

PhD Dissertation Booklet



**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**

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TABLE OF CONTENT

1. INTRODUCTION.....	4
1.1. RESEARCH AREA.....	4
1.2. AIMS AND JUSTIFICATION OF THE STUDY	5
1.3. BACKGROUND OF THE STUDY	7
1.3.1. Linguistic background.....	7
1.3.2. Theoretical background.....	8
2. METHODOLOGY.....	8
2.1. DATA COLLECTION	8
2.1.1. Materials.....	8
2.1.2. Recording process	9
2.2. SAMPLE	9
2.3. DATA ANALYSIS	9
2.3.1. Linguistic analysis.....	10
2.3.2. Statistical analysis	10
2.4. ETHICAL CONSIDERATIONS	11
3. RESULTS.....	11
3.1. INTRODUCTION	11
3.2. THE STUDY	12
3.3. THE PARTICIPANTS	12
3.3.1. Urban Dialect (UD) group.....	12
3.3.2. Rural Dialect (RD) group.....	13
3.4. ERROR ANALYSIS OF JORDANIAN BILINGUALS IN THE PRONUNCIATION OF ENGLISH CONSONANT CLUSTERS IN INITIAL AND FINAL POSITIONS.....	13
3.4.1. Word group 1: errors in three-consonant clusters in the initial position.....	13
3.4.2. Detailed error analysis.....	14
3.4.3. Word Group 2: errors in three-consonant clusters in the final position.....	14
3.4.4. Detailed error analysis.....	14
3.5. REPAIR STRATEGIES.....	14
3.6. ACOUSTIC ANALYSIS	15
3.6.1. Initial CCC errors acoustic analysis	15
3.6.2. Final CCC errors acoustic analysis	15
3.7. STATISTICAL ANALYSIS	15
3.7.1. Effect of dialect	15
3.7.2. Effect of Age of Acquisition (AoA).....	16
3.7.3. Effect of multilingualism	16
3.7.4. Effect of gender.....	16
3.8. CHAPTER SUMMARY	16
4. DISCUSSION.....	16
4.1. OVERVIEW.....	16
4.2. THE PERFORMANCE OF THE PARTICIPANTS	17
4.3. FACTORS AFFECTING L1 INTERFERENCE.....	17
4.3.1. Amount and nature of L2 input.....	18

4.3.2.	Linguistic distance between L1 and L2.....	18
4.3.3.	Task focus	18
4.4.	THEORIES OF L2 ACQUISITION	18
4.4.1.	Contrastive Analysis Hypothesis (CAH)	18
4.4.2.	Error Analysis (EA)	18
4.4.3.	Markedness Theory	18
4.5.	PREVIOUS STUDIES ON ENGLISH CONSONANT CLUSTER PRODUCTION.....	19
4.6.	CHAPTER SUMMARY	20
5.	CONCLUSION.....	20
5.1.	KEY FINDINGS:	20
5.1.1.	Pronunciation challenges.....	20
5.1.2.	Teaching environment.....	20
5.1.3.	Classroom dynamics	20
5.1.4.	Sociolinguistic factors	20
5.2.	RECOMMENDATIONS:	21
5.2.1.	Teacher training.....	21
5.2.2.	Modernizing teaching methods	21
5.2.3.	Classroom practices.....	21
5.2.4.	Continuous exposure	21
5.2.5.	Focus on speaking skills.....	21
5.3.	FUTURE RESEARCH	21
6.	REFERENCES.....	22

1. INTRODUCTION

1.1. Research area

The study focuses on the pronunciation of English by native Arabic speakers in Jordan, particularly the challenges and errors that arise due to the influence of their native language (L1) on English (L2). English has achieved a prestigious status as a leading foreign language in numerous countries, essential not only for functionality, education, and job prospects but also for its influence on cultural values, norms, ideas, and beliefs, especially among younger generations.

Despite advancements in written communication technology, speech remains a primary mode of interaction, emphasizing the need for proper pronunciation. Pronunciation is crucial because unclear pronunciation can impede interaction or cause confusion. Zemmermann (2004) notes, "Pronunciation is crucially important, as it is usually the first thing people notice about a language learner's English."

The mother tongue significantly affects language acquisition and learning, influencing pronunciation positively or negatively (interference). When the sound systems of L1 and L2 are similar, the learning process is simpler; however, significant differences can make it problematic. Numerous research papers have examined bilinguals' interlanguage to identify challenges by comparing L1 and L2, predicting potential errors, and providing remedies. Arabic/English bilinguals face specific difficulties in pronunciation, vocabulary, writing, and spelling (Abu Rass, 2015).

