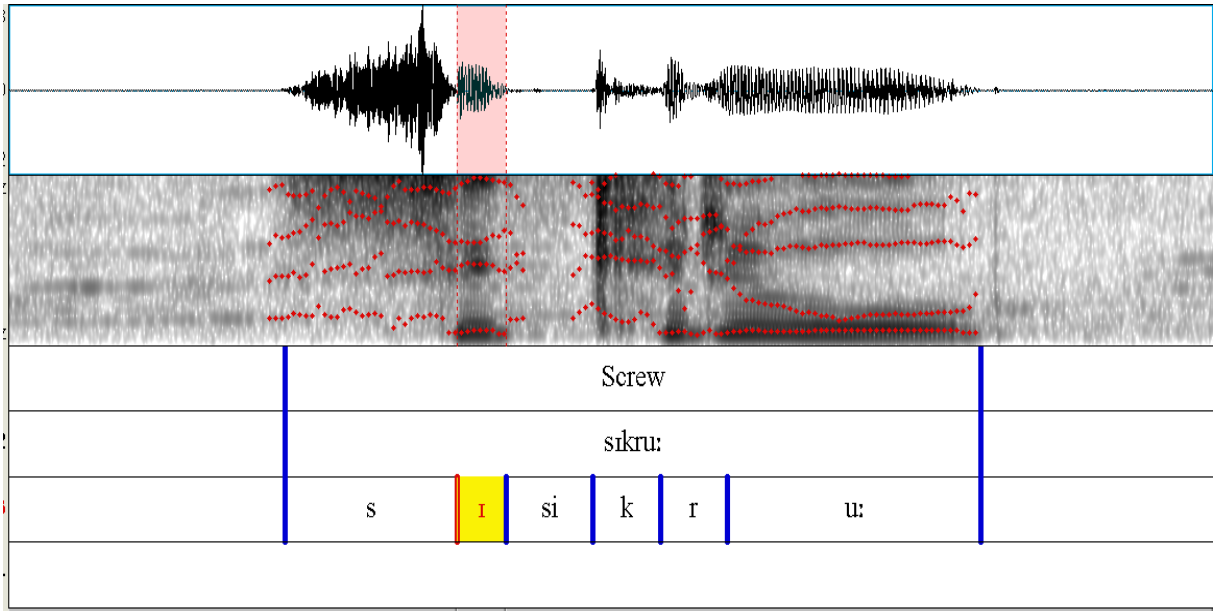
As mentioned earlier, the results of this study showed that there was a very significant difference in the number of errors committed by RD and UD participants in both CCC positions (initial, final), but also it illustrated that the consonant clusters in initial position were more problematic than the one in the final position for both RD and UD.

- **Vowel insertion**

It can easily be seen in the spectrogram of the word *screw* in Figure 8 as pronounced by an RD speaker as /sɪkruː/. The vowel /ɪ/ was inserted between the first and the second consonants unlike the one presented in Figure 9 which was produced by an UD speaker. This supports the claims of this study, UD participants find it easier to pronounce initial consonant clusters as it is considered to be unmarked to their Arabic dialect, and on the other hand, because it is

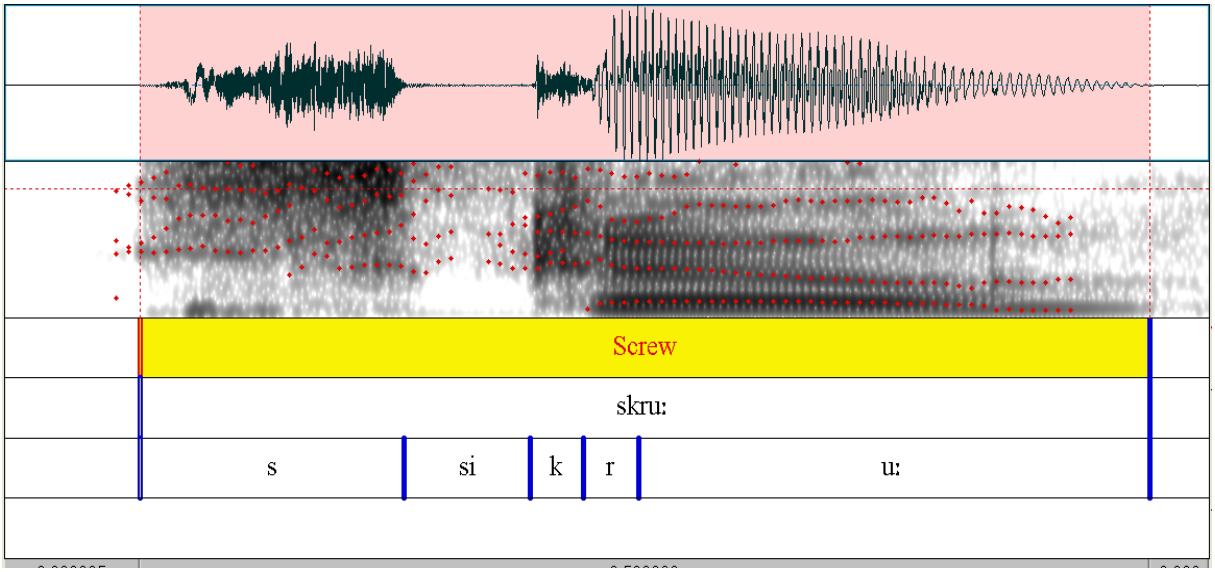
considered marked by the RD speaker's Arabic dialect, they transfer L1 rules and patterns to fill this gap.

Figure 8. Spectrogram for the word *screw* as pronounced by an RD speaker.



Note: Vowel insertion is enclosed by two red lines.

Figure 9. Spectrogram for the word *screw* as pronounced by a UD speaker.



Figures 10 and 11 show the spectrogram of the word *students* as pronounced by RD and UD participants respectively, the RD speaker inserted an epenthetic vowel before the initial consonant cluster to make it easier to pronounce. In contrast, this was not the case in the UD participant pronunciation as the spectrogram shows the pronunciation to be close to native.

Figure 10. Spectrogram for the word *students* as pronounced by an RD speaker.

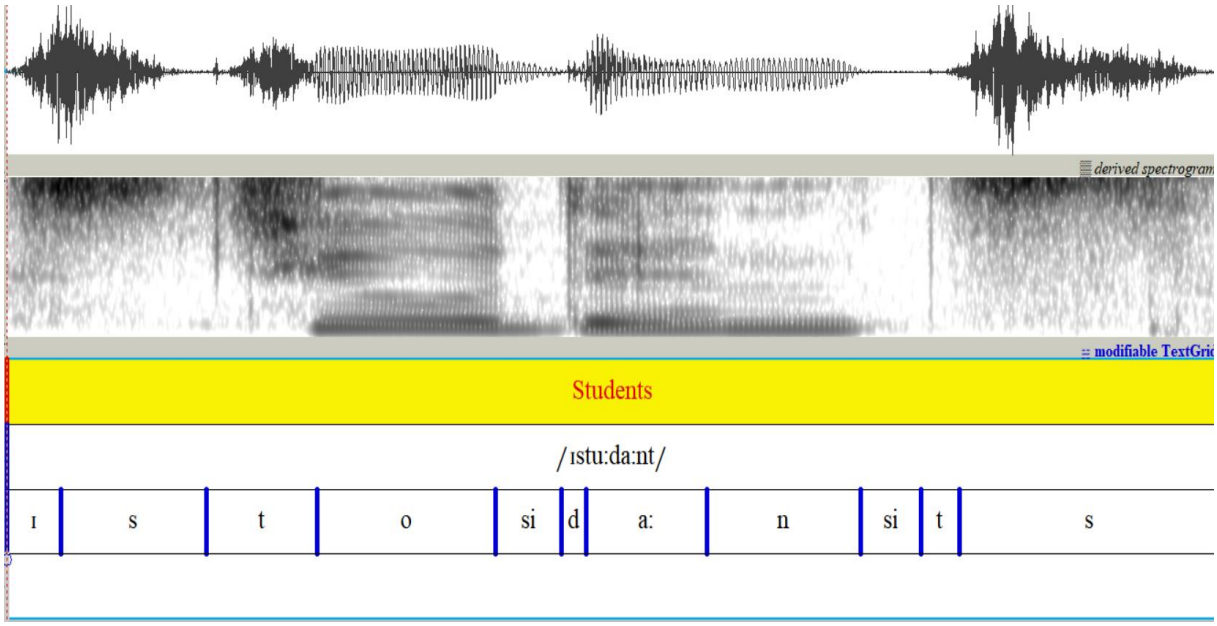
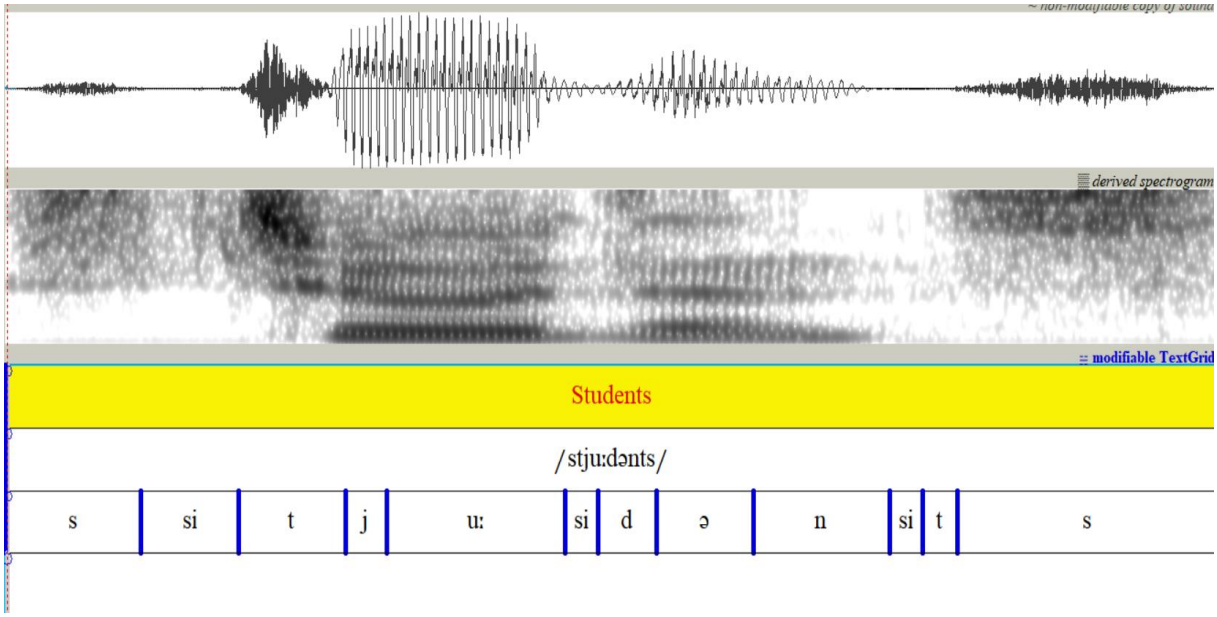


Figure 11. Spectrogram for the word *students* as pronounced by a UD speaker.



- **Metathesis**

The metathesis strategy was used in some cases of English initial CCC pronunciation errors committed by the RD participants, which was a result of the lack of L2 knowledge. This type of error changed the target words to the extent that it cannot be recognized as an English word anymore, which will indeed lead to misunderstandings. An example of such errors can be presented in the pronunciation of the word *scratch*, /skrætʃ/. In Figure 12 the RD participant used the metathesis strategy when he reduced the number of the clusters /skr/ by placing the vowel /æ/ before the third consonant /r/ pronouncing it as /ska:rtʃ/. However, to compare the

production of RD with UD speakers, figure 13 the spectrogram for the word *scratch* as pronounced by UD speaker is evidence that it was pronounced properly.