The study aims to analyze the pronunciation errors of Jordanian Arabic speakers, focusing on English consonant clusters, to understand the reasons behind these errors and suggest remedial methods for teaching English pronunciation. Mispronunciation can cause misunderstanding and confusion, as illustrated by Zemmermann (2004) with examples like replacing "will" with "well" and "park" with "bark."

English has a complex orthography where the relationship between letters and sounds is not one-to-one. For instance, the sound /ʃ/ can be represented by the letter combination in "nation." The same letter, such as, can represent different sounds in different words, like /æ/ in "fan," /ɔ:/ in "war," and /e/ in "many." In contrast, Arabic has a relatively simple orthographic system where words are written almost exactly as pronounced, with each letter usually representing a distinctive sound.

The role of L1 transfer has long been controversial in applied linguistics, Second Language Acquisition (SLA), and language teaching (Odlin 1989). Researchers cannot ignore L1 effects

in L2 speakers' language production, indicating L1 influence (Whong-Barr 2006). Bilinguals accumulate the target language's structural entities but demonstrate difficulty organizing this knowledge into appropriate and consistent structures. This raises the question: What kinds of language do bilinguals use when speaking?

When speaking the target language L2, bilinguals often rely on their native language L1 structures. Significant differences between L1 and L2 structures can lead to a high frequency of errors in L2, indicating L1 interference (Dechert 1983; Ellis 1997). Bilinguals' first language usually interferes with their second language, affecting their performance positively or negatively. When learning an additional language, speakers often apply their L1 linguistic knowledge in L2, resulting in accents similar to their L1 accent or dialect.

The study begins with a definition of terms, followed by the aims and justification, a discussion of the linguistic background, an overview of the methodology, a theoretical framework, a comparison of British English Received Pronunciation (RP) and Modern Standard Arabic (MSA) sound systems, and a comparison of MSA and Jordanian dialects (rural and urban). The results are discussed, interlingual factors behind errors are explained, and teaching suggestions are proposed.

1.2. Aims and justification of the study

This section explains the main aim of the research, the importance of studying the errors made by Arabs in English, and the reasons behind them. The purpose is to examine the role of L1 transfer in the pronunciation errors of native Arabic speakers in English. Studying pronunciation errors involves data collection, and categorization, followed by contrastive, and error analyses to recognize errors triggered by L1 transfer. The study also aims to provide a comprehensive explanation of the underlying processes of the repair strategies that speakers use based on their dialects.

The study seeks to answer the following research questions:

1. 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?
2. 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?

3. What specific phonological features of the Jordanian Arabic rural (RD) dialect contribute to higher error rates in pronouncing English words with three-consonant clusters compared to the Jordanian Arabic urban (UD) dialect?
4. What specific repair strategies do Jordanian Arabic rural (RD) speakers use when encountering difficulties in pronouncing English three-consonant clusters, and how do these strategies align with their L1 patterns?
5. To what extent does the use of L1-based repair strategies by RD speakers influence the overall intelligibility and comprehensibility of their English speech?
6. How does the age of English language acquisition (AoA) among Jordanian speakers influence the frequency and type of pronunciation errors observed when producing English three-consonant clusters?
7. 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?
8. To what extent do gender-related factors significantly influence the frequency and type of pronunciation errors in English consonant clusters among Jordanian speakers?

● **Hypotheses:**

1. Jordanian Arabic dialects affect the pronunciation of English words containing three consonant clusters in different ways and degrees.
 - H1a: Jordanian Arabic dialects affect the pronunciation of English words containing three-consonant clusters in initial positions more significantly than in final positions.
 - H1b: Rural dialect (RD) speakers commit more errors than urban dialect (UD) speakers in pronouncing English words with three consonant clusters in both initial and final positions.
2. RD and UD speakers use repair strategies similar to their respective L1 patterns to overcome difficulties in pronouncing English three-consonant clusters.
3. Multiple factors influence the number of pronunciation errors made by Jordanian speakers when producing English consonant clusters:
 - H3a: Age of English language acquisition (AoA) significantly affects the number of pronunciation errors, with later acquisition leading to more errors.
 - H3b: Multilingual speakers make fewer pronunciation errors in English due to their exposure to diverse linguistic structures and sounds.

- H3c: Gender affects the frequency of pronunciation errors, with male speakers expected to commit more errors than female speakers.

The findings are of interest to Arab teachers of English, applied linguists, and psycholinguists. The study aims to provide insights for developing remedial teaching techniques and improving overall communicative skills in English. It also targets linguists interested in the Arabic language and its various dialects, offering data to develop remedial TESL/TEFL syllabi or workshops addressing Arabs' distinctive problems with English pronunciation.

1.3. Background of the study

This section provides the linguistic and theoretical background for the study. The linguistic background covers information about the Arabic language and its dialects, the role of English as a Lingua Franca (ELF) in Jordan, and the specific Jordanian Arabic dialects involved in the study.

1.3.1. Linguistic background

- **The Arabic language:** Arabic is a South-Central Semitic language spoken by approximately 218 million speakers worldwide, primarily in the Arabian Peninsula and Arab-African countries. Classical Arabic, found in the Holy Qur'an, is considered the purest form, but Modern Standard Arabic (MSA) is used in schools, newspapers, and official interactions. Each Arab country has its dialect, often differing significantly from MSA in phonetics, phonology, syntax, semantics, and pragmatics.
- **Overview of Arabic dialects:** Arabic dialects are classified across geographical areas, transcending political borders. Common dialects include Levantine Arabic (Jordan, Syria, Lebanon, West Bank, Israel), Gulf Arabic (Saudi Arabia, Kuwait, UAE, Oman, Qatar, Bahrain), Maghrebi Arabic (Algeria, Morocco, Tunisia, Libya), and Egyptian Arabic (Egypt, Sudan).
- **Jordanian Arabic dialects:** Jordanian Arabic (JA) is part of Levantine Arabic, spoken in Jordan, Syria, the West Bank, Israel, and Lebanon. JA includes three distinct dialects: urban (UD), Bedouin (BD), and rural (RD). Urban Jordanian Arabic is used in formal and professional settings, Bedouin Jordanian Arabic reflects traditional nomadic lifestyles, and rural Jordanian Arabic is spoken in small towns and rural areas. These dialects differ significantly in syntax, morphology, and phonology

1.3.2. Theoretical background

The theoretical framework integrates the aforementioned theories to analyze pronunciation errors made by Arabic speakers of English. The framework involves:

- **Contrastive Analysis (CA):** Identifies similarities and differences between Arabic and English to predict potential pronunciation errors.
- **Error Analysis (EA):** Explores actual errors made by speakers, categorizing them into interlingual and intralingual errors.
- **Markedness Theory (MT):** Assesses the markedness of phonological structures to determine the difficulty level of acquiring English consonant clusters.

Comparison of sound systems: The study compares the sound systems of British English Received Pronunciation (RP) and Modern Standard Arabic (MSA), as well as MSA with Jordanian dialects (rural and urban). This comparison highlights the phonological differences contributing to pronunciation errors.

Research methodology: The methodology includes data collection through pronunciation tests, error categorization, and statistical analysis. The study involves Jordanian Arabic speakers from rural and urban areas, examining their pronunciation of English consonant clusters in initial and final positions. The methodology ensures a comprehensive analysis of pronunciation errors and the factors influencing them.

2. METHODOLOGY

The methodology combines data collection, advanced analytical tools like PRAAT software, and a detailed exploration of both linguistic and statistical dimensions.

2.1. Data collection

The data collection process was designed to capture a broad spectrum of pronunciation errors, enabling a thorough analysis.

2.1.1. Materials

- The study employed two primary sets of production test materials: a word list and a sentence list, both containing English words with consonant clusters in initial and final positions.
- **Word and sentence lists:** 40 English words were selected from the British National Corpus (BNC) database. These words were divided into two categories based on the position of the consonant clusters—20 words with clusters at the beginning and 20 with clusters at the end.

- **Presentation format:** Participants were shown these words and sentences on PowerPoint slides, which were uniformly formatted with white text on a dark blue background, using a large font size for clarity. Each word was displayed for 5 seconds, and each sentence for 15 seconds, allowing participants to read them aloud while being recorded.

2.1.2. Recording process

- Participants were individually presented with the materials in a controlled environment. Their pronunciations were recorded using a high-quality Sennheiser headset connected to a laptop, ensuring clear and accurate audio recordings. This setup was crucial for capturing subtle pronunciation nuances.
- **Natural speech capture:** To ensure that the speech data reflected natural pronunciation, participants were not informed about the study's specific focus on consonant clusters.