Figure 12. Spectrogram for the word *scratch* as pronounced by an RD speaker

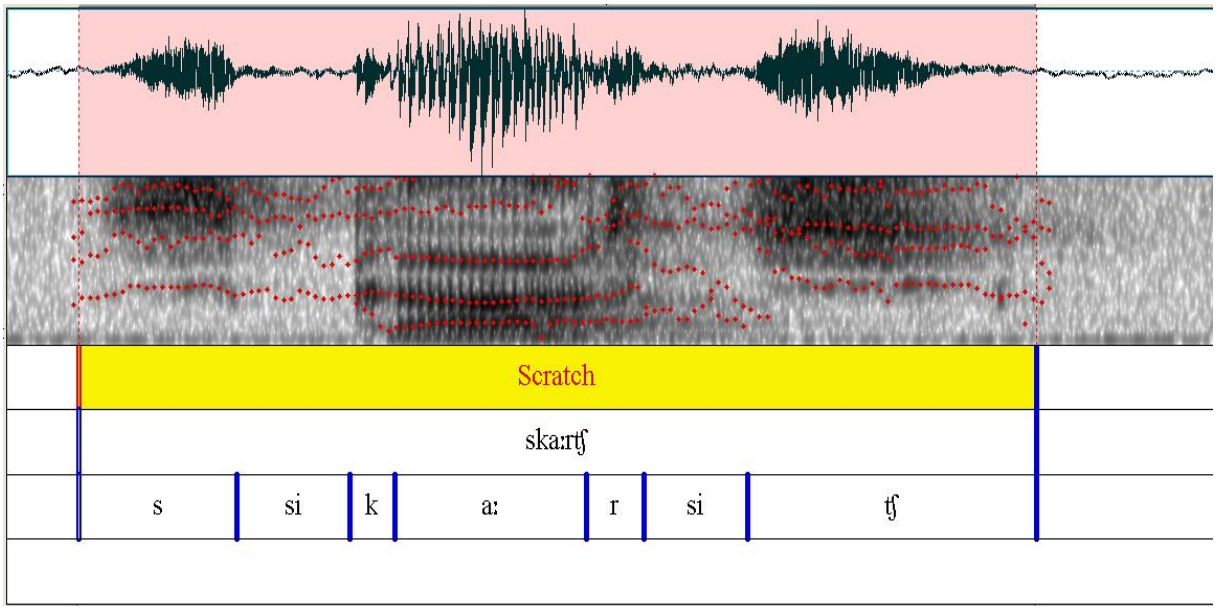
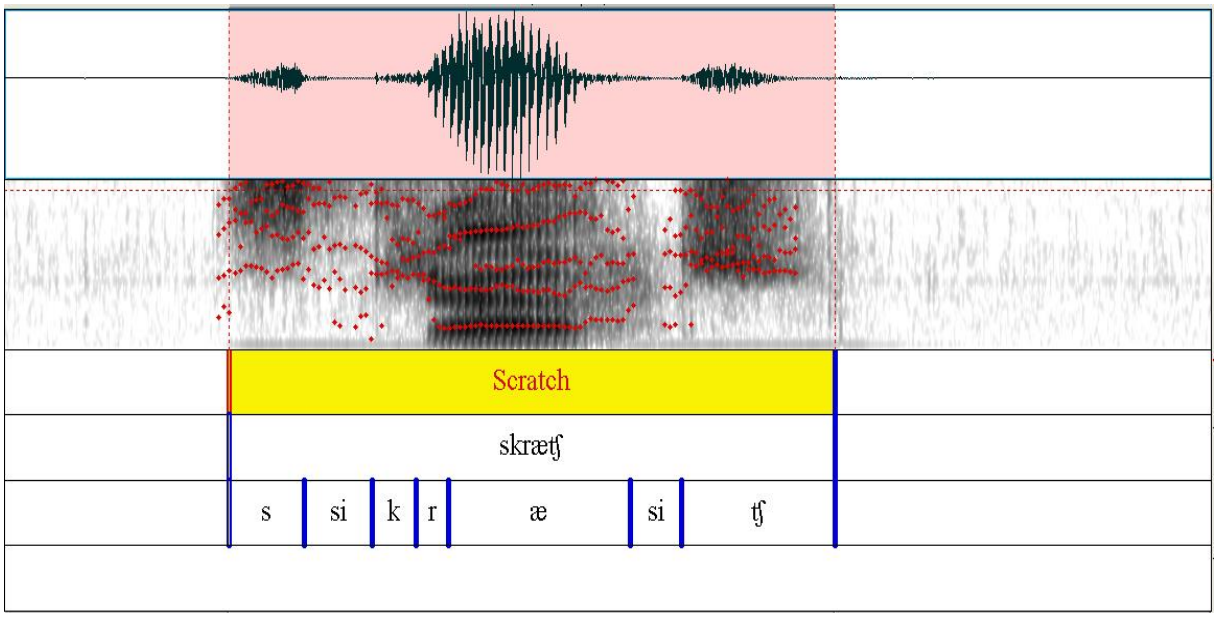


Figure 13. Spectrogram for the word *scratch* as pronounced by an UD speaker



5.6.2. Final CCC errors acoustic analysis

The findings of this study illustrated a significant number of errors committed by the RD participants, the analysis also showed that the participants used different patterns to produce the final cluster applying more various repair strategies, affected by the L1 dialect in most of

the cases. Furthermore, the results are considered as evidence to support the claims of this study, where RD speakers tend to commit more errors than UD speakers.

It can be visible in the following acoustic analysis that RD speakers to be able to pronounce the English final CCC used more different repair strategies than those used in the English initial CCC. As noted in the acoustic analysis of English initial CCC errors committed by RD participants, vowel insertion and prosthesis were strategies used frequently almost in all of the cases where insertion, deletion, addition, and substitution strategies were used by the RD participants while producing the English final CCC.

- **Vowel insertion**

The vowel insertion was almost visible in all of the data and in some cases, RD participants tended to use more than one strategy to pronounce the word and they used what is considered to be a mixed strategy when for example they inserted a vowel between two of the CCC and substitute the last consonant, or insert a vowel and adding a consonant to separate the syllable. The former can be visible in the RD production of the word launched, in figure 14, the Spectrogram for the word (launched) by RD speaker, the RD participant first inserted the /ɪ/ vowel between the last two consonants then she substituted the voiceless stop /t/ with the voiced stop /d/, pronouncing it as /laːntʃɪd/ instead of /lʌntʃt/. On the other hand, in Figure 15, the Spectrogram for the word (launched) by the UD speaker shows a significant difference compared to the RD pronunciation.

Figure 14. Spectrogram for the word *launched* as pronounced by an RD speaker

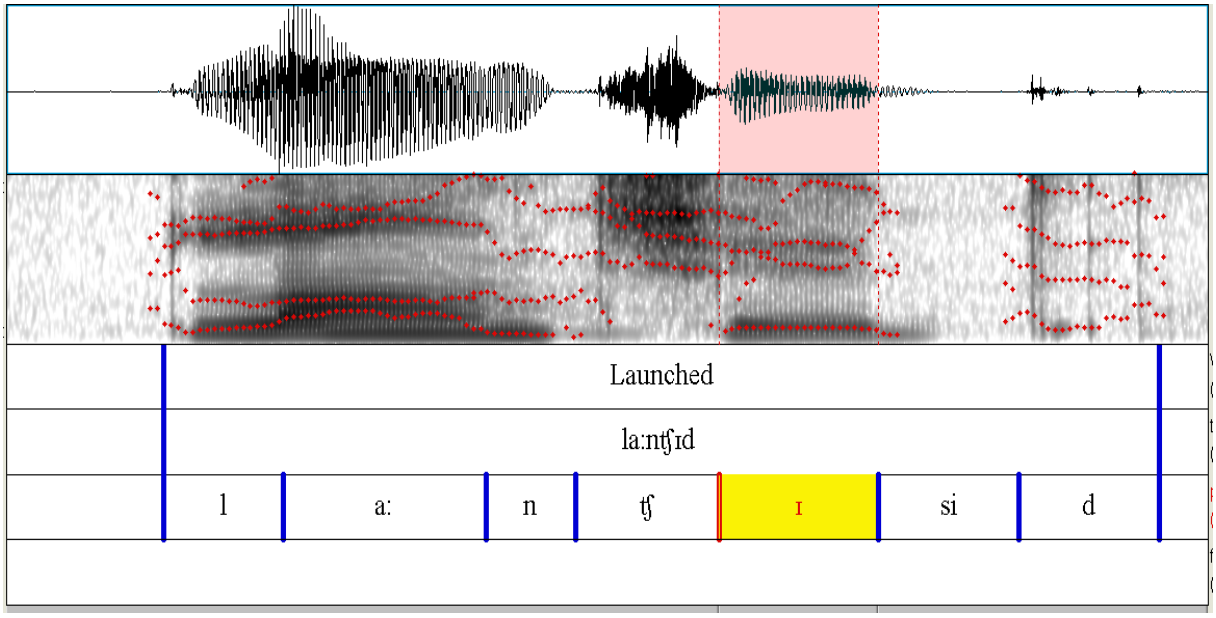
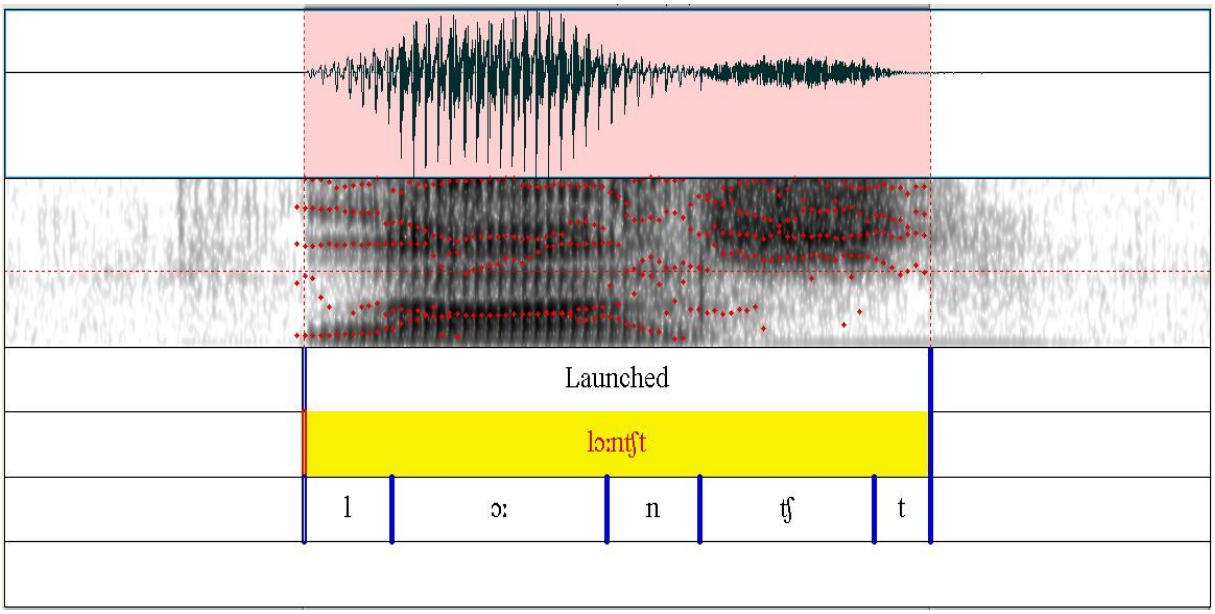


Figure 15. Spectrogram for the word *launched* as pronounced by a UD speaker



- **Deletion**

In a way, RD participants tried to simplify the final CCC by deleting either the second or the third consonant, while pronouncing the word, this was not a case of one or two incidences, but it frequently occurred in the data. In Figure 16, the spectrogram of the word students shows that the RD participant here shortened the final three consonant clusters by deleting the /t/ consonant and stressing the last consonant /s/, unlike the pronunciation of the UD participant (see Figure 17).

Figure 16. Spectrogram for the word *students* as pronounced by an RD speaker

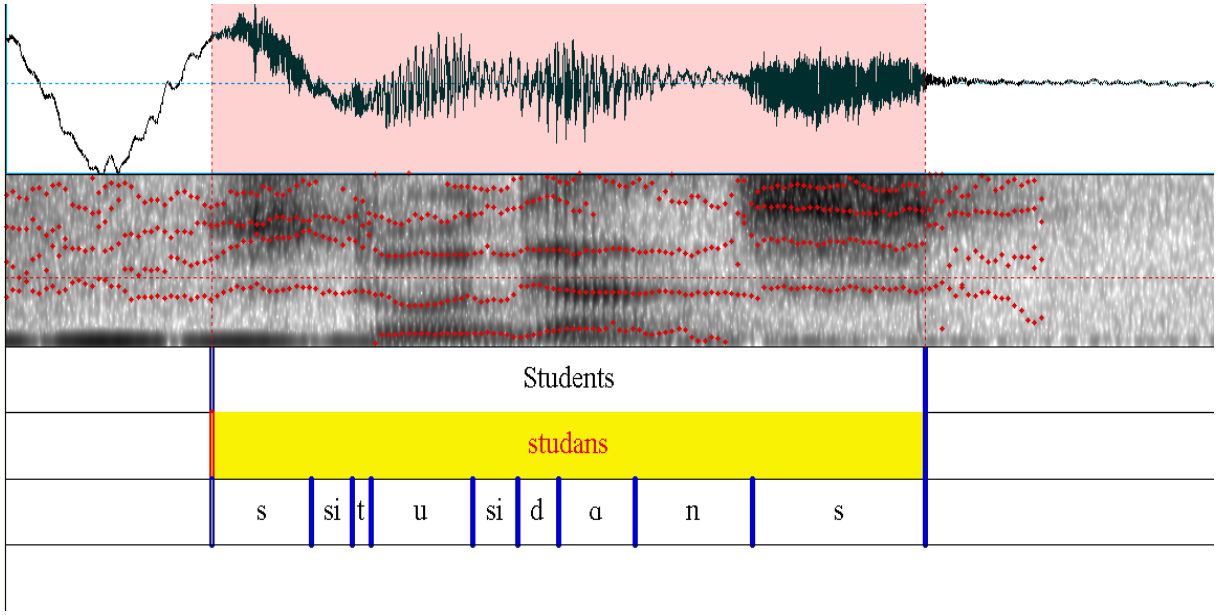
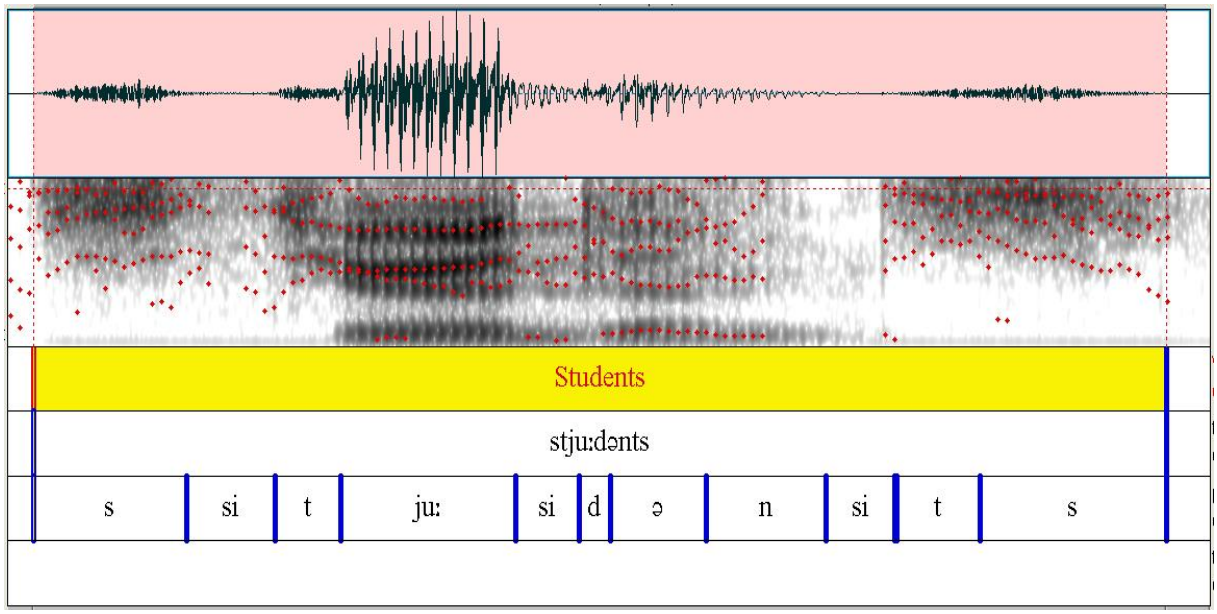


Figure 17. Spectrogram for the word *students* as pronounced by a UD speaker



This section presented the acoustic results of the English three consonant clusters produced by Jordanian English/Arabic speakers, in both initial and final positions. There are two sections in this part arranged according to cluster position and the repair strategy applied.