2.2. Sample

The sample selection process was carefully structured to ensure a diverse and representative group of participants.

- **Participant selection:**
 - **Criteria:** The study selected participants based on two primary criteria: regional origin (urban or rural) and gender. This allowed for the exploration of potential influences of dialect and sociolinguistic factors on pronunciation.
 - **Geographical scope:** The study was conducted in two Jordanian cities—Amman (urban) and Al-Ramtha (rural). Each city provided 14 participants, split evenly between males and females, making 28 participants.
 - **Gender balance and dialect considerations:** Equal gender representation allowed for an examination of any gender-specific pronunciation differences. The study also considered the potential impact of dialect prestige, particularly among rural female participants who might adopt urban speech patterns.

2.3. Data analysis

The data analysis incorporated both linguistic and statistical methods to provide a comprehensive understanding of pronunciation errors.

2.3.1. Linguistic analysis

- **Error identification:** The recorded speech was first evaluated by a native English speaker who determined whether each pronunciation was correct or incorrect, assigning labels accordingly.
- **Error categorization and theoretical frameworks:** Errors were classified based on their types, considering both phonological and phonetic aspects. The analysis was guided by several second language acquisition theories, including Contrastive Analysis, Error Analysis, and Markedness Theory. These frameworks helped in identifying the influence of the participants' native Arabic on their English pronunciation.
- **PRAAT software for acoustic analysis:** The study employed PRAAT software for a detailed acoustic analysis of the recorded speech. PRAAT was used to measure precise phonetic details such as the duration, pitch, and intensity of sounds, allowing for a deeper understanding of the pronunciation errors. This software provided reliable acoustic evidence, crucial for distinguishing subtle differences in pronunciation and verifying the nature of the errors.
- **Repair strategies:** The analysis also focused on the repair strategies used by participants when encountering difficult consonant clusters. Common strategies included epenthesis (inserting a vowel sound to break up clusters), substitution (replacing a difficult consonant with an easier one), and deletion (omitting a consonant to simplify pronunciation). These strategies were analyzed to understand how Jordanian speakers adapt their pronunciation to cope with challenging consonant clusters.

2.3.2. Statistical analysis

- **Frequency and correlation analysis:** The frequency of various types of pronunciation errors was calculated to identify patterns within the dataset. Additionally, the study examined correlations between error types and factors such as the participants' regional dialects and the position of the consonant clusters within words (initial, medial, or final).
- **Inferential statistics:** Using R Studio software, descriptive statistics and inferential tests (e.g., Two Sample T-test, Spearman Rank Correlation Test) were conducted to assess the significance of the findings and to test hypotheses about the relationship between different variables, such as dialect and pronunciation accuracy.

2.4. Ethical considerations

Throughout the study, strict adherence to ethical guidelines was maintained. Participants were assured of their privacy, with all data kept confidential. Informed consent was obtained, and participants were informed about the study's purpose and their rights, ensuring transparency and ethical integrity.

This chapter details the methodological approach taken in the study, highlighting the use of advanced analytical tools like PRAAT software, the consideration of repair strategies, and the integration of both linguistic and statistical analyses. These elements combined to provide a robust and comprehensive exploration of the factors influencing English pronunciation errors among Jordanian speakers.

3. RESULTS

3.1. Introduction

Researchers have long been interested in the complexities of language acquisition and pronunciation, particularly in the context of bilingualism and second language learning. In today's interconnected world, understanding the challenges faced by speakers of different linguistic backgrounds in acquiring new languages is crucial. Arabic, known for its historical significance and linguistic diversity, is one of the world's most widely spoken languages. Jordanian Arabic, with its three major dialects, each characterized by unique phonological features and regional variations, presents a compelling case study for exploring the complexities of second-language phonology. This study offers valuable insights into the interference between Jordanian Arabic speakers' native language and their English pronunciation.

This chapter examines how Jordanian Arabic speakers, particularly those from 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:

1. Rural dialect (RD) speakers make more errors than urban dialect (UD) speakers.
2. Jordanian Arabic dialects influence pronunciation differently in initial and final positions.
3. 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 and the strategies employed by participants. The factors that lead to L1 interference include the transfer of L1 syllable structure rules, which serve as potential explanations for the incorrect pronunciation patterns committed by participants.