This section shows the acoustic properties of the English initial and final three consonant clusters, which were produced by Jordanian speakers both from urban and rural regions. This analysis aimed to show the production problems with the speakers' different pronunciations of the English clusters targeted.

5.7. Statistical analysis

5.7.1. The effect of the dialect (AD, RD) on the production of English three consonant clusters

This study claims that Jordanian Arabic dialects have varying effects on the pronunciation of English among their speakers. Additionally, it suggests that speakers of the rural dialect (RD) are prone to more English pronunciation errors compared to those of the urban dialect (UD). The hypothesis explores the impact of dialect (AD, RD) on the frequency of English pronunciation errors.

In other words, are there differences between the total number of errors committed by UD and RD participants? Are there differences between the number of errors in the English initial three consonants cluster committed by UD and RD participants? Are there differences between the number of errors in the English final three consonants cluster committed by UD and RD participants? Are these differences statistically significant? Accordingly, to reject the null hypothesis and accept the alternative hypothesis as well as to answer the research questions a two-sample t-test was applied.

As shown in Figure 18, group UD committed an average of 1.357 total errors, while Group RD committed an average of 17.78 total errors. So, the answer for question (1), based on the t-test, is yes, we have a p-value less than 0.05, hence we can state that differences between the groups UD participants (error mean = 1.357) and RD participants (error mean = 17.78) are considered to be statistically significant. That is why we reject the null hypothesis and accept our alternative hypothesis.

Figure 18. A two-sample t-test for total CCC errors

Welch Two Sample t-test		
data: Total error by Dialect		
t = -7.1325	df = 13.753	p-value = 0.0000056
alternative hypothesis:		
true difference in means between group AD and group RD is not equal to 0		
95 percent confidence interval:		
-21.37705	-11.48009	
sample estimates:		
mean in group AD	mean in group RD	
1.357143	17.785714	

5.7.2. The effect of the dialect (AD, RD) on the production of English initial three consonant clusters

As demonstrated in Chapter 2, and in the contrastive analyses, UD allows the existence of the CC structure in the initial position under certain circumstances, unlike RD which does not permit CC structures under any circumstances. It was hypothesized in this study that RD participants are more prone to commit errors in the production of English initial Consonant clusters than UD participants. This hypothesis was confirmed statistically and based on the t-test as shown in Figure 19, the p-value is less than 0.05, hence it can be stated that the differences between the UD participants (error mean = 1) and RD participants (error mean = 11.21) are statistically significant. Accordingly, we reject the null hypothesis and accept the alternative hypothesis.

Figure 19. A two-sample t-test for initial CCC errors

Welch Two Sample t-test		
data: Initial error by Dialect		
t = -6.9924	df = 14.408	p-value = 0.0000054
alternative hypothesis:		
true difference in means between group AD and group RD is not equal to 0		
95 percent confidence interval:		
-13.339019	-7.089553	
sample estimates:		
mean in group AD	mean in group RD	
1	11.21429	

5.7.3. The effect of the dialect (AD, RD) on the production of English final three consonant clusters

As mentioned earlier UD participants are more familiar with the CC structure in initial and final positions than RD participants. However, the CC structure in the final position is even less marked and hence more familiar to them than the CC structure in the initial position. Accordingly, it was hypothesized that UD participants would encounter less difficulty producing the English CC structure in final positions than RD participants. This was confirmed statistically, as based on the t-test, the p-value is less than 0.05, hence it can be stated that the differences between the UD participants (error mean = 0.35) and the RD participants (error mean = 6.57) are significant. Accordingly, we reject the null hypothesis and accept the alternative hypothesis (see Figure 20).

Figure 20. A two-sample t-test for final CCC errors

Welch Two Sample t-test		
data: Final error by Dialect		
t = -5.0773	df = 13.31	p-value = 0.0001971
alternative hypothesis:		
true difference in means between group AD and group RD is not equal to 0		
95 percent confidence interval:		
-8.852206	-3.576366	
sample estimates:		
mean in group AD	mean in group RD	
0.3571429	6.5714286	

5.7.4. The effect of age of acquisition (AoA) on the production of English three consonant clusters

Because of the impact of age on language acquisition and particularly pronunciation as mentioned in Chapter 2, older learners might experience more pronunciation difficulties while acquiring L2 and are unlikely to master native-like pronunciation than younger learners. According to Lenneberg's (1967) "Critical Period Hypothesis," there is a biological or neurological period that ends around the age of 11; after this period, it becomes extremely challenging to attain great command of a second language, particularly pronunciation. Accordingly, it was hypothesized that the participants who acquired the English language earlier were less prone to commit pronunciation errors.

A Spearman rank correlation test was applied to measure the degree of association between two variables; Spearman's rank correlation coefficient (abbreviated *rho*) has a range of -1 to +1. The sign of the coefficient indicates whether the relationship is positive or negative monotonic. A positive correlation indicates that as one variable increases, so does the other. Concerning this study, the rho is measured to check if there is a positive relationship between AoA and total errors. In other words, the older the participants acquired L2, the more errors they made, which means the younger the participants acquired the language the fewer errors they made. Based on the results of the test and as shown in Figure 21 the p-value is less than 0.05, hence our results are significant. That is why the null is rejected hypothesis and the alternative hypothesis is confirmed. Secondly, the correlation coefficient (rho) is 0.47 which means there is a positive relationship between AoA and total errors.

Figure 21. Spearman rank correlation test (the AoA factor)

Spearman's rank correlation rho	
data: Total error and AoA	
S = 1921.5	p-value = 0.0108
alternative hypothesis:	
true rho coefficient is not equal to 0	
sample estimates:	
rho = 0.4741371	

5.7.5. The effect of multilingualism on the total number of errors

It is commonly agreed among linguists that being multilingual has a positive impact on the acquisition of languages as well as on developing linguistic skills and competencies, the results of the statistical analysis illustrated that being multilingual affected the number of pronunciation errors as well. Based on the t-test and as shown in Figure 22, a p-value is less than 0.05, hence we can state that the differences between the bilingual participants (error mean = 12.26) and the multilingual participants (error mean = 3.89) are significant. In other words, multilingual participants committed fewer pronunciation errors than bilingual participants.

Figure 22. A two-sample t-test for the linguistic background factor

Welch Two Sample t-test		
data: Total error by Multilingualism		
t = 2.3441	df = 19.927	p-value = 0.02955
alternative hypothesis:		
true difference in means between group Bi and group Mul is not equal to 0		
95 percent confidence interval:		
0.9203719	15.8281661	
sample estimates:		
mean in group Bilinguals	mean in group Multilinguals	
12.263158	3.888889	

5.7.6. The effect of gender on the total number of errors

The analysis of the impact of gender on the total number of pronunciation errors revealed that gender does not have a significant effect on the frequency of pronunciation errors[10]. This finding contradicts the hypothesis that males would exhibit a higher incidence of pronunciation errors compared to females. The t-test, as presented in Figure 23, provided a p-value exceeding 0.05. Consequently, we lack the statistical basis to assert that the differences between the females (error mean = 11.64) and males (error mean = 7.5) are statistically significant.

Figure 23. A two-sample t-test for the gender factor

Welch Two Sample t-test		
data: Total error by Gender		
t = 1.0688	df = 20.284	p-value = 0.2977
alternative hypothesis:		
true difference in means between group F and group M is not equal to 0		
95 percent confidence interval:		
-3.935765	12.22148	
sample estimates:		
mean in group Female	mean in group Male	
11.64286	7.5	

In this chapter, we have examined the complexities of English consonant cluster pronunciation among Jordanian bilinguals and explored the influence of various factors on their pronunciation errors. The hypotheses put forth in the study have been substantiated by statistical analyses, demonstrating that RD speakers exhibit more pronunciation challenges. Consequently, they are more prone to pronunciation errors, especially when dealing with initial consonant clusters. These challenges stem from differences in the syllable structures of their native Arabic dialects compared to English, leading to distinct repair strategies such as vowel insertion, prosthesis, deletion, metathesis, and substitution.

Furthermore, the impact of age of acquisition and multilingualism on pronunciation errors was evident, emphasizing the importance of early language exposure and the potential benefits of being multilingual. Surprisingly, gender did not show a significant effect on the frequency of pronunciation errors, highlighting that pronunciation difficulties are not gender specific.

[10] These results were based only on the current data which does not show a big enough difference between male and female speakers' behavior. This may only depend on the limited dataset or on the fact that almost all the subjects were very highly educated individuals.

In summary, this research provides valuable insights into the interference between L1 and L2 phonology, providing valuable insights for educators and linguists working in the field of second language acquisition. It emphasizes the need for targeted language instruction and the development of appropriate strategies to address these challenges, particularly for speakers of dialects that significantly differ from the phonological patterns of the target language.

5.8. Chapter Summary

This chapter started with introducing the study, the methods used, and the presentation of data about the participants' linguistic background, categorizing them into two groups according to their region and therefore spoken dialect (AD, RD). Besides, it presented the participant errors in English three-consonant clusters in initial and final positions and the reasons behind them. It also showed the differences in the performance of the UD participants and RD participants in the given tests. The first of the five subsections showed the results of the production test as the participants' errors in English three Consonant clusters in the initial position and the reasons behind them. The second was the discussion of their errors in English in three Consonant clusters in the final position and the reasons behind them. The third subsection was about the repair strategies used and the reasons behind them. The fourth subsection was the acoustic analysis to provide an acoustic representation of the committed errors and compare the performance of the two groups, while the fifth subsection was the statistical analysis which was used to show the significance of the findings and to test the study hypotheses.

CHAPTER SIX: GENERAL DISCUSSION

This chapter provides an analysis of the participants' performance and errors in English three-consonant clusters in initial and final positions in the light of the factors affecting L1 interference (James, 1980), then the findings of previous research on L2 pronunciation, and finally the theories of L2 acquisition in Chapter 2, as well as the predictions based on them.

6.1. The performance of the participants

As mentioned in the result section, the difference between the participants' total performance and frequency of errors shows that the RD participants are affected more by their L1 since their errors in English three-consonant clusters in initial and final positions are mostly due to L1 Arabic negative transfer. The RD participants applied their own phonological rules to replace the unfamiliar English ones, thus producing incorrect English words. UD participants, on the other hand, are significantly less affected by L1 negative transfer. Table 35 shows all the participants' total percentages of errors in English three-consonant clusters in initial and final positions in word groups 1 and 2.

Table 35. The frequency and percentage of errors in word groups (1) and (2)

Dialect	No. of Errors in Word Group (1)	percentage of Errors in Word Group (1)	No. of Errors in Word Group (2)	Percentages of Errors in Word Group (2)
AD	14	5%	5	1.78%
RD	157	56.07%	92	32.85%
Total	171	61.07%	97	34.64%

In this research, the participants' total percentage of errors in English initial three consonant clusters is 61.07% in Word Group 1 which met the expectations to be higher than the percentage in Word Group 2, i.e. English final three consonant clusters at 34.64%. The total percentages suggest that there is a difference in how initial and final clusters are treated by the different dialects of Arabic, this also supports what was mentioned in the contrastive analysis that MSA permits consonant clusters, but this varies from one Arabic dialect to another and is treated in different ways. It can be summarized from the results that the participants (both UD and RD) committed more errors while producing English initial three-consonant clusters than while producing English final three-consonant clusters. Second, RD participants committed more errors in producing English three-consonant clusters in both positions than UD participants as hypothesized. Accordingly, these results illustrate that the RD participants have difficulties

while producing English three consonant clusters and have not yet mastered English phonological rules.

The participant's errors in English three-consonant clusters are due to many reasons (Ur, 1991) such as an L2 sound does not exist in the speaker's L1 and consequently, the speaker is unfamiliar with the way such a sound is pronounced. Hence, they try to replace it with the most similar sound from their only source (L1) to fill the linguistic gap.

Another potential reason is when a sound from a second language (L2) exists in the speaker's first language (L1), but only as an allophone rather than as a distinct phoneme. In such instances, the speaker may not perceive it as a separate sound with unique characteristics that alter the meaning of a word. Moreover, speakers might acquire the sounds of an L2 that seem similar to those in their L1, though they would have difficulties on the phonological level when applying phonological rules: they tend to use their L1 rules and apply them to the second language they are learning (Ur, 1991).

The third issue worth mentioning is that most Jordanian schools do not consider English more than a 'school subject', which cannot progress to be a means of communication. With the exception of private and international schools, which can be commonly found in the capital city of Amman. These offer UD speakers a variety of choices to find an adequate educational system, but such schools can be rarely found in Al Ramtha city which makes the choice of good English education there very limited.

Furthermore, since pronunciation is completely ignored in the classroom context, the majority of teachers lack both phonetic training and the ability to teach English as an L2 in its spoken form. Thus, learners are learning the written form of L2 rather than the spoken form. In addition to the fact that school language exams are created in a way to test the learners' ability to memorize L2 grammar and vocabulary rather than to test the ability to efficiently use and understand it.

The findings of this analysis illustrate that the RD participants were more affected by L1 interference than the UD participants, who were affected significantly less. This shows that there are more factors affecting their English pronunciation besides the mother tongue. In my point of view, the RD speakers are coming from a small city compared to the capital Amman with less diversity and limited linguistic exposure. Besides, the differences in the educational systems in the mentioned cities, Amman and Al Ramtha are different: in the former, learning a second language is encouraged by society and the government offers more choices than the ones in Al Ramtha city. This might also be related to the L2 AoA, where UD participants seem to start learning L2 earlier than RD participants do. Which, as can be seen in the results, is

significantly affecting the participants' L2 proficiency. The educational level of the participants also affected the results, as UD participants were highly educated and more motivated to learn the language.

6.2. Factors affecting L1 interference

Following James (1980), this part analyses the subjects' errors in English three consonant clusters based on the factors influencing L1 interference outlined in Chapter 2.

6.2.1. Amount and nature of L2 input

It is most likely that the subjects' errors in English three-consonant clusters were affected by this factor in different ways and levels: RD errors can be caused by lack of linguistic exposure since their L2 spoken English input is very limited due to three reasons. First, their lack of exposure to native spoken English for living in a small city compared to the capital city of Amman as well as for being taught by teachers who focus more on the written than the spoken form due to the demands of the Arab educational systems.

Moreover, the undeniable fact is that the teachers are not specialists in English language teaching thus they teach English using Colloquial Arabic as a language of instruction and pronouncing English in a misleading accent. As a result, they will not be able to recognize the learners' pronunciation errors that are related to Arabic interference in the first place to be able to discuss them and give the appropriate feedback. According to Krashen's (1977) Monitor theory, the significance of L2 input (clear and accurate knowledge) is the only method that contributes to increasing the speakers' L2 linguistic competence.

6.2.2. Linguistic distance between L1 and L2

Languages like Arabic and English belong to two different linguistic families. On one hand, Arabic is a Semitic family of languages, whereas English belongs to the Indo-European family. Therefore, they differ in various linguistic levels, and these differences are the primary sources of the participants' transfer errors (i.e. L1 negative transfer). It is thus claimed that the greater the linguistic distance between L1 and L2, the higher the number of expected L2 errors. The participants' lack of L2 phonetic and phonological knowledge led to pronunciation errors mainly due to L1 interference that forced them to negatively transfer Arabic sounds and rules while producing the targeted English words.

The phonetic variations between English, MSA, and JA are discussed in Chapter 3. It provided evidence of phonemic differences between these languages and discussed the possibility of these differences having an impact on how the target language is acquired (for more detail, see Chapter 3) Furthermore, shedding light on consonant clusters, and as

mentioned in Chapter 3, the Jordanian UD allows consonant clusters in some cases unlike the Jordanian RD dialect, RD participants tend to break every Arabic cluster by using one of the repair strategies discussed, similarly to what they did with the tested English words while UD speakers tend pronounce the cluster if occurred or change the Arabic pronunciation by deleting the vowel and creating a consonant cluster. This is significant evidence that RD participants were affected by the linguistic difference not only between Arabic and English but also their Arabic rural dialect which seems to have a greater linguistic distance from English than the Arabic urban dialect.

6.2.3. Task Focus

The participants' emphasis on grammatical forms (written English) rather than "communicative effectiveness"(spoken English) was most probably the explanation for their errors in English-targeted words that were affected by L1 interference. This demonstrates that the task factor has a major impact on the individuals' proper pronunciations.

6.3. Theories of L2 acquisition

Earlier, predictions were made in the light of three of the theories of L2 (phonology) acquisition discussed in Chapter 2, namely: Contrastive Analysis, Error Analysis, and Markedness Theory. In this section, these predictions will be tested, to whether they can be confirmed as well as to provide any evidence for any of the three L2 theories below.

6.3.1. Contrastive analysis hypothesis CAH

Based on the contrasts between Arabic and English sounds and rules, this section discusses the sources of the participants' errors in the English three-consonant clusters (i.e. interlingual reasons). The results of the tested English words provide substantial evidence for theories of L2 acquisition such as the Contrastive Analysis Hypothesis CAH (Lado, 1957).

According to the CAH, it is assumed that Jordanian Arabic speakers of L2 English will find it difficult to produce English consonant clusters that are different from those in L1, because of the differences between their L1 Arabic and L2 English. These difficulties are due to L1 negative transfer. However, they would easily produce clusters that are similar to those in their L1 Arabic. It is also assumed that different Jordanian dialects affect the pronunciation of English three consonant clusters at different levels. The results of this study confirmed this CAH prediction.

For instance, most of the RD participants frequently committed errors while producing English initial consonant clusters more than while producing English final consonant clusters, since neither MSA allows initial consonant clusters nor does RD. However, under certain

circumstances, MSA allows having final consonant clusters while RD does not. This can be evidenced by the fact that the RD participants fail to pronounce English structures that are different from their L1 (MSA, RD), which are considered to be the main sources of linguistic knowledge in general, being affected more by their Arabic dialect than by MSA which is a result of limited use of MSA. On the other hand, UD participants committed significantly fewer errors while producing English consonant clusters than RD participants did, as their Arabic dialect allows consonant clusters in certain circumstances, which leads to them having no significant difficulty producing structures similar to those in their L1.

In summary, RD participants found it difficult to acquire the English rules that are different from those in their L1. Therefore, these participants substituted their different Arabic rules while producing the English words (i.e. L1 negative transfer) as indicated by their high percentage of errors (51.07%). On the other hand, UD participants, who made significantly fewer errors, positively transferred their similar L1 rules to the words producing them correctly, as shown by their low percentage of errors (3.31%). The results are in line with the Contrastive Analysis Hypothesis.

6.3.2. Error analysis EA

This section explains the factors affecting the participants' errors in English three-consonant clusters based not only on the linguistic distance between L1 and L2 sound systems (interlingual factors) but also a result of intralingual factors. The findings also provide evidence for Error Analysis EA (Corder, 1967). It was predicted based on EA that English consonant cluster errors committed by Jordanian Arabic speakers of L2 English are due to interlingual (L1 negative transfer), intralingual factors, and extra-linguistic / non-linguistic factors (such as age of acquisition AOA, linguistic exposure/use, and other individual differences).

The study's findings confirmed the prediction that participants' errors in English stem from various factors. These include not only interlingual reasons, such as negative transfer from their first language, Arabic (L1) but also intralingual reasons arising from differences between Jordanian Arabic dialects. Additionally, non-linguistic factors contribute, such as age of acquisition (AOA), overgeneralization of second language (L2) rules, fossilization, limited practice, lack of exposure to spoken English outside the classroom, and insufficient instructional support.

6.3.3. Markedness theory

This section provides explanations for the participants' errors in English three-consonant clusters based not only on the differences and similarities between L1 and L2 sound systems CAH but also on the degree of difficulty of the different structures (i.e. typological

markedness). The Markedness Differential Hypothesis MDH explains the reasons for 2 English consonant cluster errors since L2 rules and structures are both distinct and more marked than corresponding L1 ones will lead to learning difficulties. Table 36 shows the scale of markedness for the English consonant cluster production errors by all the participants.

Table 36. The scale of markedness for the English production errors by all the participants

Word group	No. of Errors	% of Errors	
Initial Three Consonant Clusters	171	30.35%	More Marked= Most Difficult
Final Three Consonant Clusters	97	17.32	Less Marked= Least Difficult

- **The markedness differential hypothesis MDH**

The results of Word Group 1 (English initial three-consonant clusters and Word Group 2 (English final three-consonant clusters), provide evidence for Eckman's (1977) Markedness Differential Hypothesis MDH, which is a reformulation of the CAH that embraces the notion of typological markedness. According to the MDH, it was predicted that English sound rules that are both different and more marked than corresponding L1 Arabic sound rules lead to learning difficulties. The results have also confirmed this MDH prediction.

6.4. Previous studies on English consonant cluster production

This part discusses, compares, and contrasts the findings of this study with previous research related to the same area. Relying on the data analysis, it was revealed that the participants experienced different levels of difficulty pronouncing English Consonant clusters in the initial (CCC) and final (CCC) positions, which supports the conclusions of other Arab studies such as (Elsaghayer, 2014; Naama, 2011). However, there are differences in the difficulty hierarchy, which means that participants in this study from both regions had more difficulty pronouncing Consonant clusters in initial positions than in final positions. Yet, the difficulties were not equal, as RD participants committed significantly more errors than UD participants.

The statistical analysis in Chapter 5 revealed that RD participants committed more errors than UD participants while producing English Consonant clusters in both positions. While UD participants committed an average of 1.357 errors/person in total, RD participants committed an average of 17.78 total errors. Based on the t-test, the p-value was less than 0.05, hence we can state that differences between the UD participants' overall performance (error mean = 1.357) and RD participants' overall performance (error mean = 17.78) are considered to be statistically significant. The results also demonstrate that the participants from both regions committed more errors while producing English Consonant clusters in initial positions than in final positions. As UD participants committed more errors while producing initial Consonant

clusters (M =1) compared to final Consonant clusters (M 0.35), similarly RD participants encountered more difficulties while producing initial Consonant clusters than final Consonant clusters with an average of (M=11.21) (M=6.57), respectively. This conclusion disagrees with the findings of Al-Yami and Al-Athwary, (2021), where they concluded that Saudi EFL learners found it more difficult to pronounce English final Consonant clusters than English initial Consonant clusters.

Students applied different strategies to pronounce Consonant clusters. However, according to the error analysis, in most of the cases, the participants used the vowel insertion strategy, where the L1 dialect influence was significantly obvious in the frequency of this type of error (67%), the place of the epenthetic vowel (CVCC-)(-CCVC), and the vowel used /ɪ/. The second highest frequency of errors used the deletion strategy with a percentage of (12%). Other strategies were not used frequently and the reason behind them might again be evidence of L1 dialect rules transfer or recognized as a lack of L2 linguistic awareness in addition to other influencing factors (see Figure 7).

Nevertheless, this result is in contrast with Al-Yami and Al-Athwary's (2021) conclusion, which argued that the most commonly used repair strategy to produce the CCC structure was prosthesis, i.e. initial vowel insertion. It is also in contradiction with Al-Sammer (2014), and Jayaraman (2010), who claimed that the most frequently used repair strategy was segmental – that is, consonant – deletion.

It can be summarized from the results that there are two different categories of factors that can indeed contribute for participant errors in Consonant clusters pronunciation. First, linguistic factors such as L1 interference and markedness, as well as non-linguistic factors including the L2 learner's age of acquisition, the amount of exposure to the English language, the quantity and quality of L2 instruction they received, and their inadequacy of practice. Considering that the participants had more difficulty pronouncing the more marked pattern (initial Consonant clusters) than the less marked pattern (final Consonant clusters), this fact supports the markedness factor. This result is also consistent with the findings of other investigations (e.g. Chen, 2011; Hansen, 2001; Turkestani, 2011). Nonetheless, such analyses only focused on certain structures in the initial or final positions.

A further linguistic factor that can indeed explain the participant errors is the effect of the L1; participants had much more difficulty with structures that were not found in their dialect, thus they relied on their L1 dialect syllable structures. Existing research supports this claim (e.g. Fatemi et al., 2012; Hago and Khan, 2015; Keshavarz, 2017). Moreover, the linguistic background questionnaire revealed some other significant factors including the lack of

linguistic awareness to pronounce the English language correctly, limited linguistic exposure, and a lack of language instruction. This seems to agree with Na'ama (2011), Al-Yami and Al-Athwary, (2021), who indicated that a lack of linguistic awareness was a significant reason for difficulties with Consonant clusters pronunciation. Nevertheless, this still contradicts other research findings (e.g., Keshavarz, 2017; Jabeen et al., 2012) who explained participants' errors exclusively to differences between L1 and L2.

In the following chapter, the researcher proposes several academic and pedagogical strategies for addressing pronunciation difficulties for native Arabic speakers learning English as a second language.

CHAPTER SEVEN: CONCLUSION

This research has explained three theories of L2 acquisition and their implications on L2 learning as follows. Contrastive Analysis CA hypothesizes that all errors in L2 learning can be anticipated and the interlingual factors influencing these errors could be clarified by making comparisons between the L1 and the L2, and that the differences between the two languages cause negative transfer from L1 to L2. It was assumed that the bigger the gap between the systems of L1 and L2, the higher the challenges and difficulties in the L2 learning process.

CA has brought to light multiple essential issues in SLA. Meanwhile, there have been continuous debates about the validity and reliability of contrastive linguistic studies in language teaching and learning. For instance, CA expects only interlingual errors, some similar L1 and L2 features were difficult to acquire (e.g. UD participants' errors), whereas several dissimilar patterns were relatively simple to pronounce (e.g. RD correct pronunciations) Finally, bilingual errors are not only the outcome of L1 interference (e.g. the differences between the performance of the participants among the same group).

Error Analysis was a substitute for CA in which L1 interference (L1 negative transfer) was regarded as the primary cause of errors in L2 acquisition. It was shown that CA was not able to detect several errors. EA considers errors as a fundamental element of L2 proficiency and explains how this occurs by analyzing bilinguals' incorrect responses. It tries to explain both interlingual and intralingual errors. Intralingual errors are typically due to factors besides L1 negative transfer, such as inadequate instructional strategies or resources, misinterpretation of L2 rules and structures, age of second language acquisition, and personal differences.

The findings of an EA can be utilized to plan remedial steps. Richards et al (1992, p. 127) demonstrate the importance of EA in language teaching and learning by asserting that the study of errors can be adopted. First to recognize strategies that participants are applying while using L2, second to determine the reasons for participants’ errors, and finally to gather data on frequently reported challenges in language learning, “as an aid to teaching or in the preparation of teaching materials”.