3.2. 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 involved 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 reliability, 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. The word lists included:

- **Initial consonant clusters (20 words):** 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):** marked, students, parked, filmed, films, helped, thanks, worked, conflicts, tasks, launched, widths, attempt, linked, asked, context, divorced, branched, stormed, changed.

3.3. The participants

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

3.3.1. Urban Dialect (UD) group

- Comprising 14 participants (7 males, 7 females), ages 20-35.

- Higher education levels: half of the UD speakers held master's degrees and the others held bachelor's degrees.
- The majority are multilingual, with 8 out of 14 participants being multilingual and the rest bilingual.
- The age of English language acquisition (AoA) ranged from 2 to 9.

3.3.2. Rural Dialect (RD) group

- Comprising 14 participants (7 males, 7 females), ages 19-35.
- Mostly bachelor's degrees, some high school graduates.
- Predominantly bilingual, with 13 out of 14 participants being bilingual and only one multilingual.
- The age of English language acquisition (AoA) ranged from 4 to 15.

The difference in education levels between the participants is visible, with the UD group holding higher educational levels than the RD group. Urban participants generally had higher education levels and earlier acquisition of English. This aligns with data from the Jordan Department of Statistics, which indicates higher literacy rates and educational attainment in urban areas compared to rural areas.

3.4. Error analysis of Jordanian bilinguals in the pronunciation of English consonant clusters in initial and final positions

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

This subsection examines the errors in pronouncing initial three-consonant clusters. The study found that urban dialect (UD) speakers made significantly fewer errors (5.35%) compared to rural dialect (RD) speakers (53.92%).

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

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

The results indicate that RD speakers frequently use L1 patterns (negative transfer) to pronounce English clusters unattested in their native Arabic dialects. The most common error patterns involved vowel insertion either before the first consonant or between the first and second consonants within a cluster. For instance, /sprei/ was often pronounced as /ɪsɪbrei/ or /sɪbrei/.

3.4.2. Detailed error analysis

- **Vowel insertion:** RD speakers inserted vowels to break clusters, e.g., /sɪkrab/ instead of /skrʌb/.
- **Prosthesis:** Adding a vowel at the beginning of a syllable, e.g., /ɪstju:bid/ instead of /stju:pid/.
- **Deletion:** Removing consonants from clusters, e.g., /stu:bid/ instead of /stju:bid/.
- **Metathesis:** Swapping positions of sounds, e.g., /ska:rtʃ/ instead of /skrætʃ/.
- **Substitution:** Replacing a consonant with another, e.g., /zɪbla:f/ instead of /splɑ:f/.

3.4.3. Word Group 2: errors in three-consonant clusters in the final position

This subsection examines the errors in pronouncing the final three consonant clusters. UD speakers made fewer errors (1.78%) compared to RD speakers (30.35%).

Table 2. Word Group 2: errors in three-consonant clusters in the final position

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

RD speakers often added a short vowel between the last two consonants, confirming O'Connor's (1967) and Smith's (1987) claims. They also used different strategies to break clusters, such as deleting the final segment or inserting a vowel, e.g., /ma:rkɪd/ instead of /ma:kt/.

3.4.4. Detailed error analysis

- **Vowel insertion:** Inserting a vowel to break clusters, e.g., /ma:rkɪd/ instead of /ma:kt/.
- **Deletion:** Removing consonants, e.g., /tʃeɪnz/ instead of /tʃeɪndz/.
- **Substitution:** Replacing sounds, e.g., /tʃeɪnz/ instead of /tʃeɪndz/.

3.5. Repair strategies

Jordanian speakers use various repair strategies to handle English consonant clusters, aligning L2 syllable structures with L1 rules.

- **Vowel insertion:** The most common strategy, inserting vowels to break clusters.
- **Prosthesis:** Adding a vowel at the beginning of a syllable.
- **Deletion:** Removing consonants to simplify clusters.
- **Metathesis:** Swapping positions of sounds.

- **Substitution:** Replacing a consonant with another from L1.

These strategies help bilinguals pronounce challenging words but often lead to incorrect pronunciations.

3.6. Acoustic analysis

The purpose of this section is to provide acoustic accounts for the pronunciation problems experienced by Jordanian speakers, particularly RD participants, with English consonant clusters. It also presents 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. This section presents the acoustic analysis results for both initial and final positions according to the repair strategy used.

3.6.1. Initial CCC errors acoustic analysis

- **Vowel insertion:** Spectrograms show RD speakers inserting vowels between consonants, e.g., /sɪkru:/ instead of /skru:/.
- **Metathesis:** RD speakers sometimes swapped positions of sounds, e.g., /ska:rtʃ/ instead of /skrætʃ/.

3.6.2. Final CCC errors acoustic analysis

- **Vowel insertion:** RD speakers frequently inserted vowels, sometimes using mixed strategies, e.g., /la:nʃɪd/ instead of /lʌnʃt/.
- **Deletion:** RD speakers often deleted consonants to simplify clusters, e.g., /stu:da:nt/ instead of /stju:dənts/.

This section presented the acoustic results of the English consonant clusters produced by Jordanian English/Arabic speakers, in both initial and final positions. The acoustic properties of the English clusters were analyzed, revealing production problems and differences between RD and UD speakers.

3.7. Statistical analysis

This section explores the impact of various factors on the production of English three-consonant clusters, testing several hypotheses.

3.7.1. Effect of dialect

- Total errors: RD speakers committed significantly more errors (mean = 17.78) compared to UD speakers (mean = 1.357).
- Initial CCC errors: RD speakers made more errors (mean = 11.21) compared to UD speakers (mean = 1).

- Final CCC errors: RD speakers made more errors (mean = 6.57) compared to UD speakers (mean = 0.35).

3.7.2. Effect of Age of Acquisition (AoA)

- Younger participants who acquired English earlier made fewer errors. A positive correlation ($\rho = 0.47$) was found between AoA and total errors, indicating that later acquisition leads to more errors.

3.7.3. Effect of multilingualism

- Multilingual participants committed fewer pronunciation errors (mean = 3.89) compared to bilingual participants (mean = 12.26).

3.7.4. Effect of gender

- Gender did not have a significant effect on the frequency of pronunciation errors. Differences between females (mean = 11.64) and males (mean = 7.5) were not statistically significant.

In summary, this chapter examined the complexities of English consonant cluster pronunciation among Jordanian bilinguals. It explored the influence of various factors on pronunciation errors, confirming that RD speakers exhibit more pronunciation challenges and are more prone to errors. The impact of age of acquisition and multilingualism on pronunciation errors was evident, emphasizing the importance of early language exposure and the benefits of being multilingual. Gender did not show a significant effect on pronunciation errors. This research provides valuable insights into L1 and L2 phonology interference, offering practical recommendations for educators and linguists.

3.8. Chapter summary

This chapter provided a comprehensive analysis of the research results, revealing the impact of Jordanian Arabic dialects on the pronunciation of English consonant clusters and the strategies employed by participants to navigate English phonology. The findings offer valuable insights into the linguistic challenges faced by Jordanian Arabic speakers as they aim to master English pronunciation. The subsequent sections delved into the findings in detail, exploring the intricacies of second-language phonology and the interference between native and second languages.

4. DISCUSSION

4.1. Overview

This chapter provides an analysis of the participant's performance and errors in pronouncing English three-consonant clusters in initial and final positions. It examines these errors in light

of factors affecting L1 interference (James, 1980), findings from previous research on L2 pronunciation, and theories of L2 acquisition discussed in Chapter 2.

4.2. The performance of the participants

The study revealed that participants from rural dialect (RD) backgrounds are significantly more affected by L1 interference compared to urban dialect (UD) speakers. RD participants frequently applied their phonological rules to replace unfamiliar English ones, resulting in incorrect pronunciations. In contrast, UD participants displayed fewer errors, suggesting less negative transfer from their L1.

Table 3. The performance of the participants

Dialect	No. of errors in word group (1)	Percentage of errors in word group (1)	No. of errors in word group (2)	Percentage 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%

The overall percentage of errors was higher for initial three-consonant clusters (61.07%) compared to final clusters (34.64%), supporting the hypothesis that initial clusters pose greater difficulties. RD participants made more errors in both positions than UD participants, indicating greater difficulty in mastering English phonological rules.

Several factors contribute to these errors:

- **Phonetic gaps:** RD speakers replace unfamiliar L2 sounds with the closest L1 equivalents.
- **Allophonic differences:** Sounds that exist in L1 only as allophones are not perceived as distinct phonemes, causing errors.
- **Educational system:** English is often treated as a school subject rather than a means of communication, with a limited focus on pronunciation in public schools, especially in rural areas.