Although error analysis may offer advantages, several linguistic papers have criticized it for a variety of reasons including the fact that it misses L2 learners' proper forms by counting only errors; it also has flaws in methodological procedures, theoretical issues, and capabilities limitations; as well as interpretive and descriptive characteristics in EA can be described as misrepresentative.

Markedness Theory is a theory of L2 acquisition that considers both L1 transfer and language universals: CA complemented with typological markedness. CA justified L2 learning difficulties solely on the grounds of L1-L2 differences, while the Markedness Differential Hypothesis suggested that these distinctions were insufficient without considering typological markedness.

According to the MDH, marked structures are much more problematic to acquire than unmarked structures in areas with L1-L2 differences. This indicates that not all L1-L2 differences are similarly demanding and that the level of difficulty correlates with the degree of markedness. Typological markedness contributed as an explanatory notion in SLA and L2 phonology, indicating the complexity of L2 learners' challenges. However, MDH failed to explain the strategies or patterns used while producing errors, besides that not all the participants' pronunciation errors were due to L1- L2 differences.

According to Odlin (1989, p. 112), there is no dispute that L1 phonetics and phonology are primary influences on second language pronunciation. The results demonstrate that there are several instances when first language transfer was explicit. The CAH's lack of ability to deal with data variation appears to be clarified by Tarone's (1989, p. 70) statement that "research which has been done in this area [interlanguage phonology] quite clearly shows that transfer is only a part - and often a small part - of the influence on interlanguage phonology." According to the findings, the participants transferred several structures from their LI to their L2, such as vowel insertion strategy. Some cases, however, indicated that the individuals committed certain pronunciation errors that the CAH failed to predict. In other words, even though participants in the same group spoke the same dialect, not all of them transferred the same sound pattern from their LI to their L2. The CAH did not account for this variation. Moreover, although vowel insertion was the most frequent strategy used, different repair strategies were applied in several cases that cannot be explained by L1 negative transfer.

Furthermore, Broselow (1987, pp. 292-293) regarding this asserted that:

> "While it is certain that many factors other than transfer from the first language are involved in phonological errors made by language learners, the failure to predict errors from an examination of the linguistic systems of the first and second languages by no means constitutes sufficient grounds for abandoning the contrastive analysis hypothesis altogether."

Therefore, the findings of this study confirm Gass and Selinker's (1994, p. 98) argument that to better understand the acquisition of L2 phonology, the CAH should be developed in a manner that takes into consideration "linguistic differences between the L1 and the L2 systems,

universal facts of phonology, and sociolinguistic constraints." The results of this analysis support the assertion that phonological acquisition cannot be described solely by comparing LI and L2; other aspects, such as the learners' age of L2 acquisition, sociolinguistic factors, developmental factors, and so on, should also be considered to explain clearly the reasons behind L2 pronunciation errors.

It can be concluded that CA studies between Arabic and English can provide some help while teaching English as a second language However, it cannot be regarded as a tool that allows teachers to detect all errors. As a result, dedicating further research to Arabic vernacular dialects can contribute to identifying critical areas of each dialect and thereby addressing errors that are specific to the dialect under investigation. Furthermore, the reason behind certain errors is L2 teachers, the teachers in the Jordanian schools are Arabs who were trained in local dialects by teachers who had the same situations. If not treated immediately, especially for younger or recently graduated teachers, these pronunciation errors by teachers within English classes eventually get to be fossilized, passing their foreign accents to future generations.

Classroom instruction is the primary if not the only source of L2 input for most Arab learners. Therefore, focusing on the teachers, classroom instructions and materials, and the learners should be given extra consideration. First, English teachers in most Jordanian schools and universities are locals who speak English with a foreign accent themselves, which would be transferred easily to their learners as the teacher's pronunciation is the immediate source of L2. Moreover, the use of outdated traditional teaching methods and strategies as the grammar-translation method based on L2 to L1 translation, requiring the learners to memorize extensive lists of vocabulary items and rules, also focuses solely on the writing and reading skills more than speaking and listening skills. Accordingly, this method is known to favor accuracy more than fluency and actual language use. Another issue in this regard is that English language usage is limited to classroom contexts, which is again in most cases in the written form rather than the spoken form, and the learners' participation in the classroom is restricted since Jordanian classrooms are typically teacher-centered classrooms.

To find solutions for such issues, from the beginning starting with English teachers, pre-service teacher preparation programs must receive a significant amount of attention. They must take thorough phonetics and phonology training to acknowledge fully the English sound system. However, studying phonetics and phonology separately may result in fossilization, like in the case of former schoolteachers. As a result, an EA and CA course is advised, especially if it concentrates on the linguistic limitations of the teachers' dialect. Consequently, they will indeed be aware of the significance of starting their professional instruction with skills to

anticipate and/or assess errors that may emerge as an outcome of MSA or colloquial dialect transfer.

Regarding the teaching methods and materials, serious modifications should be initiated. first by using different and up-to-date teaching methods and applying different techniques and strategies matching the learners' needs and different individual backgrounds, to engage the learners in the English language classrooms by using interesting materials and techniques, for example watching a movie or listening to a story along with the English subtitles will enhance the development of the learners linguistic awareness by tracking how a word in a written form is pronounced and used by native speakers, constructing the proper homework like recording a story and correcting themselves by comparing it to the original until they produce the correct pronunciation. Different ways to teach English sound systems may also be used taking into consideration the differences between the learners' L1 and English by focusing on marked patterns and structures giving them more time and effort, for example teaching English by using the Arabic diacritics - called vowelization. This technique is not used very often even though it helps beginner language learners avoid pronunciation problems on the level of phonetics and phonology such as sound production, consonant cluster production, word stress, etc.

With enough English exposure over multiple years, it is also advised that basic phonetics and phonology instruction be included in course materials. These courses should contain the IPA to educate learners on how to learn not simply the meaning or translation of a word but also its phonetic transcription in a dictionary as online dictionaries offer the option of playing the pronunciation of a word according to the selected accents.

During the instructional or presentation phases, the abovementioned techniques are applicable. However, it is expected that errors to arise throughout the practicing and production phases. If the preceding measures are regarded as preventative, the following measures may be categorized as remedial. Therefore, teachers must be attentive to the classroom environment, which should be a quiet and friendly atmosphere for the learner to practice or produce language.

Teachers should not regard errors as a prohibition or a sign of poor performance, but rather as a necessary part of the learning process and indications of the learners' progress toward L2. Learners could be constrained by a stressful environment in which they are always concerned about errors and expect the teacher's corrections at any time throughout their spoken output. Based on the surroundings, teachers must never disrupt the flow of their students' speaking whatsoever to correct them on the spot every time they commit an error. The concept of fear affects the progress of the learners. Teachers must also understand the distinction between errors and mistakes. Consequently, correcting mistakes is not always required, mainly when

they are aware of the learner's level of knowledge and skills. Meanwhile, unnecessary error correction is frustrating and can create negative attitudes towards the class and the language itself.

Teachers are advised to focus on certain errors at a time to minimize embarrassment and to provide learners with adequate training. It is noteworthy that specific errors become fossilized because of a lack of practice. Correction, on the other hand, may emerge not just from the instructor but also from the learners themselves as mentioned, or by other classmates. Allowing learners to self-correct will boost their self-esteem and decrease their fear of committing mistakes since they are self-correctable.

Generally, after committing errors, exposure to native speaker input is also required. It needs to be a continuous task, certainly with all of the accessible media and modern technologies. On a pedagogical level, greater emphasis should be centered on speaking competence, since it is the tool used to test and correct pronunciation. Speaking testing should be considered in both formative and summative evaluations. In the case of formative assessment, learners should receive explicit instruction by giving corrective feedback to assist them in developing, whereas speaking should be included so that learners understand the importance of pronunciation and take it seriously to complete their speaking assessments. It is also essential to keep in mind that negative washback should be avoided in both formative and summative evaluations. In other words, “an oral proficiency test is introduced in the expectation that it will promote the teaching of speaking skills” (Taylor 2005, p. 154).

To conclude, this study focuses on the linguistic factors that make Arab Jordanian bilinguals contribute to making pronunciation errors. It was limited to analyzing only the production of English three consonant clusters in initial and final positions; further research is required to investigate the dialects under investigation, and the impact of these dialects on the production of English consonants and vowels. Although this study proved that, some intralingual factors have a significant impact on the participants’ performance, such as the participants’ age of acquisition, their education levels, and being bilingual or multilingual. Certain extra-linguistic factors, such as sociolinguistic and psycholinguistic factors, must be investigated. Some learners, for example, view learning another language as harmful to their identities. From their perspective, their mother tongue is an indivisible part of who they are. As a result, properly speaking the second language involves a form of adopting behaviors that are not part of their cultural heritage for them. As a result, combining linguistic and extra-linguistic investigations may give a more comprehensive insight into the issue at hand.

REFERENCES

Abdelali, A. (2004). Localization in modern standard Arabic. *Journal of the American Society for Information Science and technology*, *55*(1), 23-28.

Abercrombie, D. (1967) *Elements of General Phonetics*, Edinburgh University Press.

AbiSamra, N. (2003). *An Analysis of Errors in Arabic Speakers English Writings.* /online/. /Accessed, 10 March, 2012/. Available at http://abisamra03.tripod.com/nada/languageacq-erroranalysis.html#12

AbuAbbas, K. H. (2003). *Topics in the phonology of Jordanian Arabic: An optimality theory perspective*. University of Kansas.

Abu-Rakhieh, B. A. (2009). *The phonology of Ma'ani Arabic: Stratal or parallel OT. University of Essex* (Doctoral dissertation, Doctoral dissertation).

Alain, P. (1993). *Survey Research Methodology in Management Information Systems: An Assessment.* I.T. in Government, Center for Research on Information Technology and Organizations, UC Irvine. /online/. /Accessed, 17Sept, 2013/. Available at http://escholarship.org/uc/item/6cs4s5f0#page-4

Alan, S. K. (1997). Arabic and its relationship to the other Semitic languages. California State University. Fullerton. 2, 188-204.

Al-Ani, S. H. (2014). *Arabic phonology: An acoustical and physiological investigation* (Vol. 61). Walter de Gruyter.

Al-Aqlobi, O. (2013). Difficulties in pronouncing and perceiving English word-final consonant clusters among Saudi ESL learners.

Al-Deaibes, M. (2015a). The morpho-syntax of sentential negation in Rural Jordanian Arabic. *Journal of Advances in Linguistics*, 5: 3, 750-760.

Al-Deaibes, M. (2015b). Rural Jordanian Arabic assimilation across morpheme boundaries. Paper presented at *the 31st North West Linguistics Conference*. University of Victoria, Victoria, BC, Canada

Al-Deaibes, M. (2016). Code-switching on Facebook: Structural constraints. In Aubrey Healey, Ricardo Napoleão de Souza, Pavlína Pešková, and Moses Allen (Eds.). *Proceedings of the 11th High Desert Linguistics Society*, 30-43. University of New Mexico

Al-Khresheh, M. H. (2016). A Review Study of Error Analysis Theory. *International Journal of Humanities and Social Science Research*, 49-59.

Alomoush, O. (2007). *Jordanian students attitudes toward Anglicism: a sociolinguistic study. MA thesis.* Yarmouk University.

Alomoush, O., & Al Fagara, W. (2010). The adaptation of English loanwords into Jordanian Arabic. *Journal of Language & Literature*, *2*, 27-39.

Alomoush, O., & Matarneh, M. (2010). The spread of code-switches into Jordanian social settings. *Interna-tional Journal of Philosophy of Culture & Axiology*, *7 (20)*, 223-233.

Al-Saidat, E. M. (2010). Phonological analysis of English phonotactics: A case study of Arab learners of English. The Buckingham Journal of Language and Linguistics, 3, 121-134.

Al-Sammer, M. (2014). Patterns of coda clustering simplification in RP English by Omani female students: A generative perspective. *Journal of the College of Arts*, *(69)*, 25-56.

Al-Shalabi, F. (2021). Phonological Errors and L1 Interference: A Case Study of Jordanian Learners of English as a Foreign Language. *Journal of Studies in Education*, *11*(3), 116.

Al-Sobhi, B. M. S., & Preece, A. S. (2018). Teaching English speaking skills to the Arab *students* in the Saudi school in Kuala Lumpur: Problems and solutions. *International Journal of Education and Literacy Studies*, *6*(1), 1-11.

Al-Sughayer, K. I. (1990). *Aspects of comparative Jordanian and modern standard Arabic phonology*. Michigan State University.

Al-Wer, E. (2007). The formation of the dialect of □. In Miller, C.-Al-Wer, E. - Caubet, D. - Watson, Janet C. E. (eds.): *Arabic in the city: Issues in dialect contact and language variation*. New York/London: Routledge, 55-76.

Al-Yami, E. M., & Al-Athwary, A. A. (2021). Phonological analysis of errors in the consonant cluster system encountered by Saudi EFL learners. *Theory and Practice in Language Studies*, *11*(10), 1237-1248.

Amer, W. (2001). An investigation into the differences between English and Arabic consonant and vowel sounds: A contrastive study with pedagogical implications. *Site. iugaza. edu. ps*, 1-20.

Archibald, J. (1998). *Second Language Phonology.* Amsterdam, Philadelphia: John Benjamins Publishing Company. https://doi.org/10.1075/lald.17

Ashour, H. M. (2017). Major differences between Arabic and English pronunciation systems: a contrastive analysis study. *AL-Lisan International Journal for Linguistic & Literary Studies*, *1*(1), 132–150.

Avery, P., & Ehrlich, S. (1992). Teaching American English: Oxford handbook for language *teachers*.

Bell, R.T. (1974). Error analysis: a recent pseudo procedure in applied linguistics, *lntemational Review of Applied Linguistics,* Vols. 25-26, 35-49.