The findings suggest that RD participants are more affected by L1 interference due to less exposure to English, differences in educational quality, and delayed age of acquisition (AoA) compared to UD participants.

4.3. Factors affecting L1 interference

4.3.1. Amount and nature of L2 input

Participants' errors were influenced by limited exposure to native spoken English. RD speakers, living in smaller cities and taught by teachers who focus more on written English, had fewer opportunities for spoken practice. According to Krashen's Monitor Theory (1977), adequate and accurate L2 input is crucial for increasing linguistic competence.

4.3.2. Linguistic distance between L1 and L2

Arabic and English belong to different linguistic families (Semitic and Indo-European, respectively), leading to significant phonetic and phonological differences. The greater the linguistic distance, the higher the likelihood of L2 errors due to negative transfer. RD participants, whose dialect does not permit consonant clusters, faced greater challenges compared to UD participants.

4.3.3. Task focus

Participants' emphasis on grammatical forms rather than communicative effectiveness contributed to pronunciation errors. This focus on written English over spoken English led to insufficient practice and reinforcement of proper pronunciation.

4.4. Theories of L2 acquisition

4.4.1. Contrastive Analysis Hypothesis (CAH)

According to CAH, difficulties in L2 pronunciation arise from differences between L1 and L2. RD participants struggled with English initial consonant clusters, which are not permitted in their L1. UD participants, whose dialect allows some consonant clusters, made fewer errors. The study's findings support CAH, showing that RD participants who encountered structures different from their L1 struggled more and often substituted L1 rules, leading to higher error rates.

4.4.2. Error Analysis (EA)

EA considers both interlingual (L1 transfer) and intralingual factors. The study confirmed that errors were due to:

1. **Interlingual factors:** Negative transfer from Arabic.
2. **Intralingual factors:** Differences between Jordanian Arabic dialects.
3. **Extralinguistic factors:** Age of acquisition, limited practice, and instructional quality.

4.4.3. Markedness Theory

The Markedness Differential Hypothesis (MDH) explains that more marked (complex) structures are harder to learn. The study found that initial consonant clusters (more marked) were more difficult for participants than final clusters (less marked), supporting MDH.

Table 4. Markedness Theory

Word group	No. of errors	% of errors
Initial three consonant clusters	171	30.35% (More Marked)
Final three consonant clusters	97	17.32% (Less Marked)

The results confirm that marked structures lead to higher error rates, aligning with MDH predictions.

4.5. Previous studies on English consonant cluster production

This section compares the findings of this study with previous research on English consonant clusters. The data analysis revealed that participants experienced different levels of difficulty pronouncing English consonant clusters in initial and final positions, supporting conclusions from other Arab studies (e.g., Elsaghayer, 2014; Naama, 2011). However, the degree of difficulty varied, with participants from this study finding initial clusters more challenging than final clusters. RD participants committed significantly more errors than UD participants.

Statistical analysis in Chapter 5 showed that RD participants committed an average of 17.78 errors per person, while UD participants averaged 1.357 errors. These differences were statistically significant, with RD participants encountering more difficulties in both initial and final consonant clusters compared to UD participants. These findings contrast with Al-Yami and Al-Athwary (2021), who found Saudi EFL learners struggled more with final clusters.

Participants employed various strategies to pronounce consonant clusters, with vowel insertion being the most common (67%), followed by deletion (12%). This differs from Al-Yami and Al-Athwary (2021), who found prosthesis (initial vowel insertion) to be the most common strategy, and Al-Sammer (2014) and Jayaraman (2010), who reported segmental deletion as the most frequent strategy. Two categories of factors contribute to pronunciation errors:

- **Linguistic factors:** L1 interference, markedness, and the absence of specific L2 sounds in L1.
- **Non-linguistic factors:** Age of acquisition, exposure to English, quality of L2 instruction, and practice opportunities.

The study supports the markedness factor, with participants finding more marked patterns (initial clusters) more difficult than less marked ones (final clusters). This aligns with other studies (e.g., Chen, 2011; Hansen, 2001; Turkestani, 2011). Additionally, L1 influence was significant, with participants struggling more with structures absent in their dialects, consistent with findings from Fatemi et al. (2012), Hago and Khan (2015), and Keshavarz (2017).

4.6. Chapter summary

This chapter analyzed the participants' performance in pronouncing English three-consonant clusters, highlighting the significant impact of L1 interference. RD participants faced greater challenges due to limited exposure, educational quality, and the linguistic distance between their L1 and L2. The findings support the theories of L2 acquisition, particularly CAH, EA, and MDH, providing valuable insights for educators and linguists in developing effective teaching strategies for Arabic speakers learning English.

In summary, the chapter examined factors contributing to pronunciation errors, confirming the predictions of CAH, EA, and MDH. The findings underscore the need for targeted language instruction and improved educational practices to address the challenges faced by Arabic speakers in mastering English pronunciation.

5. CONCLUSION

This chapter concludes the research by highlighting key insights into the challenges of L2 acquisition, particularly for Arab Jordanian learners of English, and offering practical recommendations for improving language teaching and learning.

5.1. Key findings:

5.1.1. Pronunciation challenges

The study found that Arab learners face significant difficulties with English pronunciation, especially with certain consonant clusters. These challenges are not solely due to differences between Arabic and English but also involve various linguistic and extra-linguistic factors, such as the learner's age, education level, and attitudes toward language learning.

5.1.2. Teaching environment

The research pointed out that many English teachers in Jordanian schools speak with a foreign accent, which is often transferred to their students. The teaching methods used are frequently outdated, focusing more on reading and writing than on speaking and listening, which are crucial for developing proper pronunciation.

5.1.3. Classroom dynamics

Jordanian classrooms are typically teacher-centered, limiting students' opportunities to practice spoken English. This environment can create anxiety about making mistakes, which hampers language development and leads to the fossilization of errors.

5.1.4. Sociolinguistic factors

Cultural attitudes toward language learning also play a role. Some learners may resist acquiring a native-like accent in English because they perceive it as a threat to their cultural identity.

5.2. Recommendations:

5.2.1. Teacher training

Pre-service teacher preparation programs should include comprehensive training in phonetics and phonology to help teachers better understand and teach the English sound system. Incorporating courses on Error Analysis (EA) and Contrastive Analysis (CA) can equip teachers with the skills to anticipate and address common pronunciation errors specific to their students' dialects.

5.2.2. Modernizing teaching methods

The study recommends updating teaching methods and materials to be more engaging and effective. Techniques such as using multimedia resources (e.g., movies, and stories with subtitles) can help students improve their listening and speaking skills. Introducing phonetic transcription (IPA) and encouraging self-correction can also enhance pronunciation accuracy.

5.2.3. Classroom practices

Teachers should create a supportive and low-stress classroom environment that encourages students to practice speaking without fear of immediate correction. Errors should be viewed as a natural part of the learning process, with a focus on fostering self-correction and peer correction.

5.2.4. Continuous exposure

Providing students with continuous exposure to native speaker input through accessible media and technology is crucial for improving their pronunciation and overall language proficiency.

5.2.5. Focus on speaking skills

Greater emphasis should be placed on developing speaking skills, both in formative and summative assessments. Speaking tests should be used to motivate students to take pronunciation seriously and to track their progress in acquiring accurate pronunciation.

5.3. Future research

The chapter concludes by suggesting further research into the influence of Arabic dialects on English pronunciation and the role of sociolinguistic and psycholinguistic factors in L2 acquisition. This would provide a more comprehensive understanding of the challenges Arab learners face to employ more effective teaching strategies.

6. REFERENCES

- 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-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.
- 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.
- Elsaghayer, M. A. (2014). Markedness approach to the production of English consonant clusters among the Libyan Arabic speakers of English.
- 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.
- Hago, O., & Khan, W. (2015). The pronunciation problems faced by Saudi EFL learners at secondary schools. *Education and Linguistics Research*, 1(2), 85-99.
- 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.
- James, C. (1980). *Contrastive Analysis - Applied Linguistics and Language Study*. Longman.
- 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.
- 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.
- 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.
- 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.
- Odlin, T. (1989). *Language transfer: cross-linguistic influence in language learning*. Cambridge: Cambridge University Press. PhD dissertation, University of Wisconsin, Madison

- Rass, R. A. (2015). Challenges Face Arab Students in Writing Well-Developed Paragraphs in English. *English Language Teaching*, 8(10), 49-59.
- Turkustani, A. A. M. A. A. (2011). *Analyzing Arabic-English interlanguage coda consonant clusters: Optimality theoretic approach* (Doctoral dissertation, University of Malaya).
- 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.
- 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.