Bernaus, M., Masgoret, A. M., Gardner, R. C., & Reyes, E. (2004). Motivation and attitudes towards learning languages in multicultural classrooms. *International Journal of Multilingualism*, *1*(2), 75-89.

Bialystock, E. (1997). Anatomy of a revolution. *The future of the cognitive revolution*, 109-113.

Bista, K. K. (2009). Age as an affective factor in second language acquisition. *Journal of International Students, 9(2),* 1–20.

Bongaerts, T., van Summeren, C., Planken, B., & Schils, E. (1997). Age and ultimate attainment in the pronunciation of a foreign language. *Studies in second language acquisition*, 447-465.

Bouchhioua, N. (2019). Epenthesis in the production of English consonant clusters by Tunisian EFL learners. *Applied Linguistics Research Journal*, *3*(4), 33-44.

Broselow, E. (1987). Non-obvious transfer: On predicting epenthesis errors in G. Ioup and SH Weinberger (eds.): Interlanguage Phonology: The Acquisition of a Second Language Sound System. (pp. 80-269). Cambridge: Newbury House.

Broselow, E. (1992). Language transfer and universals in second language epenthesis, in S. Gass and L. Selinker, eds., *Language Transfer and Language Learning*: 71-86. Amsterdam: John Benjamins.

Btoosh, M. A. (2006). Constraint interactions in Jordanian Arabic phonotactics: An optimality-theoretic approach. *Journal of Language and Linguistics*, *5*(2), 102-221.

Burt, M. and C. Kiparsky (1975), Global and local mistakes. In Schumann and Stenson (eds.), *New Frontiers in Second Language Learning.*

Carlisle, R. S. (1997). The modification of onsets in a markedness relationship: testing the interlanguage structural conformity hypothesis. *Language Learning*, 47:2, 327-361.

Carlisle, R. S. (1998). The acquisition of onsets in a markedness relationship: a longitudinal study. *Studies in Second Language Acquisition*, 20, 245-260.

Carr, P. (1993). *Phonology*. London: Macmillan. Chan 2007;

Caubet, D. - Watson, Janet C. E. (eds.): *Arabic in the city: Issues in dialect contact*

Celce-Murcia, M., Brinton, D. M., & Goodwin, J. M. (1996). *Teaching pronunciation: A reference for teachers of English to speakers of other languages*. Cambridge University Press.

Chomsky, N. and M. Halle (1968). *The Sound Pattern of English*. New York: Harper and Row.

Cook, V. (1993). *Linguistics and Second Language Acquisition*. London: The Macmillan Press LTD.

Corder, S. (1967). The significance of learners' errors, *International Review of Applied Linguistics*, 9: 147-159.

Corder, S. (1971). Idiosyncratic dialects and error analysis, *International Review of Applied Linguistics*, 9: 147-159.

Corder, S. (1973). *Introducing Applied Linguistics*. Harmonds worth: Penguin Education.

Corder, S. (1975). *Error Analysis, Interlanguage and Second Language Acquisition.* Cambridge University Press for the English-Teaching Information Centre.

Corder, S. (1981). *Error Analysis and Interlanguage.* Oxford University Press.

Corder, S. P. (1974). *Error Analysis*. In J. P. B. Allen and S. Pit Corder (eds.) *Techniques in Applied Linguistics* (The Edinburgh Course in Applied Linguistics: 3), London: Oxford University Press (Language and Language Learning), pp. 122-154.

Crystal, D. (1997). *English as a global language*. Cambridge university press.

Dechert, H. (1983). How a story is done in a second language in Strategies. In *Interlanguage Communication, eds. C. Faerch and G. Kasper, Longman, London.*

Derwing, T. M. and M. J. Munro (2005). Second language accent and pronunciation teaching: a research-based approach. *TESOL Quarterly, 39,* 379-397.

Derwing, T. M., & Munro, M. J. (1997). Accent, intelligibility, and comprehensibility: Evidence from four L1s. *Studies in second language acquisition*, *19*(1), 1-16.

Di Pietro, R. (1971). *Language Structures in Contrast.* Newbury House.

Dulay, H., M. Burt and S. Krashen (1982). *Language Two*. New York: Oxford University Press.

Eckman, F. and G. Iverson (1994). Pronunciation difficulties in ESL: coda consonants in English interlanguage. In M. Yavas (ed.): *First and Second Language Phonology*. San Diego: Singular Publishing Company. pp. 251-265.

Eckman, F. R. (1977). Markedness and the Contrastive Analysis Hypothesis. *Language Learning* 27 (2). 315-330.Eckman, 1991.

Eckman, F. R. (2008). Typological markedness and second language phonology. In *Phonology and Second Language Acquisition*, Hansen Edwards, Jette G. and Mary L. Zampini (eds.).

EI-Badarin M., Bani-Yasin R. (1993). Consonant clusters in a Northern Jordanian Arabic *dialect*. *Language Research, 29,* 201-242.

Eisenstein, M. R. (Ed.). (1989). *The Dynamic Interlanguage: Empirical Studies in School Language Variation*. Springer Science & Business Media.

El Zarka, A. M. E. S. (2013). *The Pronunciation errors of L1 Arabic learners of L2 English: The role of modern standard Arabic and vernacular dialects transfer* (Doctoral dissertation, The British University in Dubai (BUiD)).

El-Hassan, S. (1977). Educated spoken Arabic and the Levant: a critical review of diglossia and related concepts. *Archivum Linguisticum,* 8, 112-32.

Eliot, A. R. (1995). Foreign Language Phonology: Field independence, attitude, and the success of formal instruction in Spanish pronunciation. *The Modern Language Journal, 79*(iv), 530–542.

Ellis, R. (1997). *Second Language Acquisition.* Oxford: Oxford University Press.

Elsaghayer, M. A. (2014). Markedness approach to the production of English consonant clusters among the Libyan Arabic speakers of English.

Faerch, C. & Kasper, G. (1987). Perspectives on Language Transfer. *Applied Linguistics 8*, 111-36.

Fatemi, M. A., Sobhani, A., & Abolhasani, H. (2012). Difficulties of Persian learners of English in pronouncing some English consonant clusters. *World Journal English Language*, *2*(4), 69-75.

Ferguson, C. (1959). Myths about Arabic. *Georgetown Monograph Series on Language and Linguistics,* 12, 75-82.

Fisiak, J, Lipinska-Grzegorek, M & Zabrocki, T. (1978). *An Introductory English-Polish Contrastive Grammar*. Warszawa: PWN.

Fisiak, J. (1983) Current Issues in Linguistic Theory 43: *Papers from the VI International* Conference *on Historical Linguistics*, Poznan, 22-26 August 1983. Adam Mickiewicz University Press.

Forel, C., & Puskás, G. (2005). Phonetics and Phonology: Reader for First Year English Linguistics. Retrieved on March 9, 2014.

Fries, C. (1945). *Teaching and Learning English as a Foreign Language.* Ann Arbor: Wahr.

Gass, S. & Selinker, L. (2008). *Second language acquisition: an introductory course.* 3rd ed. New York: Routledge.

Gatbonton, E., & Segalowitz, N. (2005). Rethinking communicative language teaching: A focus on access to fluency. *Canadian Modern Language Review, 61*(3), 325-353.

Gay, L.R., Mills, G.E. & Airasian, P. (2009). *Educational Research: Competencies for Analysis and Applications.* (9th ed.). NJ: Pearson Education Inc.

Gilakjani, A. P., & Ahmadi, M. R. (2011). Why Is Pronunciation So Difficult to Learn? *English language teaching*, *4*(3), 74-83.

Greenberg, J. (1978). Generalizations about numeral systems. In Joseph H. Greenberg, Charles A. Ferguson and Moravcsik, Edith A. (eds.), *Universals of Human Language*, Volume 3: Word Structure, 249–295. Stanford: Stanford University Press.

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

Hall, N. (2011). Vowel epenthesis. In Marc van Oostendorp, Colin J. Ewen, Elizabeth Hume and Keren Rice (eds.) *The Blackwell companion to phonology*. 5, 1576-1596. Malden, MA & Oxford: Wiley-Blackwell.

Hamad, M. M. (2014). Contrastive Linguistic English Phonology vs. Arabic Phonology. *International Journal of Education and Practice, 2*(4), 96-103.

Hamdi, R., Ghazali, S., & Barkat-Defradas, M. (2005, September). Syllable Structure in Spoken Arabic: a comparative investigation. In *Eurospeech—9th European Conference on Speech Communication and Technology*.

Hammarburg, B. (1979). The Insufficiency of Error Analysis. Paper presented at the Symposium on Error Analysis, Lund, 26/27 September 1972; in D. Nehls (ed.) 1979 *Studies in Contrastive Linguistics and Error Analysis: I. The Theoretical Background.* Heidelberg: Julius Groos Verlag, 105-114.

Hansen, J. G. (2001). Linguistic constraints on the acquisition of English syllable codas by native speakers of Mandarin Chinese. *Applied Linguistics*, *22*(3), 338-365.

Harmer, J. (1991). *The practice of English language teaching*. New York: Longman.

Hawkins, E. (1984). *Awareness of Language: An Introduction*. Cambridge University Press.

Hayat, A. (2005). Transcribing Arabic phonemes. *A preliminary attempt. I-mag*, *3*, 29-34.

Herdan, G. (1962). The patterning of Semitic verbal roots subjected to combinatory analysis. *Word*, *18*(1-3), 262-268.

Hind, D. (2018, September 23). A qualitative study on problems in speaking English as L3 The case of Arab immigrants in Sweden. Västerås, Eskilstuna, Sweden.

Horesh, U. (2014). *Phonological outcomes of language contact in the Palestinian Arabic dialect of Jaffa*. PhD thesis, University of Essex.

Huthaily, K. (2003). Contrastive phonological analysis of Arabic and English.

Hyman, L. M. (1975). *Phonology: theory and analysis* (p. 48). New York: Holt, Rinehart and Winston.

Ibrahim, M. (1984). On the notion Standard and Prestigious in Arabic sociolinguistics. In Issam Abu-Salim and Jonathan Owens (eds.). *Proceedings of the Third Annual Linguistics Conference*. Yarmouk University, Jordan.

Jabeen, F., Mahmood, A., & Asghar, M. (2012). Vowel epenthesis in Pakistani English. *Interdisciplinary Journal of Contemporary Research in Business*, *3*(10).

Jain, M P. (1974). *Error Analysis: Source, Cause and Significance.* In Richards, J. (1974). Error Analysis: *Perspectives on Second Language Acquisition. London*: Longman.

James, C. (1974). Linguistic measures for error gravity. *AVLA Journal* 12 (1): 3-9.

James, C. (1980). *Contrastive Analysis - Applied Linguistics and Language Study*. Longman.

James, C. (1998). *Errors in Language Learning and Use*. London: Longman.

Jarbou, S. and Al-Share, B. (2012). The effect of dialect and gender on the representation of consonants in Jordanian chat. *Language at Internet*, 9, 1-19

Javed, F. (2013). Arabic and English phonetics: A comparative study. *The Criterion: An International Journal in English*, *4*(4), 1-13.

Jayaraman, S. (2010). Acquisition of pronunciation of consonant clusters by Arabic speakers of English as a second language. *Sino-US English Teaching*, *7*(1), 46-54.

Jenkins, J. (2000). *The phonology of English as an international language*. Oxford university press.

Jenkins, J. (2002). A sociolinguistically based, empirically researched pronunciation syllabus for English as an international language. *Applied linguistics*, *23*(1), 83-103.

Johnson, J. S., & Newport, E. L. (1989). Critical period effects in second language learning: The influence of maturational state on the acquisition of English as a second language. *Cognitive psychology*, *21*(1), 60-99.

Jonsson, E. (2015, May 29). Slips or errors? A study of the grammatical mistakes in Swedish.
Katalin, B. B., & Szilárd, S. (2006). Az angol nyelv kiejtése The Pronunciation of English. *Bölcsész Kanzorcium. Minden jog fenntartva*.
Kaye, A. S. (1987). Saleh M. Suleiman. Jordanian Arabic between Diglossia and Bilingualism. Amsterdam: John Benjamins. 1985. Pp. 131. *Canadian Journal of Linguistics/Revue canadienne de linguistique*, *32*(4), 391-393.Suter, R. W. (1976). Predictors of pronunciation accuracy in second language learning 1. *Language learning*, *26*(2), 233-253.
Kenstowicz, M. (1994). *Phonology in Generative Grammar*. Cambridge, MA Blackwell.
Keshavarz, M. H. (2017). Syllabification of Final Consonant Clusters: A Salient Pronunciation Problem of Kurdish EFL Learners. *Iranian Journal of Language Teaching Research*, *5*(2), 1-14.
Khalifa, M. F. (2020). *Errors in English pronunciation among Arabic speakers: Analysis and remedies*. Cambridge Scholars Publishing.
Kim, E. J. (2009). Teaching ESL/EFL listening and speaking (ISP Nation and Jonathan Newton, New York, NY: Routledge, 2009, Pl. xiii+ 205). *한국교육문제연구*, *27*(1), 165-168.
Krashen, S. (1977). The monitor model for adult second language performance. In M. Burt, H. Dulay and M. Finocchario (eds.), Viewpoints on English as a second language. New York: Regents.
Lado, R. (1957). *Linguistics Across Cultures: Applied Linguistics for Language Teachers.* University of Michigan Press.
Lange, M. (1974). Lanalyse des erreurs: état actual: état actuel de la recherche. In R. Shiu (ed.) *Errors: A New Perspective.* Toronto: Research Division, Directorate of Studies, Civil Service Commission.
Laroy, C. (1995). *Pronunciation*. Oxford University Press.
Larsen-Freeman, D. and M. H. Long (1991). *An Introduction to Second Language Acquisition Research*. Longman (Applied Linguistics and Language Study).
Lass, R. (1984). Phonology. Cambridge: Cambridge University Press.
Lenneberg, E. H. (1967). *The biological foundation of language*. New York: Wiley.
Liggett, M. (1983) *Teaching English to Arabic Speakers: Methodology, materials development, and classroom management.* Cairo: The American University Press.
Mahmoud, A. (2010). *Modern Standard Arabic vs. Non-Standard Arabic: Where Do Arab Students of EFL Transfer From?* Language, Culture and Curriculum, 13:2, 126-136. /online/. /Accessed, 3 June 2013/. Available at http://dx.doi.org/10.1080/07908310008666594
Majeed, Z. (1999). English Phonetics and Phonology for Arab Students. *Leeds, United Kingdom*.
Major, R. C. (2008). Transfer in second language phonology: a review. In J.G. Hansen Edwards and M. L. Zampini (Eds.), *Phonology and Second Language Acquisition.* (p. 63-94). Amsterdam: John Benjamins.
Major, R. C. and E. Kim (1996). The Similarity Differential Rate Hypothesis *Language Learning*, 46, 3: p465-496.
Malick, A. P. (1956). A COMPARATIVE STUDY OF AMERICAN ENGLISH AND IRAQI *ARABIC* CONSONANT CLUSTERS. *Language learning*, *7*(3-4), 65-87.

Marinova-Todd, S. H., Marshall, D. B. & Snow, C. E. (2000). Three misconceptions about age and L2 learning. *TESOL Quarterly 34*, 9–34.

Masgoret, A. M., & Gardner, R. C. (2003). Attitudes, motivation, and second language learning: A meta-analysis of studies conducted by Gardner and associates. *Language learning*, *53*(S1), 167-210.

Mathe, C. (2017). „Error Analysis: Written Work of Final Year Mainstream vs. CLIL *Students*". *Vienna, Vienna, Austria*.

McMahon, A. (2002). An Introduction to English Phonology. Oxford: Oxford University Press.

Mitchell, T. F. (2004). Arabic phonology 1: Translated with introduction and commentary. Oxford: Oxford University Press.

Mochizuki-Sudo, M. & Kiritani, S. (1991). "Production and Perception of Stress-related *Durational* Patterns in Japanese Learners of English". Journal of Phonetics, 19, 231–248.

Moyer, A. (2007). Do language attitudes determine accent? A study of bilinguals in the USA. *Journal of multilingual and multicultural development*, *28*(6), 502-518.

MUIA, M. J. (2015, March 30). Cross-Linguistic Influence in Foreign Language Learning. Nairobi, Nairobi, Kenya.

Naama, A. (2011). An analysis of errors made by Yemeni university students in the English consonant-clusters system. *Damascus University Journal*, *27*(3), 145-161.

Newton, J. M., & Nation, I. S. (2020). *Teaching ESL/EFL listening and speaking*. Routledge.

Nickel, G. (1972) Grundsätzliches Zur Fehleranalyse und Ferhlerbewertung. Fehlerkunde, ed. by G. Nickel, Berlin 1972: 8-24.

Nogoud, J. A. (2020). Phonotactic Cruciality of English Initial and Final Consonant Clusters Pronunciation on Sudanese EFL Undergraduates. *European academic research*, *8*(3), 2131-1251.Pennington, M. C., & Yue, F. (1994). English and Chinese in Hong Kong: pre-1997 language attitudes. *World Englishes*, *13*(1), 1-20.

Nwesri, A. F., Tahaghoghi, S. M., & Scholer, F. (2006, July). Capturing out-of-vocabulary words in Arabic text. In *Proceedings of the 2006 Conference on Empirical Methods in Natural Language Processing* (pp. 258-266).

O'Connor, J.P. (1967) "Better *English Pronunciation* "C.V.P. Cambridge.

Odlin, T. (1989). *Language transfer: cross-linguistic influence in language learning.* Cambridge: Cambridge University Press. PhD dissertation, University of Wisconsin, Madison

Paradis, C. (1987). On constraints and repair strategies.

Price & Oswald. (2006). *Research Methods by Dummies.* /online/. /Accessed, 17Sept., 2013/. Available at http://psych.csufresno.edu/psy144/Content/Design/Types/correlational.html

Ramsaran, S. (2015). *Studies in the pronunciation of English: a commemorative volume in honour of AC Gimson*. Routledge.

Rass, R. A. (2015). Challenges Face Arab Students in Writing Well-Developed Paragraphs in *English*. *English Language Teaching*, *8*(10), 49-59.

Richards, J. (1974). *Error Analysis: Perspectives on Second Language Acquisition.* London: Longman.

Richards, J. C. (1971). Error analysis and second language strategies. *Language Sciences*, 17: 12-22.

Roach, P. (2004). British English: received Pronunciation. *Journal of the International Phonetic Association*, *34*(2), 239-245.

Robins, H. R. (1964). General Linguistics: An Introduction Survey. London: Longman

Saadah, E. (2011). *The production of Arabic vowels by English L2 learners and heritage speakers of Arabic*. PhD dissertation, University of Illinois at Urbana-Champaign.

Sakarna, A. K. (1999). *Phonological aspects of 9abady Arabic: A Bedouin Jordanian dialect*. The *University* of Wisconsin-Madison.

Sanders, C (1976). *Recent Developments in Contrastive Analysis and their Relevance to Language Teaching.* IRAL14, 67-73.

Schachter, J. (1974). An error in error analysis 1. *Language learning*, *24*(2), 205-214.

Schumann, J. H. (1986). Research on the acculturation model for second language acquisition. *Journal of multilingual & multicultural development*, *7*(5), 379-392.

Selkirk, E. (1984). On the major class features and syllable theory. *Language sound structure*.

Shehata, A. (2015). Problematic Arabic consonants for native English speakers: Learner's perspectives. *The International Journal of Educational Investigations*, *2*(9), 24-47.

Shibatani, M. (1973). The role of surface phonetic constraints in generative phonology. *Language*, 87-106.

Singh, R. (1987). On repair strategies and constraints: A reply to Paradis.

Smith, B. (1987). Arabic speakers. In Swan, M and B. Smith (eds.) (1987), *Learner English: A Teacher's Guide to Interference and Other Problems.* Cambridge University Press.

Sparks, R. L., & Ganschow, L. (1991). Foreign language learning differences: Affective or native language aptitude differences? *The modern language journal*, *75*(1), 3-16.

Suhono, S. (2016). Surface strategy taxonomy on the efl students' composition a study of error analysis. *Jurnal Iqra': Kajian Ilmu Pendidikan*, *1*(2), 1-30.

Suleiman, S. (1985). *Jordanian Arabic between Diglossia and Bilingualism: Linguistic analysis*. John Benjamins Publishing Company: Amsterdam/Philadelphia.

Svartvik, J. (1973). Errata: Papers in Error Analysis.

Taylor, B. P. (1975). Adult language learning strategies and their pedagogical implications. *TESOL quarterly*, 391-399.

Taylor, L. (2005). Washback and impact. *ELT Journal*, *59*(2), 154-155.

Thelwall, R., & Sa'Adeddin, M. A. (1990). Arabic. *Journal of the International Phonetic Association*, *20*(2), 37-39.

Thohir, M., Kurjum, M., & Muhid, A. (2020). Design and discourse of modern standard Arabic e-*textbook*. *LITERA-Jurnal Penelitian Bahasa, Sastra, Dan Pengajarannya*, *19*(1), 1-20.

Treiman, R. (1989). The internal structure of the syllable. In *Linguistic structure in language processing* (pp. 27-52). Dordrecht: Springer Netherlands.

Turkustani, A. A. M. A. A. (2011). *Analyzing Arabic-English interlanguage coda consonant clusters: Optimality theoretic approach* (Doctoral dissertation, University of Malaya).

United Nations. (2011). Official languages, Retrieved on February 16, from http://www.un.org/en/sections/about-un/official-languages/

Ur, P. (1991) A Course in Language Teaching, *Practice and Theory.* Cambridge University Press, Cambridge.

Versteegh, K. (2014). *Arabic language*. Edinburgh University Press.

Wenk, B. J. (1985). Speech rhythms in second language acquisition. *Language and speech, 28*(2), 157-175.

Whong-Barr. (2006). What transfers? In T. P.-S. Unsworth, *Paths of Development in L1 and L2 Acquisition* (pp. 187-199). Amsterdam: John Benjamins Publishing Company.

Wu, C. H. (*2011*). *The evaluation of second language fluency and foreign accent*. University of Illinois at Urbana-Champaign.

Yule, G. (2006). *The study of language (3rd Ed).* Cambridge: Cambridge University Press.

Zemmermann, L. (2004) *Teaching Pronunciation: A Specialist Approach*. In Davidson, P., Al-Hamly, M., Khan, M., Aydelott, J., Bird, K., & Coombe, C. Proceedings of the 9th TESOL Arabia Conference: *The English language teaching in an IT Age.* Vol.8. Dubai: TESOL Arabia.

Zuraiq, W., and Zhang, J. (2006). Phonological Assimilation in Urban Jordanian Arabic. *Kansas Working Papers in Linguistics,* University of Kansas, 28, 33-64.

Appendix 1
Participants Written Consent

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you a basic idea of what the research is about and what your participation will involve. If you would like more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

My name is Hala Saed, and I am a PhD candidate in multilingualism at the University of Pannonia. I am conducting a study on how different Jordanian dialects affect the pronunciation of English words containing consonant clusters. If you choose to participate in this study, you will have to be audio-recorded reading some English words and sentences. You will be asked to read 20 words and 20 sentences and fill in an information sheet which will take approximately 20-30 minutes. At the end of the recordings, you will be offered a cup of coffee and chocolate in compensation for your time.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence.

Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation. The University of Pannonia may look at your research records to see that the research is being done safely and properly.

This work is part of my doctoral studies under the supervision of Prof. Szilard Szentgyorgyi. A copy of this consent form has been given to you to keep for your records and reference. If you have any questions regarding the research or you would like to receive a non-technical summary of the results, please feel free to contact me at Halasaed17@gmail.com, or Prof. Szilard Szentgyorgyi at szentgyorgyiszilard1@gmail.com.

Please circle the appropriate:

1. I have read and understood the information given about the project, (Yes/No).
2. I agree to participate in this research, (Yes/No).
3. I am aware that all parts of the interview will be treated with extreme confidentiality, (Yes/No).
4. I am aware that the researcher will refer to the participants in pseudonyms in her research writing, (Yes/No).

5. I know and agree that the recorded test will be saved on the researcher's personal computer, protected with a password. (Yes/No).
6. I know and agree that the recorded test will be used for this research only, (Yes/No).
7. The researcher informed me that nothing of what I (the participant) say in the recordings will affect me in any way in the future, (Yes/No).
8. The researcher handed me a copy of a statement containing full information about this study in the form of participants' "information sheets" and contact details of the researcher and the supervisor. (Yes/No).
9. I agree that the anonymity and confidentiality of the information I provide are explained to me by the researcher, (Yes/No).
10. I have had the opportunity to ask questions, (Yes/No).

Participants' names and signature:

_____

Date (DD/MM/YY):

Appendix 2

The linguistic background questionnaire

1. First and last names: الاسم من مقطعين
2. Age (in years):العمر بالسنوات
3. Gender:الجنس
4. Education (degree obtained or school level attended): الدرجة العلمية
5. Country of origin: بلد المنشأ
6. Country of residence: بلد الاقامة الحالي
7. City of birth: مدينة الولادة
8. City of residence: مدينة الاقامة الحالي
9. If questions 5 and 6 are different, how long have you been in the country of your current residence? اذا كانت الاجابتين لكل من سؤال 5و6 مختلفتين الرجاء تحديد المدة الزمنية للاقامة بالدولة الحالية
10. If questions 7 and 8 are different, how long have you been in the city of your current residence?اذا كانت الاجابتين لكل من سؤال 7و8 مختلفتين الرجاء تحديد المدة الزمنية للاقامة بالمدينة الحالية
11. What is your native language or languages? ما هي لغتك او لغاتك الام؟
12. How many languages do you speak? Please list them according to proficiency? كم عدد اللغات التي تجيد التحدث بها؟ الرجاء ذكر اللغات حسب المهارة.
13. At what age did you begin to learn each? كم كان عمرك عند بدء تعلم كل لغة؟
14. If you have lived or traveled in other countries for more than three months, please indicate the name(s) of the country or countries, your length of stay, and the language(s) you learned or tried to learn. اذا كنت قد عشت او سافرت لبلد اجنبي الرجاء ذكر كل من ما يلي اسم البلد، المدة الزمنية، اللغات التي تعلمتها.

Appendix 3
The words list

Table 37. Initial three consonant clusters

Word	IPA transcription
stretch	strɛʧ
students	/stju:dants/
stupid	/stju:pɪd/
screen	skri:n
squeeze	skwi:z
screw	skru:
scratch	skræʧ
square	skweə
squad	skwɒd
scrub	skrʌb
scrap	skræp
splash	slæʃ
split	slɪt
splendid	splɛndɪd
sprite	spraɪt
spray	spreɪ
spring	sprɪŋ
spread	sprɛd
stream	/stri:m/
string	/strɪŋ/

Table 38. The final three consonant clusters

Word	IPA transcription
marked	mɑ:kt
parked	pɑ:kt
changed	ʧeɪnʤd
students	/stju:dants/
filmed	fɪlmd
films	fɪlmz
helped	hɛlpt
worked	wɜ:kt

conflicts	kɒnflɪkts
tasks	tɑːsks
launched	lʌnʧt
widths	wɪdθs
attempt	əˈtɛmt
linked	lɪŋkt
asked	ɑːskt
context	kɒntɛkst
divorced	dɪˈvɔːst
branched	brɑːnʧt
stormed	stɔːmd
asked	ɑːskt

Appendix 4

The Results of the Linguistic background questionnaire

Table 39. Group (1) linguistic background

Participant	Gender(F/M)	Age	Rural/Urban	AoA	Bi/multilingual	Education
P1	F	24	U	2	6	BA
P2	F	28	U	6	2	MA
P3	F	30	U	6	2	MA
P4	F	23	U	3	3	BA
P5	F	31	U	3	4	BA
P6	F	20	U	5	2	BA
P7	F	35	U	2	2	BA
P8	M	26	U	3	3	MA
P9	M	28	U	5	3	MA
P10	M	25	U	5	3	MA
P11	M	35	U	5	3	MA
P12	M	25	U	6	2	BA
P13	M	25	U	5	3	BA
P14	M	35	U	9	2	BA

AoA: Age of Acquisition

Table 40. Group (2) linguistic background

Participant	Gender(F/M)	Age	Rural/Urban	AoA	Bi/multilingual	Education
P15	M	32	R	11	2	BA
P16	M	28	R	11	2	BA
P17	M	34	R	13	2	BA
P18	M	35	R	13	2	TAWJIHI
P19	M	31	R	15	3	BA
P20	M	22	R	11	2	BA
P21	F	19	R	6	2	BA
P22	F	20	R	5	2	BA
P23	F	21	R	11	2	BA
P24	F	19	R	4	2	BA
P25	F	21	R	5	2	BA
P26	F	19	R	5	2	BA
P27	F	21	R	7	2	BA
P28	M	35	R	13	2	TAWJIHI

Appendix 5
The analysis of the recordings

Table 41. Initial CCC errors group (1)

Word\ID	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14
string	+	+	+	+	+	+	+	-	+	+	+	+	-	-
students	+	+	+	+	+	+	+	+	+	+	+	+	+	+
stream	+	+	+	+	+	+	+	+	+	+	+	+	+	+
stupid	+	+	+	+	+	+	+	+	+	+	-	-	+	-
stretch	+	+	+	+	+	+	+	+	+	+	+	+	+	+
screen	+	+	+	+	+	+	+	+	+	+	+	+	+	+
squeeze	+	+	+	+	+	+	+	+	+	+	+	+	+	+
screw	+	+	+	+	+	+	+	+	+	+	+	+	+	+
scratch	+	+	+	+	+	+	+	+	+	+	+	+	+	+
square	+	+	+	+	+	+	+	+	+	+	+	+	+	+
squad	+	+	+	+	+	+	+	+	+	+	+	+	+	+
scrub	+	+	+	+	+	+	+	+	+	+	+	+	+	+
scrap	+	+	+	+	+	+	+	+	+	+	+	+	+	+
splash	+	+	+	+	+	+	+	+	+	+	+	+	+	+
split	+	+	+	+	+	+	+	+	-	+	+	+	-	+
splendid	+	+	+	+	+	-	+	+	-	+	+	+	-	-
sprite	+	+	+	+	+	+	+	+	+	+	+	+	+	+
spray	+	+	+	+	+	+	+	+	+	+	+	+	+	+
spring	+	+	+	+	+	+	+	+	+	+	+	+	-	+
spread	+	-	+	+	+	-	+	+	+	+	+	+	+	+

Table 42. Initial CCC errors group (2)

Word\ID	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24	P25	P26	P27	P28
string	+	+	+	+	+	+	+	+	+	+	+	+	+	-
students	+	+	+	+	+	+	+	+	+	-	+	-	+	+
stream	+	+	+	+	-	+	+	+	+	-	+	+	+	-
stupid	+	-	-	-	-	-	-	+	-	+	-	-	-	-
stretch	-	+	+	+	-	+	+	+	-	-	+	-	-	+
screen	+	+	+	+	-	+	+	-	-	-	-	+	+	+
squeeze	+	+	+	+	-	-	+	-	-	-	-	-	-	+
screw	-	+	+	-	-	-	-	-	-	-	-	+	+	-

scratch	-	+	+	-	-	-	-	-	-	+	-	+	+	-
square	-	+	+	-	-	-	-	+	+	-	-	+	+	+
squad	+	+	+	-	+	-	-	-	+	-	-	-	+	+
scrub	-	-	-	+	-	-	+	+	-	-	-	-	-	-
scrap	+	+	+	-	+	-	-	+	-	-	-	+	-	-
splash	-	+	-	-	+	-	-	-	-	-	-	+	-	-
split	-	-	-	-	-	-	-	-	-	-	+	-	-	-
splendid	-	+	+	+	-	+	+	-	-	-	+	-	-	-
sprite	+	+	-	+	-	-	+	-	+	-	+	+	-	-
spray	-	+	+	+	-	-	+	-	-	-	+	+	-	-
spring	-	+	-	+	+	+	+	-	-	-	+	-	-	-
Spread	-	+	+	+	-	+	+	-	-	-	+	-	-	-

Table 43. Final CCC errors group (1)

Word\ID	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P11**	**P12**	**P13**	**P14**
marked	+	+	+	+	+	+	+	+	+	+	+	+	+	+
students	+	+	+	+	+	+	+	+	+	+	+	+	+	+
parked	+	+	+	+	+	+	+	+	+	+	+	+	+	+
filmed	+	+	+	+	+	+	+	+	+	+	+	+	+	+
films	+	+	+	+	+	+	+	+	+	+	+	+	+	+
helped	+	+	+	+	+	-	+	+	+	+	+	+	+	+
thanks	+	+	+	+	+	+	+	+	+	+	+	+	+	+
worked	+	+	+	+	+	+	+	+	+	+	+	+	+	+
conflicts	+	+	+	+	+	+	+	+	+	+	+	+	+	+
tasks	+	+	+	+	+	+	+	+	+	+	+	+	+	+
launched	+	+	+	+	+	+	+	-	+	+	-	+	+	+
widths	+	+	+	+	+	+	+	+	+	+	+	+	+	+
attempt	+	+	+	+	+	+	+	+	+	+	+	+	+	-
linked	+	+	+	+	+	+	+	+	+	+	+	+	+	+
asked	+	+	+	+	+	+	+	+	+	+	+	+	+	+
context	+	+	+	+	+	+	+	+	+	+	+	-	+	+
divorced	+	+	+	+	+	+	+	+	+	+	+	+	+	+
branched	+	+	+	+	+	+	+	+	+	+	+	+	+	+
stormed	+	+	+	+	+	+	+	+	+	+	+	+	+	+
changed	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Table 44. Final CCC errors group (2)

Tested word	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24	P25	P26	P27	P28
marked	+	+	+	+	-	+	+	+	-	-	-	-	-	+
students	+	+	+	+	+	+	+	+	+	+	+	-	+	+
parked	+	-	+	-	-	+	-	+	-	+	+	-	+	-
filmed	+	+	+	-	-	+	-	+	+	-	+	+	-	-
films	-	-	+	+	+	+	+	+	+	+	+	+	-	+
helped	+	+	+	+	-	+	+	+	+	+	+	-	+	+
thanks	+	+	+	+	+	+	+	+	+	+	+	+	+	+
worked	+	+	+	+	-	+	+	+	+	+	+	-	-	+
conflicts	+	+	+	-	-	-	-	+	-	+	+	-	-	-
tasks	+	+	+	+	+	+	+	+	+	+	+	+	+	+
launched	+	+	+	-	-	+	-	+	-	+	+	-	+	+
widths	+	+	+	-	+	+	-	+	+	+	+	-	+	-
attempt	+	+	+	-	-	+	-	+	+	+	+	-	-	-
linked	+	+	+	-	-	+	-	+	+	+	+	-	+	-
asked	+	-	+	+	-	+	+	+	+	-	+	-	+	+
context	+	+	+	+	+	+	+	+	+	+	+	+	+	+
divorced	+	+	+	+	+	-	+	-	+	+	-	+	+	+
branched	+	+	-	-	-	+	-	+	+	+	+	-	+	+
stormed	+	+	-	-	-	-	-	+	+	+	-	-	-	+
changed	+	-	-	-	-	+	-	+	+	+	-	-	+	-

- **The number of pronunciation errors**

Table 45. Numbers of pronunciation errors for initial CCC

Word	R	U	Total
string	1	3	4
students	2	0	2
stream	3	0	3
stupid	11	3	14
stretch	6	0	6
screen	5	0	5
squeeze	8	0	8

screw	10	0	10
scratch	9	0	9
square	7	0	7
squad	7	0	7
scrub	11	0	11
scrap	8	0	8
splash	11	0	11
split	13	2	15
splendid	8	4	12
sprite	7	0	7
spray	8	0	8
spring	8	1	9
spread	8	2	10
total	151	15	

Table 46. Initial CCC incorrect pronunciations with percentages

Tested Word	Correct Pronunciation	Error	Incorrect Pronunciation	No.of Errors	% of Errors
string	/strɪŋ/	/str/	/ɪstrɪŋ/	4	14.29
students	/stjuːdənts/	/stj/	/stuːdaːnt/, /ɪstuːdaːnt/	2	7.14
stream	/striːm/	/str/	/ɪstrɪm/	3	10.71
stupid	/stjuːpɪd/	/stj/	/stuːbɪd/, /ɪstjuːbɪd/	14	50.00
stretch	/strɛʧ/	/str/	/sɪtrɪʧ/	6	21.43
screen	/skriːn/	/skr/	/sɪkriːn/	5	17.86
squeeze	/skwiːz/	/skw/	/sɪkwiːz/	8	28.57
screw	/skruː/	/skr/	/sɪkru/	10	35.71
scratch	/skræʧ/	/skr/	/sɪkræʃ/	9	32.14
square	/skweə/	/skw/	/sɪkwer/	7	25.00
squad	/skwɒd/	/skw/	/sɪkwaːd/, /ɪskwaːd/	7	25.00
scrub	/skrʌb/	/skr/	/sɪkrʌb/	11	39.29
scrap	/skræp/	/skr/	/sɪkraːb/	8	28.57
splash	/splæʃ/	/spl/	/sɪplæʃ/	11	39.29
split	/splɪt/	/spl/	/sɪblɪt/	15	53.57
splendid	/splɛndɪd/	/spl/	/sɪblɛndɪd/	12	42.86
sprite	/spraɪt/	/spr/	/sɪbraɪt/	7	25.00

spray	/spreɪ/	/spr/	/sɪbreɪ/, /ɪsɪbreɪ/	8	28.57
spring	/sprɪŋ/	/spr/	/sɪbrɪŋ/	9	32.14
spread	/sprɛd/	/spr/	/sɪbrɛd/	10	35.71

Table 47. Numbers of pronunciation errors for final CC

Word	**R**	**U**	**Total**
marked	6	0	6
students	2	0	2
parked	7	0	7
filmed	6	0	6
films	3	0	3
helped	2	1	4
thanks	0	0	0
worked	3	0	3
conflicts	8	0	8
tasks	0	0	0
launched	5	2	7
widths	4	0	4
attempt	6	1	7
linked	5	0	5
asked	4	0	4
context	0	1	1
divorced	3	0	3
branched	5	0	5
stormed	8	0	8
changed	8	0	8
Total	85	5	

Table 48. Final CCC incorrect pronunciations with percentages

Tested Word	**Correct Pronunciation**	**Error**	**Incorrect Pronunciation**	**No.of Errors**	**% of Errors**
marked	/mɑːkt/	/rkt/	Maːrkɪd	6	21.43

students	/stjuːdənts/		stjuːdaːnt	2	7.14
parked	/pɑːkt/	/rkt/	baːrkɪd	7	25.00
filmed	/fɪlmd/	/lmd/	fɪlmɪd	6	21.43
films	/fɪlmz/	/lmz/	fɪlɪmz	3	10.71
helped	/hɛlpt /	/lpt/	hɛlbɪd	4	14.29
thanks	/θæŋks/	/ŋks/	-	0	0.00
worked	/wɜːkt/	/rkt/	wɜːrkɪd	3	10.71
conflicts	/kɒnflɪkts/	/kts/	kɒnɪflɪkt	8	28.57
tasks	/tɑːsks/	/sks/	/taːsk/	0	0.00
launched	/lʌnʧt/	/nʧt/	lʌnʃɪd	7	25.00
widths	/wɪdθs/	/dθs/	/wɪdθɪs/	4	14.29
attempt	/ətɛmt/	/mpt/	/ətɛmbɪd/	7	25.00
linked	/lɪŋkt/	/ŋkt/	/lɪŋɪd/, / lɪŋɪt/	5	17.86
asked	/ɑːskt /	/skt/	/askɪd/	4	14.29
context	/kɒntɛkst/	/kst/	/kɒntɛks/	1	3.57
divorced	/dɪˈvɔːst /	/rst/	dɪvɔrsɪd	3	10.71
branched	/brɑːnʧt/	/nʧt/	/braːnʧɪd/, /ɪbraːnʃɪd/	5	21.43
stormed	/stɔːmd/	/rmd/	/stɔːrmɪd/, /struːmd/	8	7.14
changed	/ʧeɪnʤd/	/nʤd/	ʧeɪnʒ	8	25.00

Table 49. Total number errors group (1)

Urban P	Initial	Final	Total
P1	0	0	0
P2	1	0	1
P3	0	0	0
P4	0	0	0
P5	0	0	0
P6	2	1	3
P7	0	0	0
P8	1	1	0
P9	2	0	2
P10	0	0	0

P11	1	1	2
P12	1	1	0
P13	4	0	4
P14	3	1	4
	15	5	

Table 50. Total number of errors group (2)

Rural P	Initial	Final	Total
P15	11	1	12
P16	3	4	7
P17	6	3	9
P18	8	10	18
P19	14	13	27
P20	12	3	15
P21	8	10	18
P22	12	1	13
P23	14	4	18
P24	17	4	21
P25	10	4	14
P26	10	14	24
P27	12	7	19
P28	14	7	21
	151	85	

Table 51. Initial CCC errors

	No. of Errors	% of Errors
G1	15	5.35%
G2	151	53.92%

Table 52. Final CCC errors

	No. of Errors	% of Errors
G1	5	1.78%
G2	85	30.35%